

IBM DB2 10.1
for Linux, UNIX, and Windows

*Database Monitoring Guide and
Reference*

Updated January, 2013



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Note

Before using this information and the product it supports, read the general information under Appendix B, "Notices," on page 1679.

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About this book

The *System Monitor Guide and Reference* describes how to collect different kinds of information about your database and the database manager.

It also explains how you can use the information you collected to understand database activity, improve performance, and determine the cause of problems.

Part 1. Interfaces for database monitoring

There are two ways to monitor operations in your database. You can view information that shows the state of various aspects of the database at a specific point in time. Or, you can set up event monitors to capture historical information as specific types of database events take place.

You can monitor your database operations in real-time using monitoring table functions. For example, you can use a monitoring table function to examine the total amount of space used in a table space. These table functions let you examine *monitor elements* and metrics that report on virtually all aspects of database operations using SQL. The monitoring table functions use the newer, lightweight, high-speed monitoring infrastructure that was introduced in Version 9.7. In addition to the table functions, snapshot monitoring routines are also available. The snapshot monitoring facilities in DB2® use monitoring infrastructure that existed before Version 9.7. Generally speaking, snapshot monitoring facilities are no longer being enhanced in the product; where possible, use the monitoring table functions to retrieve the data you want to see.

Event monitors capture information about database operations over time, as specific types of events occur. For example, you can create an event monitor to capture information about locks and deadlocks as they occur in the system. Or you might create an event monitor to record when a threshold that you specify (for example the total processor time used by an application or workload) is exceeded. Event monitors generate output in different formats; all of them can write event data to regular tables; some event monitors have additional output options.

IBM® InfoSphere® Optim™ Performance Manager provides a Web interface that you can use to isolate and analyze typical database performance problems. You can also view a summary of the health of your databases and drill down. For more details, see Monitoring with Optim Performance Manager at http://publib.boulder.ibm.com/infocenter/idm/docv3/topic/com.ibm.datatools.perfmgmt.monitor.doc/p_monitor.html.

Chapter 1. Database monitoring

The term *database monitoring* refers to the tasks associated with examining the operational status of your database.

Database monitoring is a vital activity for the maintenance of the performance and health of your database management system. To facilitate monitoring, DB2 collects information from the database manager, its databases, and any connected applications. With this information you can perform the following types of tasks, and more:

- Forecast hardware requirements based on database usage patterns.
- Analyze the performance of individual applications or SQL queries.
- Track the usage of indexes and tables.
- Pinpoint the cause of poor system performance.
- Assess the impact of optimization activities (for example, altering database manager configuration parameters, adding indexes, or modifying SQL queries).

Chapter 2. Table functions for monitoring

Starting with DB2 Version 9.7, you can access monitor data through a light-weight alternative to the traditional system monitor. Use monitor table functions to collect and view data for systems, activities, or data objects.

Data for monitored elements are continually accumulated in memory and available for querying. You can choose to receive data for a single object (for example, service class A or table TABLE1) or for all objects.

When using these table functions in a database partitioned environment, you can choose to receive data for a single partition or for all partitions. If you choose to receive data for all partitions, the table functions return one row for each partition. Using SQL, you can sum the values across partitions to obtain the value of a monitor element across partitions.

Monitoring system information using table functions

The system monitoring perspective encompasses the complete volume of work and effort expended by the data server to process application requests. From this perspective, you can determine what the data server is doing as a whole as well as for particular subsets of application requests.

Monitor elements for this perspective, referred to as request monitor elements, cover the entire range of data server operations associated with processing requests.

Request monitor elements are continually accumulated and aggregated in memory so they are immediately available for querying. Request monitor elements are aggregated across requests at various levels of the workload management (WLM) object hierarchy: by unit of work, by workload, by service class. They are also aggregated by connection.

Use the following table functions for accessing current system monitoring information:

- MON_GET_SERVICE_SUBCLASS and MON_GET_SERVICE_SUBCLASS_DETAILS
- MON_GET_WORKLOAD and MON_GET_WORKLOAD_DETAILS
- MON_GET_CONNECTION and MON_GET_CONNECTION_DETAILS
- MON_GET_UNIT_OF_WORK and MON_GET_UNIT_OF_WORK_DETAILS

This set of table functions enables you to drill down or focus on request monitor elements at a particular level of aggregation. Table functions are provided in pairs: one for relational access to commonly used data and the other for XML access to the complete set of available monitor elements.

The system monitoring information is collected by these table functions by default for a new database. You can change default settings using one or both of the following settings:

- The database configuration parameter **mon_req_metrics** specifies the minimum level of collection in all service classes.

- The COLLECT REQUEST METRICS clause of the CREATE/ALTER SERVICE CLASS statement specifies the level of collection for a service superclass. Use this setting to increase the level of collection for a given service class over the minimum level of collection set for all service classes.

The possible values for each setting are the following:

None No request monitor elements are collected

Base All request monitor elements are collected

For example, to collect system monitoring information for only a subset of service classes, do the following:

1. Set the database configuration parameter **mon_req_metrics** to NONE.
2. For each required service class, set the COLLECT REQUEST METRICS clause of the CREATE/ALTER SERVICE CLASS statement to BASE.

Monitoring activities using table functions

The activity monitoring perspective focuses on the subset of data server processing related to executing activities. In the context of SQL statements, the term activity refers to the execution of the section for a SQL statement.

Monitor elements for this perspective, referred to as activity monitor elements, are a subset of the request monitor elements. Activity monitor elements measure aspects of work done for statement section execution. Activity monitoring includes other information such as SQL statement text for the activity.

For activities in progress, activity metrics are accumulated in memory. For activities that are SQL statements, activity metrics are also accumulated in the package cache. In the package cache activity metrics are aggregated over all executions of each SQL statement section.

Use the following table functions to access current data for activities:

MON_GET_ACTIVITY_DETAILS

Returns data about the individual activities in progress when the table function is called. Data is returned in a relational form, however, the detailed metrics are returned in an XML document in the DETAILS column of the results table.

MON_GET_PKG_CACHE_STMT

Returns a point-in-time view of both static and dynamic SQL statements in the database package cache. Data is returned in a relational form.

MON_GET_PKG_CACHE_STMT_DETAILS

Returns detailed metrics for one or more package cache entries. Data is returned in a relational form, however, the detailed metrics are returned in an XML document in the DETAILS column of the results table.

Activity monitoring information is collected by default for a new database. You can change default settings using one or both of the following settings:

- The **mon_act_metrics** database configuration parameter specifies the minimum level of collection in all workloads.
- The COLLECT ACTIVITY METRICS clause of the CREATE/ALTER WORKLOAD statement specifies the level of collection for a given workload over the minimum level of collection set for all workloads.

The possible values for each setting are the following:

None No activity monitor elements are collected

Base All activity monitor elements are collected

For example, to collect activity monitor elements for only selected workloads, do the following:

1. Set the **mon_act_metrics** database configuration parameter to NONE.
2. Set the COLLECT ACTIVITY METRICS clause of the CREATE/ALTER WORKLOAD statement to BASE. By default, the values for other workloads is NONE.

Monitoring data objects using table functions

The data object monitoring perspective provides information about operations performed on data objects, that is tables, indexes, buffer pools, table spaces, and containers.

A different set of monitor elements is available for each object type. Monitor elements for a data object are incremented each time a request involves processing that object. For example, when processing a request that involves reading rows from a particular table, the metric for rows read is incremented for that table.

Use the following table functions to access current details for data objects:

- MON_GET_BUFFERPOOL
- MON_GET_TABLESPACE
- MON_GET_CONTAINER
- MON_GET_TABLE
- MON_GET_INDEX

These table functions return data in a relational form.

You cannot access historical data for data objects.

Data object monitor elements are collected by default for new databases. You can use the **mon_obj_metrics** database configuration parameter to reduce the amount of data collected by the table functions.

The possible values for this configuration parameter are the following:

None No data object monitor elements are collected

Base Some data object monitor elements are collected

Extended

All data object monitor elements are collected

To stop collecting data object monitor elements reported by the following table functions, set the **mon_obj_metrics** configuration parameter to NONE.

- MON_GET_BUFFERPOOL
- MON_GET_TABLESPACE
- MON_GET_CONTAINER

Object usage

When SQL statements are executed, they use various database objects, such as tables and indexes. Knowing which database objects a statement accesses and how the statement affects them can help you identify targets for monitoring or performance tuning.

The following table shows the entities that you can use to explore the relationship between database objects and statements.

Table 1. Ways to identify object usage

Mechanism	Definition	Usage
Usage list	A usage list is a database object that records each DML statement section that references a particular table or index and captures statistics about that section as it executes.	Identify the statements that affected a table or index. If you notice an unusual value for a metric when monitoring a database object, use a usage list to determine whether a particular statement contributed to that metric. You can also view statistics for each statement that affected the object.
Section explain with actuals	A section explain is a set of information about the access plan that the optimizer chose for an SQL statement. You can capture section actuals as part of the explain. Section actuals are runtime statistics that are collected when a section executes.	Identify the tables or indexes that a statement affects. You can view statistics for each table or index and use these statistics to determine how the statement affects each object and where tuning might be required.

You can use the information in a usage list or section explain with actuals as baseline data for performance tuning. Collect information about object usage before tuning statements or database configuration parameters. After tuning, collect the information again to verify that tuning improved performance.

Identifying the statements that affect a table

Use usage lists to identify DML statement sections that affect a particular table when the statement sections execute. You can view statistics for each statement and use these statistics to determine where additional monitoring or tuning might be required.

Before you begin

Do the following tasks:

- Identify a table for which you want to view object usage statistics. You can use the `MON_GET_TABLE` table function to view monitor metrics for one or more tables.
- To issue the required statements, ensure that the privileges that are held by the authorization ID of each statement include DBADM authority or SQLADM authority.
- Ensure that you have EXECUTE privilege on the `MON_GET_TABLE_USAGE_LIST` and `MON_GET_USAGE_LIST_STATUS` table functions.

About this task

When you view the output of the `MON_GET_TABLE` table function, you might see an unusual value for a monitor element. You can use usage lists to determine whether any DML statements contributed to this value.

Usage lists contain statistics about factors like locks and buffer pool usage for each statement that affected a table during a particular time frame. If you determine that a statement affected a table negatively, use these statistics to determine where further monitoring might be required or how the statement can be tuned.

Procedure

To identify the statements that affect a table:

1. Set the `mon_obj_metrics` configuration parameter to `EXTENDED` by issuing the following command:

```
DB2 UPDATE DATABASE CONFIGURATION USING MON_OBJ_METRICS EXTENDED
```

Setting this configuration parameter to `EXTENDED` ensures that statistics are collected for each entry in the usage list.

2. Create a usage list for the table by using the `CREATE USAGE LIST` statement. For example, to create the `INVENTORYUL` usage list for the `SALES.INVENTORY` table, issue the following command:

```
CREATE USAGE LIST INVENTORYUL FOR TABLE SALES.INVENTORY
```

3. Activate the collection of object usage statistics by using the `SET USAGE LIST STATE` statement. For example, to activate collection for the `INVENTORYUL` usage list, issue the following command:

```
SET USAGE LIST INVENTORYUL STATE = ACTIVE
```

4. During the collection of object statistics, ensure that the usage list is active and that sufficient memory is allocated for the usage list by using the `MON_GET_USAGE_LIST_STATUS` table function. For example, to check the status of the `INVENTORYUL` usage list, issue the following command:

```
SELECT MEMBER,  
       STATE,  
       LIST_SIZE,  
       USED_ENTRIES,  
       WRAPPED  
FROM TABLE(MON_GET_USAGE_LIST_STATUS('SALES', 'INVENTORYUL', -2))
```

5. When the time period for which you want to collect object usage statistics is elapsed, deactivate the collection of usage list data by using the `SET USAGE LIST STATE` statement. For example, to deactivate collection for the `INVENTORYUL` usage list, issue the following command:

```
SET USAGE LIST SALES.INVENTORYUL STATE = INACTIVE
```

6. View the information that you collected by using the `MON_GET_TABLE_USAGE_LIST` function. You can view statistics for a subset or for all of the statements that affected the table during the time period for which you collected statistics. For example, to see only the 10 statements that read the most rows of the table, issue the following command:

```
SELECT MEMBER,  
       EXECUTABLE_ID,  
       NUM_REFERENCES,  
       NUM_REF_WITH_METRICS,  
       ROWS_READ,  
       ROWS_INSERTED,  
       ROWS_UPDATED,
```

```

        ROWS_DELETED
FROM TABLE(MON_GET_TABLE_USAGE_LIST('SALES', 'INVENTORYUL', -2))
ORDER BY ROWS_READ DESC
FETCH FIRST 10 ROWS ONLY

```

7. If you want to view the text of a statement that affected the table, use the value of the **executable_id** element in the MON_GET_TABLE_USAGE_LIST output as input for the MON_GET_PKG_CACHE_STMT table function. For example, issue the following command to view the text of a particular statement:

```

SELECT STMT_TEXT
FROM TABLE
(MON_GET_PKG_CACHE_STMT(NULL,
x'0100000000000000007C00000000000000000000020020081126171720728997',
NULL, -2))

```

8. Use the list of statements and the statistics that are provided for the statements to determine where additional monitoring or tuning, if any, is required. For example, a statement that has a low value for the **pool_writes** monitor element compared to the **direct_writes** monitor element value might have buffer pool issues that require attention.

What to do next

When you do not require the information in the usage list, free the memory that is associated with the usage list by using the SET USAGE LIST STATE statement. For example, to free the memory that is associated with the INVENTORYUL usage list, issue the following command:

```
SET USAGE LIST SALES.INVENTORYUL STATE = RELEASED
```

Identifying how a statement affects database objects

Use a section explain that includes section actuals information to identify how a statement affects database objects. You can use statistics about how the statement section affected each table or index to determine whether additional monitoring or tuning is required.

Before you begin

Do the following tasks:

- Identify a statement for which you want to view object usage statistics.
- Ensure that you migrated your explain tables to DB2 Version 10.1.
- Ensure that automatic statistics profile generation is not enabled.
- Ensure that you have the privileges that are required to call the EXPLAIN_FROM_ACTIVITY procedure.

About this task

After you identify a statement for which you want to view object usage statistics, you can get a section explain that includes section actuals information. Section actuals information indicates how the statement affected each table or index that the statement used when it executed.

Actuals information includes runtime statistics about factors like locks and buffer pool usage for each table or index. You can compare these statistics to baseline data and use them to determine where additional monitoring or tuning might be required.

Procedure

To determine how database objects are affected by a statement:

1. Enable the collection of section actuals at the database level by issuing the following command:

```
DB2 UPDATE DATABASE CONFIGURATION USING SECTION_ACTUALS BASE
```

2. Create a workload to collect section actuals information for activities that are submitted by the application that issues the statement. For example, to create the ACTWORKLOAD workload for activities that are submitted by the TEST application and enable collection for those activities, issue the following command:

```
CREATE WORKLOAD ACTWORKLOAD APPLNAME ('TEST')  
COLLECT ACTIVITY DATA ON ALL WITH DETAILS,SECTION INCLUDE ACTUALS BASE
```

Enabling collection of section actuals can also be accomplished in the following ways:

- The CREATE SERVICE CLASS or ALTER SERVICE CLASS statement
 - The CREATE WORK ACTION SET or ALTER WORK ACTION SET statement
 - The WLM_SET_CONN_ENV procedure
 - The **section_actuals** configuration parameter
3. Create an activity event monitor by using the CREATE EVENT MONITOR statement. For example, to create the ACTEVMON activity event monitor, issue the following command:

```
CREATE EVENT MONITOR ACTEVMON  
FOR ACTIVITIES  
WRITE TO TABLE  
CONTROL (TABLE CONTROL_ACTEVMON ),  
ACTIVITY (TABLE ACTIVITY_ACTEVMON ),  
ACTIVITYSTMT (TABLE ACTIVITYSTMT_ACTEVMON ),  
ACTIVITYVALS (TABLE ACTIVITYVALS_ACTEVMON ),  
ACTIVITYMETRICS (TABLE ACTIVITYMETRICS_ACTEVMON )
```

4. Activate the activity event monitor that you created by using the SET EVENT MONITOR STATE statement. For example, to activate the ACTEVMON activity event monitor, issue the following command:

```
SET EVENT MONITOR ACTEVMON STATE 1
```

5. Run the application that issues the statement for which you want to view object statistics.
6. Find identifier information for the statement section by using the following command to query the activity event monitor tables:

```
SELECT APPL_ID,  
       UOW_ID,  
       ACTIVITY_ID,  
       STMT_TEXT  
FROM ACTIVITYSTMT_ACTEVMON
```

7. Obtain a section explain with actuals by using the activity identifier information as input for the EXPLAIN_FROM_ACTIVITY procedure. For example, to obtain a section explain for a section with an application ID of *N2.DB2INST1.0B5A12222841, a unit of work ID of 16, and an activity ID of 4, issue the following command:

```
CALL EXPLAIN_FROM_ACTIVITY( '*N2.DB2INST1.0B5A12222841', 16, 4, 'ACTEVMON',  
                           'MYSHEMA', '?', '?', '?', '?', '?' )
```

You get output that looks like the following sample output:

```
Value of output parameters
-----
Parameter Name : EXPLAIN_SCHEMA
Parameter Value : MYSCHEMA

Parameter Name : EXPLAIN_REQUESTER
Parameter Value : GSDBUSER3

Parameter Name : EXPLAIN_TIME
Parameter Value : 2010-11-23-10.51.09.631945

Parameter Name : SOURCE_NAME
Parameter Value : SQLC2J21

Parameter Name : SOURCE_SCHEMA
Parameter Value : NULLID

Parameter Name : SOURCE_VERSION
Parameter Value :

Return Status = 0
```

8. Format the explain data by using the **db2exfmt** command. Use the values of the **explain_requester**, **explain_time**, **source_name**, **source_schema**, and **source_version** parameters in the output from the EXPLAIN_FROM_ACTIVITY procedure as input for the command.
9. View the explain output to determine how the section affected the database objects that it used when it executed. Statistics in the output might indicate that additional monitoring or tuning is required. For example, if a table that the section uses has a high value for the **lock_wait** monitor element, lock management might be required.
10. If you tune the statement, repeat steps 5 on page 11 through 9 to verify that performance is improved.

What to do next

Deactivate the activity event monitor by using the SET EVENT MONITOR STATE statement. For example, to deactivate the ACTEVMON activity event monitor, issue the following command:

```
SET EVENT MONITOR ACTEVMON STATE 0
```

Monitoring locking using table functions

You can retrieve information about locks using table functions. Unlike request, activity or data object monitor elements, information about locks is always available from the database manager. You do not need to enable the collection of this information.

Use the following monitor table functions to access current information for locks in the system:

- MON_GET_LOCKS
- MON_GET_APPL_LOCKWAIT

Both table functions return data in relational form.

Monitoring system memory using table functions

You can retrieve information about system memory usage using table functions.

You can examine memory usage at the level of memory sets, which are allocations of memory from the operating system. You can also examine memory usage by specific memory pools within a given memory set. Use the following monitor functions to access current information about memory usage:

- MON_GET_MEMORY_SET
- MON_GET_MEMORY_POOL

Monitoring routines using table functions

You can use table functions to retrieve information about routines.

Table functions can be used to monitor routines and provide the following information:

- Aggregated metrics that report the total cost of the routine. Metrics are aggregated across all invocations of the routine and include metrics for all child statements and requests that are executed by the routine.
- Lists of statements that are executed by routines that assist you in drilling down and problem determination
- Lists of routines that might be invoked by a statement that aid you in performing additional drill downs on routine-related details.

Use the following monitor functions to access information about routines:

- MON_GET_ROUTINE
- MON_GET_ROUTINE_DETAILS
- MON_GET_ROUTINE_EXEC_LIST
- MON_GET_SECTION_ROUTINE

Example: Identifying the most expensive routines by CPU consumption

You can use routine monitoring to identify your most expensive routines.

Scenario

In this example, a database administrator (DBA) wants to identify the database routines that are consuming the most total CPU. The DBA issues the following query which displays all routines that have executed since database activation time:

```
SELECT ROUTINESHEMA, ROUTINEMODULENAME, ROUTINENAME,
       SPECIFICNAME, SUM(TOTAL_CPU_TIME) AS TOTAL_CPU
FROM TABLE(MON_GET_ROUTINE(NULL,NULL,NULL,NULL,-2)) AS T
GROUP BY ROUTINESHEMA, ROUTINEMODULENAME, ROUTINENAME, SPECIFICNAME
ORDER BY TOTAL_CPU DESC
```

The result is ordered by total routine CPU consumption.

ROUTINESHEMA	ROUTINEMODULENAME	ROUTINENAME	SPECIFICNAME	TOTAL_CPU
SYSIBMINTERNAL	-	COMPILED_ANON_BLOCK_INVOKE	SQL120801135416210	8942414
DRICARD	-	PROC1	PROC1	23444
SYSIBMSUBROUTINE	-	PROC1_66613_101877843	-	4213
DRICARD	-	MYPROC	SQL120801135351900	1838
DRICARD	-	TRIG1	SQL120801135519200	467

5 record(s) selected.

MON_RTN_EXECLIST database configuration parameter. The DBA issues the following query to sum the CPU usage for each statement that is executed by the routine across all members:

```

WITH TOTAL_STMT_CPU (EXEC_ID, TOTAL_CPU, NUM_ROUTINES, MIN_MEMBER) AS
  (SELECT
    EXECUTABLE_ID,
    SUM(TOTAL_CPU_TIME),
    MAX(NUM_ROUTINES),
    MIN(MEMBER)
  FROM
    TABLE(MON_GET_ROUTINE_EXEC_LIST('P', 'TEST', NULL, 'PROC1', -2)) AS T
  GROUP BY
    EXECUTABLE_ID
),
TOTAL_RTN_CPU (TOTAL_RTN_CPU) AS
  (SELECT
    SUM(TOTAL_CPU_TIME)
  FROM
    TABLE(MON_GET_ROUTINE('P', 'TEST', NULL, 'PROC1', -2)) AS R
  )
SELECT
  B.EXEC_ID,
  100*B.TOTAL_CPU / A.TOTAL_RTN_CPU AS PERCENT_CPU,
  B.NUM_ROUTINES,
  C.STMT_TEXT
FROM
  TOTAL_RTN_CPU AS A,
  TOTAL_STMT_CPU AS B,
  TABLE(MON_GET_PKG_CACHE_STMT(NULL, NULL, NULL, -2)) AS C
WHERE
  B.EXEC_ID = C.EXECUTABLE_ID AND
  B.MIN_MEMBER = C.MEMBER AND
  A.TOTAL_RTN_CPU <> 0
ORDER BY
  TOTAL_CPU DESC

```

The result lists the statements executed by the stored procedure ranked by percentage CPU consumption relative to the total CPU used by the routine.

EXEC_ID	PERCENT_CPU	NUM_ROUTINES	STMT_TEXT
x'010000000000000056010000000000002000000010020120801142628005514'	10	0	WITH GET_UPDATE_LIST (COL1, COL2STATS) AS AF
x'010000000000000056010000000000002000000010020120801142628005514'	1	0	insert into T1 values(3,'d','d','d')
x'010000000000000056010000000000001000000010020120801142628005514'	0	1	call SYSIBMSUBROUTINE.P1_66613_1157394573()

3 record(s) selected.

The CPU usage reported for each statement by the MON_GET_ROUTINE_EXEC_LIST table function does not include CPU consumed by any child statements. The report that is generated by MON_GET_ROUTINE_EXEC_LIST shows only the percentage of CPU consumed by statements invoked directly by the routine. The DBA can continue the investigation in the following ways:

- If a direct child statement is using most of the CPU, the MON_GET_ROUTINE_EXEC_LIST report identifies that candidate and the DBA can investigate that statement. For example, drilling down on the statement that has high CPU usage using the MON_GET_PKG_CACHE_STMT table function to list the full set of metrics for all executions of the statement:

```

SELECT * FROM TABLE(MON_GET_PKG_CACHE_STMT
  (NULL, '<high_cpu_consuming_exec_id>', NULL, -2)) AS T

```

- If the output shows that none of the statements that are executed directly by the routine are using a high amount of CPU, the DBA can examine the **num_routines** monitor element that is listed for each executed statement.

- If **num_routines** is 0 (zero) for each executed statement, then the high CPU consumption is due to processing in the routine itself.
- If **num_routines** is not zero, then the DBA can use the `MON_GET_SECTION_ROUTINE` table function to determine the routines that the statement invoked and investigate if those statements might be contributing to the overall CPU consumption of `TEST.PROC1`. For example:

```
SELECT
  ROUTINESCHEMA, ROUTINEMODULENAME, ROUTINENAME, SPECIFICNAME
FROM TABLE(MON_GET_SECTION_ROUTINE('<exec_id>')) AS T
```

The returned result is:

ROUTINESCHEMA	ROUTINEMODULENAME	ROUTINENAME	SPECIFICNAME
DRICARD	-	PROC1	PROC1
SYSIBMSUBROUTINE	-	PROC1_66613_101877843	-

2 record(s) selected

The DBA can investigate these routines for high CPU consumption, but must keep in mind that the routines might have been called from different contexts other than `TEST.PROC1`. This means that the metrics returned from `MON_GET_SECTION_ROUTINE` for these routines might be larger than the metrics for `TEST.PROC1`.

Example: Listing aggregate routine metrics for an anonymous block

You can use routine monitoring to list the aggregate metrics for statements that are executed by an anonymous block.

Scenario

In this example, a database administrator (DBA) wants to view the aggregate metrics for all statements that are executed by an anonymous block with the statement text `'BEGIN ... END'`. The DBA issues the following query to find the **executable_id** for the anonymous block in the package cache:

```
SELECT EXECUTABLE_ID
FROM TABLE(MON_GET_PKG_CACHE_STMT(NULL, NULL, NULL, -1)) AS T
WHERE STMT_TEXT = 'BEGIN BLAH BLAH END'
```

The returned result is:

EXECUTABLE_ID
x'010000000000000007A0000000000000000000000000000000020020120801153841789993'

1 record(s) selected.

Using the returned **executable_id**, the DBA issues the following query to find the aggregate metrics for the anonymous block:

```
SELECT * FROM TABLE(MON_GET_ROUTINE('A', NULL, NULL, NULL, -2)) AS T
WHERE DYN_COMPOUND_EXEC_ID = x'010000000000000007A0000000000000000000000000000000020020120801153841789993'
```

The returned result is:

ROUTINETYPE	ROUTINESCHEMA	ROUTINEMODULENAME	ROUTINENAME	SPECIFICNAME	DYN_COMPOUND_EXEC_ID
C	SYSIBMINTERNAL	-	COMPILED_ANON_BLOCK_INVOKE	SQL120801153841490	x'010000000000000007A00000

1 record(s) selected.

Alternatively, the DBA can look up the internal procedure and schema name corresponding to the anonymous block by using the MON_GET_SECTION_ROUTINE table function and then pass those values as inputs to the MON_GET_ROUTINE table function. This method would return only information for the anonymous block and so avoids filtering the output with a WHERE clause.

Example: Retrieving statement text for a routine

You can use routine monitoring to retrieve the statements that are executed by a routine.

Scenario

In this example, a database administrator (DBA) is manually investigating costly statements executed by a routine. As part of the investigation it can be useful to link a row in MON_GET_ROUTINE_EXEC_LIST to a specific statement or line of the routine. Getting statement text for short lived routines like anonymous blocks, dynamic SQL statements, or external routines is accomplished by retrieving the statement from the package cache. The following query links a row in MON_GET_ROUTINE_EXEC_LIST to a specific statement:

```
SELECT
  A.ROUTINETYPE, A.ROUTINESHEMA, A.ROUTINENAME,
  A.SECTION_TYPE, A.SECTION_NUMBER, A.STMTNO,
  SUBSTR(B.STMT_TEXT,1,160)
FROM
  TABLE(MON_GET_ROUTINE_EXEC_LIST('P','DRICARD',NULL,'PROC1',-1)) AS A,
  TABLE(MON_GET_PKG_CACHE_STMT(NULL,NULL,NULL,-1)) AS B
WHERE
  A.EXECUTABLE_ID=B.EXECUTABLE_ID
```

The returned result is as follows:

```
STMT_TEXT
-----
WITH GET_UPDATE_LIST (COL1, COL2STATS) AS AF
insert into T1 values(3,'d','d','d')
call SYSIBMSUBROUTINE.P1_66613_1157394573()
```

3 record(s) selected.

Note: If a dynamic SQL statement or external routine statement is returned by MON_GET_ROUTINE_EXEC_LIST and the associated **executable_id** is no longer in the package cache, that statement text cannot be recovered unless an event monitor was used to log this information. The refresh cycle for InfoSphere Optim Performance Manager product allows it to retrieve this information in most cases.

For compiled SQL statements and inlined routines, the statement text can be found by using the package and statement information that is returned by MON_GET_ROUTINE_EXEC_LIST. For example:

```
SELECT RS.ROUTINETYPE, RS.ROUTINESHEMA, RS.ROUTINENAME,
  RS.SECTION_NUMBER, RS.STMTNO, SUBSTR(SS.TEXT,1,160)
FROM
  TABLE(MON_GET_ROUTINE_EXEC_LIST('F','DRICARD','','MYFUNC',-1)) AS RS,
  SYSIBM.SYSSTMT SS
WHERE
```

```
RS.SECTION_TYPE = 'S'  
AND SS.PLNAME = RS.PACKAGE_SCHEMA  
AND SS.PLCREATOR = RS.PACKAGE_NAME  
AND SS.STMTNO = RS.STMTNO  
AND SS.SECTNO = RS.SECTION_NUMBER
```

The returned result is as follows:

```
STMT_TEXT  
-----  
insert into MYTABLE values('1')  
  
1 record(s) selected.
```

Other monitoring table functions

Besides table functions that return information about the system, activities, locks, or data objects there are also table functions that return various types of miscellaneous information. These functions include ones that return information related to the fast communications manager (FCM), and about the status of table space extent movement.

Each of the table functions that follow can be used at any time. Unlike the table functions that return request metrics (the system monitoring perspective), activity metrics (the activity monitoring perspective) or metrics related to data objects (the data object monitoring perspective), it is not necessary to first enable the collection of the monitor elements returned by these functions.

- MON_GET_FCM
- MON_GET_FCM_CONNECTION_LIST
- MON_GET_EXTENT_MOVEMENT_STATUS

Interfaces that return monitor data in XML documents

Starting in DB2 Version 9.7, some monitor data is reported as elements in XML documents.

Using XML to report monitor information provides improved extensibility and flexibility. New monitor elements can be added without having to add new columns to an output table. Also, XML documents can be processed in a number of ways, depending on your needs. For example:

- You can use XQuery to run queries against the XML document.
- You can use the XSLTRANSFORM scalar function to transform the document into other formats.
- You can view their contents as formatted text by using built-in MON_FORMAT_XML_* formatting functions, or the XMLTABLE table function.

XML documents that contain monitor elements are produced by several monitoring interfaces. The sections that follow describe how results are returned as XML documents.

- “Monitor table functions with names that end with _DETAILS”
- “XML data returned by event monitors” on page 20.

Monitor table functions with names that end with “_DETAILS”

Examples of these table functions include:

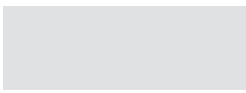
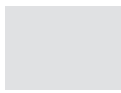

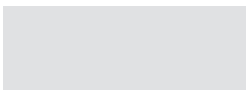
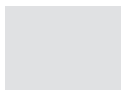

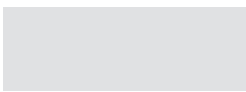
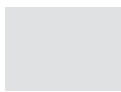

- MON_GET_PKG_CACHE_STMT_DETAILS

- MON_GET_WORKLOAD_DETAILS
- MON_GET_CONNECTION_DETAILS
- MON_GET_SERVICE_SUBCLASS_DETAILS
- MON_GET_ACTIVITY_DETAILS
- MON_GET_UNIT_OF_WORK_DETAILS


These table functions return monitor elements from the system and the activity monitoring perspectives. Most of the monitor elements returned by these functions are contained in an XML document. For example, the MON_GET_CONNECTION_DETAILS table function returns the following columns:

- APPLICATION_HANDLE
- MEMBER
- DETAILS

The DETAILS column of each row contains an XML document that contains monitor element data. This XML document is composed of several document elements that correspond to monitor elements. Figure 1 on page 20 illustrates the DETAILS column that contains the XML documents. In addition, it shows monitor elements returned in the XML documents in the DETAILS column.

APPLICATION_HANDLE	MEMBER	DETAILS
		
		
		1 

Legend

 Other content

1

```
<?xml version="1.0" encoding="windows-1252" ?>
- <db2_connection xmlns="http://www.ibm.com/xmlns/prod/db2/mon" release="907nnnn">
  <application_handle>52</application_handle>
  <member>0</member>
- <system_metrics release="9070100">
  <wlm_queue_time_total>0</wlm_queue_time_total>
  <wlm_queue_assignments_total>0</wlm_queue_assignments_total>
  <fcm_tq_recv_wait_time>0</fcm_tq_recv_wait_time>
  <fcm_message_recv_wait_time>0</fcm_message_recv_wait_time>
  <fcm_tq_send_wait_time>0</fcm_tq_send_wait_time>
  <fcm_message_send_wait_time>0</fcm_message_send_wait_time>
  <agent_wait_time>0</agent_wait_time>
  ⋮
```

Figure 1. Table returned by `MON_GET_CONNECTION_DETAILS`, showing the `DETAILS` column that contains XML documents. The contents of the XML document in the third row (**1**) are shown following the table.

In the preceding example, the `<agent_wait_time>` XML document element corresponds to **agent_wait_time** monitor element.

The schema for the XML document that is returned in the `DETAILS` column is available in the file `sqlllib/misc/DB2MonRoutines.xsd`. Further details can be found in the file `sqlllib/misc/DB2MonCommon.xsd`.

Some of the monitor elements contained in the document in the `DETAILS` column might be grouped into higher-level document elements. For example, monitor elements that report on activity-related metrics are part of the **activity_metrics** element. Similarly, system-level metrics are part of the **system_metrics** element.

XML data returned by event monitors

Several event monitors return data in XML format. They are summarized in Table 2 on page 21. Details about the XML documents returned by the various event monitor are described in the sections that follow.

Table 2. XML documents returned by various event monitors

Event monitor	Event monitor output format	XML document returned (Note: In these topics, when <code>details_xml</code> appears in lower-case letters, it refers to the XML document <code>details_xml</code> . <code>DETAILS_XML</code> , in upper-letters, refers to a column in a relational table called <code>DETAILS_XML</code> that contains the <code>details_xml</code> documents.)
"Statistics event monitor"	Relational table File Named pipe	<p>metrics The metrics reported in this document reflect the change in value for each metric since the last time statistics were collected.</p> <p>details_xml The metrics reported in this document accumulate until the database is deactivated.</p>
"Activity event monitor" on page 23	Relational table File Named pipe	details_xml
"Package cache event monitor" on page 23	Unformatted event (UE) table	<p>metrics</p> <p>This document can be viewed only after the UE table is transformed to either XML or relational tables.</p>
"Unit of work event monitor" on page 23	Unformatted event (UE) table	<p>metrics</p> <p>This document can be viewed only after the UE table is transformed to either XML or relational tables.</p>

Statistics event monitor

The statistics event monitor records metrics in XML format when either of the two following logical data groups are included in the event monitor output:

- EVENT_SCSTATS
- EVENT_WLSTATS

When you create a statistics event monitor to report on monitor elements in either of these groups, some system metrics are collected as part of two XML documents. One for each of the `details_xml` and `metrics` monitor elements. Both XML documents contain the same set of monitor elements. In the `metrics` document, the values of the elements reflect the change in value for each element since the last time statistics were collected. The values of the elements contained in `details_xml` are not reset at each interval; they are reset only when the database is reactivated. If the data is written to a file or named pipe, these elements are part of the self-describing data stream. If the event monitor data is written to a table, the `metrics` document is stored in a column called `METRICS`; `details_xml` is stored in a column called `DETAILS_XML`. Figure 2 on page 22 shows the XML documents in the `METRICS` and `DETAILS_XML` columns as they appear in the `SCSTATS` table produced by the statistics event monitor:

...	CONCURRENT_WLO_ACT_TOP	...	DETAILS_XML	LAST_WLM_RESET	...	METRICS	PARTITION_NUMBER	...
			1			1		

Legend
 Other content

Figure 2. Output of statistics event monitor (when written to a table), showing the *DETAILS_XML* and *METRICS* columns.. The contents of the XML document in the third row (**1**) are shown following the table.

Each of the documents contained in these columns contains **system_metrics** as the top-level element, which, in turn, contains a number of monitor elements that report on system-related metrics.

```

1 <?xml version="1.0" encoding="windows-1252" ?>
- <db2_connection xmlns="http://www.ibm.com/xmlns/prod/db2/mon" release="907nnnn">
  <application_handle>52</application_handle>
  <member>0</member>
- <system_metrics release="9070100">
  <wlm_queue_time_total>0</wlm_queue_time_total>
  <wlm_queue_assignments_total>0</wlm_queue_assignments_total>
  <fcm_tq_rcv_wait_time>0</fcm_tq_rcv_wait_time>
  <fcm_message_rcv_wait_time>0</fcm_message_rcv_wait_time>
  <fcm_tq_send_wait_time>0</fcm_tq_send_wait_time>
  <fcm_message_send_wait_time>0</fcm_message_send_wait_time>
  <agent_wait_time>0</agent_wait_time>
  :
  :
  :

```

In addition to viewing system metrics from the XML document in the **metrics** monitor element, you can view the individual metrics directly from the output associated with the *EVENT_SCMETRICS* and *EVENT_WLMETRICS* logical data groups.

Notes:

- The **system_metrics** element that is reported in the *details_xml* document contained in the *DETAILS_XML* column produced by the statistics event monitor is also a part of the XML document contained in the *DETAILS* column returned by the *MON_GET_SERVICE_SUBCLASS_DETAILS* and *MON_GET_WORKLOAD_DETAILS* table functions. Like the metrics reported in the *details_xml* document, the values for the metrics reported in the document contained in the *DETAILS* column accumulate until the database is deactivated.
- See “Information written to XML for *system_metrics* and *activity_metrics* monitor elements” on page 322 for the schema for the XML output from a statistics event monitor.

Activity event monitor

When you create an activity event monitor to report on monitor elements in the event_activity logical data group (see “event_activity logical data group” on page 49), one of the columns produced is DETAILS_XML. If the event monitor is written to a table, DETAILS_XML is a column. If it is written to a file or named pipe, DETAILS_XML is part of the self-describing data stream. Either way, the document contains the **activity_metrics** monitor element, which, in turn, contains a number of monitor elements that report on metrics related to activities. See “Information written to XML for system_metrics and activity_metrics monitor elements” on page 322 for the schema for the XML output from an activity event monitor.

Note: activity_metrics as reported in the XML document in the DETAILS_XML column produced by the activity event monitor is also a part of the XML document contained in the DETAILS column returned by the MON_GET_ACTIVITY_DETAILS table function.

Package cache event monitor

The package cache event monitor writes its output to an unformatted event (UE) table. If you convert the data in this table with the EVMON_FORMAT_UE_TO_TABLES table function, one of the tables produced is PKGCACHE_EVENT. This table contains a METRICS column. In each row, this column contains an XML document with elements associated with package cache event monitor elements.

Note: Starting in DB2 Version 9.7 Fix Pack 1, EVMON_FORMAT_UE_TO_TABLES also creates a separate table for the metrics collected by this event monitor called PKGCACHE_METRICS. This table contains the same information reported in the METRICS column of the PKGCACHE_EVENT table. So, you can retrieve metrics from the columns of the PKGCACHE_METRICS table, or you can use the XML document contained in the METRICS column of the PKGCACHE_EVENT table. See “Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a package cache event monitor” on page 247 for details.

The EVMON_FORMAT_UE_TO_XML function also produces an XML document with elements associated with package cache event monitor elements. For example, the XML document element <num_executions> corresponds to the **num_executions** monitor element. See “Information written to XML for a package cache event monitor” on page 256 for the schema for the XML output from a package cache event monitor.

Unit of work event monitor

The unit of work event monitor writes its output to an unformatted event (UE) table. If you convert the data in this table with the EVMON_FORMAT_UE_TO_TABLES table function, one of the tables produced is UOW_EVENT. This table contains a METRICS column, which contains an XML document with elements associated with unit of work event monitor elements.

Note: Starting in DB2 Version 9.7 Fix Pack 1, EVMON_FORMAT_UE_TO_TABLES also creates a separate table for the metrics collected by this event monitor called UOW_METRICS. This table contains the same information reported in the METRICS column of the UOW_EVENT table. So, you can retrieve metrics from the columns of the UOW_METRICS table, or you can use the XML document

contained in the METRICS column of the UOW_EVENT table. See “Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a unit of work event monitor” on page 198 for details.

The EVMON_FORMAT_UE_TO_XML function also produces an XML document with elements associated with unit of work event monitor elements. For example, the XML document element <workload_name> corresponds to the **workload_name** monitor element. See “Information written to XML by EVMON_FORMAT_UE_TO_XML for a unit of work event monitor” on page 210 for the schema for the XML output from a unit of work event monitor.

Interfaces for viewing XML monitor information as formatted text

You can view the data contained in the XML documents produced by monitor interfaces in several ways, depending on how you want to view or use the data.

You can use XQuery to query and manipulate the XML documents returned by monitoring interfaces. You can also use table functions to format the XML documents for easier reading.

XQuery provides a powerful and flexible interface for querying and manipulating XML data. However, there are times where you might want to view element data in a text-based format. Depending on your needs, you can view monitor elements contained in an XML document in column- or row-oriented format. The former is useful if you know which monitor elements you want to see. The latter is useful if you do not know ahead of time which monitor elements you want to examine, such as when you want to see the top five types of wait times. The sections that follow describe two ways that you can view monitor data contained in XML documents as formatted text.

- “Viewing monitor elements in column-oriented format”
- “Viewing monitor elements in row-oriented format” on page 25

Viewing monitor elements in column-oriented format

The XMLTABLE table function takes an XML document as input and converts it into a relational table such that each of the selected XML document elements appears as a column. This approach is useful if you know which monitor elements you want to display. For example, assume that you have created a statistics event monitor called DBSTATS to collect information from the event_scstats logical data group. (See “event_scstats logical data group” on page 76 for more information about the monitor elements associated with this logical data group.) The monitor elements in this logical group include **details_xml**, which is actually an XML document that itself contains the metrics that comprise the **system_metrics** monitor element. (See “system_metrics” on page 322 for more information about the monitor elements associated with the system_metrics monitor element.) To view specific **system_metrics** monitor elements contained in details_xml, such as rows_returned, total_section_time, or total_cpu_time, you can use the XMLTABLE table function to format selected monitor elements from the details_xml documents returned by the statistics event monitor. The example that follows illustrates this. (For presentation purposes, the SQL returns results only for a specific service

1. Note: In these topics, when details_xml appears in lower-case letters, it refers to the XML document details_xml. DETAILS_XML, in upper-letters, refers to a column in a relational table called DETAILS_XML that contains the details_xml documents.

class.)

```
SELECT partition_number,
       service_class_id,
       statistics_timestamp,
       event.rows_returned,
       event.total_section_time,
       event.total_cpu_time
FROM   SCMETRICS_DBSTATS as DBSTATS,
XMLTABLE( XMLNAMESPACES( DEFAULT 'http://www.ibm.com/xmlns/prod/db2/mon' ),
          '$metrics/system_metrics' PASSING XMLPARSE( DOCUMENT DBSTATS.METRICS ) as "metrics"
          COLUMNS
            rows_returned          BIGINT          PATH 'rows_returned',
            total_section_time     BIGINT          PATH 'total_section_time',
            total_cpu_time         BIGINT          PATH 'total_cpu_time'
          ) AS EVENT
WHERE  service_class_id = 12;
```

The following output shows the results for this query:

PARTITION_NUMBER	SERVICE_CLASS_ID	STATISTICS_TIMESTAMP	ROWS_RETURNED	TOTAL_SECTION_TIME	TOTAL_CPU_TIME
0	12	2010-01-05-12.14.37.001717	402	990	1531250
0	12	2010-01-05-12.15.00.035409	402	990	1531250
0	12	2010-01-05-12.20.00.021884	412	1064	1609375
0	12	2010-01-05-12.25.00.039175	422	1075	1687500
0	12	2010-01-05-12.29.59.950137	432	1104	1765625
0	12	2010-01-05-12.34.59.948979	442	1130	1796875
0	12	2010-01-05-12.39.59.903928	452	1149	1890625
0	12	2010-01-05-12.44.59.953596	462	1178	1953125
0	12	2010-01-05-12.49.59.970059	473	1207	2062500
0	12	2010-01-05-12.54.59.971990	483	1230	2109375

10 record(s) selected.

In this case, the first three columns are displayed directly from the table SCSTATS_DBSTATS table produced by the statistics event monitor. The last three columns are metrics monitor elements extracted from the XML document in the DETAILS_XML column of the table.

For more information about using XMLTABLE, refer to the documentation for that function. You can also see examples of using XMLTABLE to view monitor elements in the documentation for the various MON_GET_*_DETAILS functions.

Viewing monitor elements in row-oriented format

The table functions with names of the form MON_FORMAT_XML_*_BY_ROW introduced in DB2 Version 9.7 Fix Pack 1 provide a quick way to display the metrics monitor elements contained in an XML document. They report metrics in a row-based format, with each monitor element appearing in a row by itself. The following functions are included in this group:

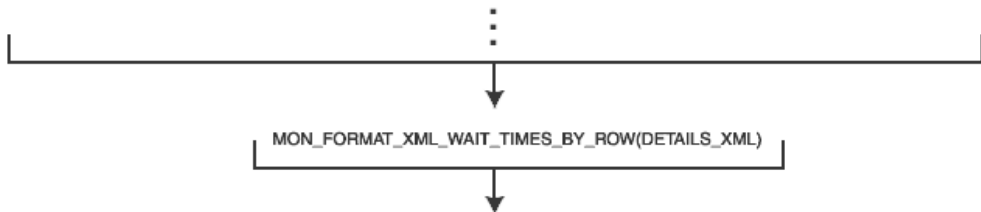
- MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW
- MON_FORMAT_XML_TIMES_BY_ROW
- MON_FORMAT_XML_WAIT_TIMES_BY_ROW
- MON_FORMAT_XML_METRICS_BY_ROW

For example, the XML document returned by the statistics event monitor, DETAILS_XML, might look something like the one shown in the first part of Figure 3 on page 26. If you use the MON_FORMAT_XML_WAIT_TIMES_BY_ROW function to format the content of DETAILS_XML, the output would look like the table at the bottom of the diagram.

```

<?xml version="1.0" encoding="windows-1252" ?>
- <system_metrics xmlns="http://www.ibm.com/xmlns/prod/db2/mon" release="907nnnn">
  <wlm_queue_time_total>0</wlm_queue_time_total>
  <wlm_queue_assignments_total>0</wlm_queue_assignments_total>
  <fcm_tq_rcv_wait_time>0</fcm_tq_rcv_wait_time>
  <fcm_message_rcv_wait_time>0</fcm_message_rcv_wait_time>
  <fcm_tq_send_wait_time>0</fcm_tq_send_wait_time>
  <fcm_message_send_wait_time>0</fcm_message_send_wait_time>
  <agent_wait_time>0</agent_wait_time>
  <agent_waits_total>0</agent_waits_total>
  <lock_wait_time>0</lock_wait_time>

```



METRIC_NAME	TOTAL_TIME_VALUE	COUNT	PARENT_METRIC_NAME
WLM_QUEUE_TIME_TOTAL	0	0	TOTAL_WAIT_TIME
FCM_TQ_RECV_WAIT_TIME	0	0	FCM_RECV_WAIT_TIME
FCM_MESSAGE_RECV_WAIT_TIME	0	0	FCM_RECV_WAIT_TIME
FCM_TQ_SEND_WAIT_TIME	0	0	FCM_SEND_WAIT_TIME
FCM_MESSAGE_SEND_WAIT_TIME	0	0	FCM_SEND_WAIT_TIME
AGENT_WAIT_TIME	0	0	TOTAL_WAIT_TIME
LOCK_WAIT_TIME	0	0	TOTAL_WAIT_TIME
DIRECT_READ_TIME	0	0	TOTAL_WAIT_TIME
DIRECT_WRITE_TIME	0	0	TOTAL_WAIT_TIME
LOG_BUFFER_WAIT_TIME	0	0	TOTAL_WAIT_TIME
LOG_DISK_WAIT_TIME	0	0	TOTAL_WAIT_TIME

Figure 3. An XML file containing monitoring data, processed by one of the MON_FORMAT_XML_* functions. This example shows the use of the MON_FORMAT_XML_WAIT_TIMES_BY_ROW function. Only wait times are returned; other metrics contained in the XML file, such as wlm_queue_assignments_total are excluded by this particular function.

The number of columns returned varies by the specific function that you use. For example MON_FORMAT_XML_METRICS_BY_ROW returns two columns, one for the metric name, and one for its corresponding value:

METRIC_NAME	VALUE
WLM_QUEUE_TIME_TOTAL	0
WLM_QUEUE_ASSIGNMENTS_TOT	0
FCM_TQ_RECV_WAIT_TIME	0
FCM_MESSAGE_RECV_WAIT_TIM	0
FCM_TQ_SEND_WAIT_TIME	0

By comparison, MON_FORMAT_XML_TIMES_BY_ROW returns four columns:

METRIC_NAME	TOTAL_TIME_VALUE	COUNT	PARENT_METRIC_NAME
WLM_QUEUE_TIME_TOTAL	0	0	TOTAL_WAIT_TIME
FCM_TQ_RECV_WAIT_TIME	0	0	FCM_RECV_WAIT_TIME
FCM_MESSAGE_RECV_WAIT_TIME	0	0	FCM_RECV_WAIT_TIME
FCM_TQ_SEND_WAIT_TIME	0	0	FCM_SEND_WAIT_TIME
FCM_MESSAGE_SEND_WAIT_TIME	0	0	FCM_SEND_WAIT_TIME

The MON_FORMAT_XML_*_BY_ROW functions are useful when you do not know which elements you want to view. For example, you might want to see the

top 10 wait-time monitor elements for the workload named CLPWORKLOAD. To collect this information, you can create a statistics event monitor called DBSTATS (event_wlstats logical data group). Assuming you set up this event monitor to write to a table, it records metrics in a column called DETAILS_XML. Once the output table from the event monitor is populated with monitor data, you can construct a query that uses the MON_FORMAT_XML_WAIT_TIMES_BY_ROW function to extract the monitor elements you want to see:

```
SELECT SUBSTR(STATS.WORKLOAD_NAME,1,15) AS WORKLOAD_NAME,
       SUBSTR(METRICS.METRIC_NAME,1,30) AS METRIC_NAME,
       SUM(METRICS.TOTAL_TIME_VALUE) AS TOTAL_TIME_VALUE
FROM   WLSTATS_DBSTATS AS STATS,
       TABLE(MON_FORMAT_XML_WAIT_TIMES_BY_ROW(STATS.DETAILS_XML)) AS METRICS
WHERE  WORKLOAD_NAME='CLPWORKLOAD' AND (PARENT_METRIC_NAME='TOTAL_WAIT_TIME')
GROUP BY WORKLOAD_NAME,METRIC_NAME
ORDER BY TOTAL_TIME_VALUE DESC
FETCH FIRST 10 ROWS ONLY
```

Remember: Time spent monitor elements are organized into hierarchies. In this example, to avoid double-counting wait times, only the monitor elements that roll-up to **total_wait_time** are included (see the WHERE clause in the preceding SQL statement). Otherwise, **total_wait_time** itself would be included in the results, which includes several individual wait times.

The output that follows shows what the results of the preceding query might look like:

WORKLOAD_NAME	METRIC_NAME	TOTAL_TIME_VALUE
CLPWORKLOAD	LOCK_WAIT_TIME	15138541
CLPWORKLOAD	DIRECT_READ_TIME	6116231
CLPWORKLOAD	POOL_READ_TIME	6079458
CLPWORKLOAD	DIRECT_WRITE_TIME	452627
CLPWORKLOAD	POOL_WRITE_TIME	386208
CLPWORKLOAD	IPC_SEND_WAIT_TIME	283172
CLPWORKLOAD	LOG_DISK_WAIT_TIME	103888
CLPWORKLOAD	DIAGLOG_WRITE_WAIT_TIME	78198
CLPWORKLOAD	IPC_RECV_WAIT_TIME	15612
CLPWORKLOAD	TCPIP_SEND_WAIT_TIME	3291

10 record(s) selected.

Note: The MON_FORMAT_XML_*_BY_ROW functions return only monitor elements that track measurements or *metrics*. These include monitor elements that track wait and component times, as well as counters. They do not return non-metrics monitor elements contained in the XML document, such as uow_id, or activity_id.

You can use the XMLTABLE function to view *any* of the elements (including non-metrics elements) contained in the XML document. However, the most frequently used, non-metrics monitor elements are returned as columns by the monitor functions that begin with MON_GET_*, such as MON_GET_UNIT_OF_WORK, or MON_GET_CONNECTION. If you are not familiar with XML, you might find it faster and easier to create queries using these functions than using the XMLTABLE function to extract monitor elements from an XML document.

To summarize: if you are interested in viewing non-metrics monitor elements, the MON_GET_* series of table functions might be a good alternative to the XMLTABLE function. If you are interested in viewing metrics monitor elements, the MON_FORMAT_XML_*_BY_ROW table functions might suit your needs.

Viewing metrics monitor elements from XML documents as rows in a table

One way to view metrics-related information contained in an XML document returned from an event monitor is to convert it into a format where each monitor element appears in a row by itself.

This format is useful if you want to view the information in a text-based format, but do not know specifically which monitor elements you want to examine.

About this task

To view metrics information in row-based format from the XML documents returned by various monitoring interfaces, use the `MON_FORMAT_XML_*_BY_ROW` table functions. These functions were introduced in DB2 Version 9.7 Fix Pack 1.

Procedure

The example shown in this task uses the `MON_FORMAT_XML_TIMES_BY_ROW` table function to view component times for a statement as tracked by the package cache event monitor. It assumes that a package cache event monitor called `PKG_CACHEEVENTS` has been created and activated. The package cache event monitor writes its output to an unformatted event (UE) table. Before it can be used, the data in the UE table must be converted to either relational tables using the `EVMON_FORMAT_UE_TO_TABLES` stored procedure, or to XML using the `EVMON_FORMAT_UE_TO_XML` table function. This task shows the first of these two approaches.

1. First, convert the unformatted event (UE) table that the package cache event monitor writes to into relational tables using the `EVMON_FORMAT_UE_TO_TABLES` procedure

```
ca11 EVMON_FORMAT_UE_TO_TABLES ('PkgCache',NULL,NULL,NULL,NULL,NULL,
    NULL,0,'SELECT * FROM PKGCACHEEVENTS')
```

This procedure creates two tables:

- One is called `PKG_CACHE_EVENT`, which contains a column called `METRICS`. This column, in turn, contains XML documents with metrics monitor elements.
- The other is called `PKG_CACHE_METRICS`.

Note: You could view the metrics directly from the columns in `PKG_CACHE_METRICS`, rather than extract metrics from the `METRICS` column of the `PKG_CACHE_EVENT` table. However, when you examine `PKG_CACHE_METRICS`, the metrics appear in columns, rather than rows; it is not as easy to get a ranking of, say, the metrics with the highest values.

2. Query the two tables produced in the preceding step to determine which statement is the most expensive in terms of execution times:

```
SELECT EVENTS.EXECUTABLE_ID,
       SUM(METRICS.STMT_EXEC_TIME) AS TOTAL_STMT_EXEC_TIME
FROM   PKGCACHE_EVENT AS EVENTS,
       PKGCACHE_METRICS AS METRICS
WHERE  EVENTS.XMLID = METRICS.XMLID
GROUP BY EVENTS.EXECUTABLE_ID
ORDER BY TOTAL_STMT_EXEC_TIME DESC
FETCH FIRST 5 ROWS ONLY
```

In the preceding query, the two tables produced in step 1 on page 28 are joined so that the statement IDs from the PKGCACHE_EVENT table can be associated with their execution times in the PKGCACHE_METRICS table:

EXECUTABLE_ID	TOTAL_STMT_EXEC_TIME
x'0100000000000001A030000000000000000000000020020091215115933859000'	250
x'010000000000000150300000000000000000000000020020091215115850328000'	191
x'010000000000000210200000000000000000000000020020091215115818343001'	129
x'010000000000000C40200000000000000000000000020020091215115838578000'	41
x'010000000000000B00200000000000000000000000020020091215115838203000'	38

5 record(s) selected.

The first item in the results represents the statement with the largest overall execution time.

- Optional: If you like, you can display the text for the statement using the following SQL:

```
SELECT SUBSTR(STMT_TEXT,1,60) AS STMT_TEXT
FROM PKGCACHE_EVENT
WHERE EXECUTABLE_ID = x'0100000000000001A030000000000000000000000020020091215115933859000'
```

Results:

STMT_TEXT
DROP XSROBJECT MYSCHEMA.EVMON_PKGCACHE_SCHEMA_SQL09070

1 record(s) selected.

- Use the MON_FORMAT_XML_TIMES_BY_ROW table function to view a listing of the time-spent monitor elements for the statement you identified in step 2 on page 28:

```
SELECT SUBSTR(XMLMETRICS.METRIC_NAME,1,30) AS METRIC_NAME,
XMLMETRICS.TOTAL_TIME_VALUE,
SUBSTR(XMLMETRICS.PARENT_METRIC_NAME,1,30) AS PARENT_METRIC_NAME
FROM PKGCACHE_EVENT AS EVENTS,
TABLE(MON_FORMAT_XML_TIMES_BY_ROW(EVENTS.METRICS)) AS XMLMETRICS
WHERE EVENTS.EXECUTABLE_ID=
x'0100000000000001A030000000000000000000000020020091215115933859000'
AND PARENT_METRIC_NAME='STMT_EXEC_TIME'
ORDER BY XMLMETRICS.TOTAL_TIME_VALUE DESC
```

Notes:

- Remember that time-spent monitor elements are organized into hierarchies. To eliminate double-counting, only those metrics that roll-up to **stmt_exec_time** are included in the results. Otherwise, **stmt_exec_time** itself would be included in the results, which includes several individual component times.
- PARENT_METRIC_NAME, one of the columns returned by MON_FORMAT_XML_TIMES_BY_ROW is included for illustrative purposes.

When run, the following results are returned by this query:

METRIC_NAME	TOTAL_TIME_VALUE	PARENT_METRIC_NAME
TOTAL_ACT_WAIT_TIME	234	STMT_EXEC_TIME
TOTAL_SECTION_PROC_TIME	15	STMT_EXEC_TIME

Here, you can see that the total processing time adds up to 249 ms. Compare this time to the total time of 250 shown in step 2 on page 28; the extra millisecond is accounted for by other times (for example, waits) not included in **stmt_exec_time**.

Results

In the results from the preceding example, you can see the arrangement of the metrics: they appear in row-oriented format, one metric per row. The advantage of using this approach is that you do not need to know ahead of time which metrics or monitor elements you want to see. If you want to see which of the time-spent metrics have the five highest values, or which metrics fall within a specific range of values, you can easily create a query to return the results you are interested in. By contrast, if you use the XMLTABLE function to display the monitor elements as columns, you need to specify which monitor elements to display (or display them all).

Example

*Viewing the contents of the DETAILS column produced by a MON_GET_*_DETAILS table function*

You can also use the MON_FORMAT_XML_*_BY_ROW functions to view the contents of the DETAILS column returned by any of the MON_GET_*_DETAILS functions. For example, MON_GET_CONNECTION_DETAILS returns a DETAILS column that contains an XML document with metrics that pertain to a database connection.

For example, to view the non-zero component times for each connection across all members, you could use the following query:

```
SELECT CONDETAILS.APPLICATION_HANDLE,
       SUBSTR(XMLMETRICS.METRIC_NAME,1,30) AS METRIC_NAME,
       SUM(XMLMETRICS.TOTAL_TIME_VALUE) AS TOTAL_TIME_VALUE,
       SUBSTR(XMLMETRICS.PARENT_METRIC_NAME,1,30) AS PARENT_METRIC_NAME
FROM TABLE(MON_GET_CONNECTION_DETAILS(NULL,-1)) AS CONDETAILS,
     TABLE(MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW(CONDETAILS.DETAILS))AS XMLMETRICS
WHERE TOTAL_TIME_VALUE > 0 AND XMLMETRICS.PARENT_METRIC_NAME='TOTAL_RQST_TIME'
GROUP BY CONDETAILS.APPLICATION_HANDLE,
         XMLMETRICS.PARENT_METRIC_NAME,
         XMLMETRICS.METRIC_NAME
ORDER BY CONDETAILS.APPLICATION_HANDLE ASC, TOTAL_TIME_VALUE DESC
```

Notes:

- To eliminate double-counting, only those metrics that roll-up to **total_rqst_time** are included in the results (WHERE XMLMETRICS.PARENT_METRIC_NAME='TOTAL_RQST_TIME'). Otherwise, total_rqst_time itself would be included in the results, which includes several individual component times.
- PARENT_METRIC_NAME, one of the columns returned by MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW is included for illustrative purposes.

The preceding query returns the following results:

APPLICATION_HANDLE	METRIC_NAME	TOTAL_TIME_VALUE	PARENT_METRIC_NAME
52	TOTAL_SECTION_TIME	3936	TOTAL_RQST_TIME
52	TOTAL_COMPILE_TIME	482	TOTAL_RQST_TIME
52	TOTAL_COMMIT_TIME	15	TOTAL_RQST_TIME
52	TOTAL_ROLLBACK_TIME	1	TOTAL_RQST_TIME
496	TOTAL_COMPILE_TIME	251	TOTAL_RQST_TIME
496	TOTAL_SECTION_TIME	46	TOTAL_RQST_TIME
496	TOTAL_IMPLICIT_COMPILE_TIME	5	TOTAL_RQST_TIME

7 record(s) selected.

As this example shows, only metrics that comprise **total_rqst_time** are included. Had the WHERE XMLMETRICS.PARENT_METRIC_NAME='TOTAL_RQST_TIME' clause not been included in the query, the results would look like those that follow:

APPLICATION_HANDLE	METRIC_NAME	TOTAL_TIME_VALUE	PARENT_METRIC_NAME
	52 TOTAL_RQST_TIME	4603	-
	52 TOTAL_SECTION_TIME	3942	TOTAL_RQST_TIME
	52 TOTAL_COMPILE_TIME	537	TOTAL_RQST_TIME
	52 <i>TOTAL_SECTION_SORT_TIME</i>	299	<i>TOTAL_SECTION_TIME</i>
	52 TOTAL_COMMIT_TIME	15	TOTAL_RQST_TIME
	52 TOTAL_ROLLBACK_TIME	1	TOTAL_RQST_TIME
	496 TOTAL_RQST_TIME	341	-
	496 TOTAL_COMPILE_TIME	251	TOTAL_RQST_TIME
	496 TOTAL_SECTION_TIME	46	TOTAL_RQST_TIME
	496 TOTAL_IMPLICIT_COMPILE_TIME	5	TOTAL_RQST_TIME
	496 <i>TOTAL_SECTION_SORT_TIME</i>	2	<i>TOTAL_SECTION_TIME</i>

11 record(s) selected.

In this case, the values for **total_rqst_time** for each connection are included in the results, which includes the values for all other elements for which it is the parent. Similarly, the values for items in *italics* roll up to the **total_section_time**. Had they not been excluded in the WHERE clause, they would have been triple-counted in the results, as **total_section_time** itself rolls up to **total_rqst_time**.

Chapter 3. Event monitors

Monitoring table functions and snapshot routines return the values of monitor elements at the specific point in time the routine is run, which is useful when you want to check the current state of your system. However, you might not always want to monitor points in time.

There are many times when you need to capture information about the state of your system at exactly the time that a specific event occurs. Event monitors serve this purpose.

Event monitors can be created to capture point-in-time information related to different kinds of *events* that take place in your system. For example, you can create an event monitor to capture information when a specific threshold that you define is exceeded. The information captured includes such things as the ID of the application that was running when the threshold was exceeded. Or, you might create an event monitor to determine what statement was running when a lock event occurred.

Types of events for which event monitors capture data

You can use event monitors to capture information related to many different kinds of events that take place on your system.

The following tables lists the types of events that occur in the system that you can monitor with an event monitor. It also describes the type of data collected for different events, as well as when the monitoring data is collected. The names of the event monitors shown in column two correspond to the keywords used to create that type of event monitor using the CREATE EVENT MONITOR statement.

Table 3. Event Types

Type of event to monitor	Event monitor name	Event monitor properties	Details
Locks and deadlocks	LOCKING	<i>Uses of this event monitor</i>	To determine when locks or deadlocks occur, and the applications that are involved. The advantages of using the LOCKING event monitor instead of the deprecated DEADLOCKS event monitor include consolidated reporting of both lock and deadlock events, as well as the inclusion of information about lock waits and lock time-outs.
		<i>Data collected</i>	Comprehensive information regarding applications involved, including the identification of participating statements (and statement text) and a list of locks being held.
		<i>When the event data is generated¹</i>	Upon detection of any of the following event types, depending on how you configure the event monitor: <ul style="list-style-type: none">• lock timeout• deadlock• lock wait beyond a specified duration

Table 3. Event Types (continued)

Type of event to monitor	Event monitor name	Event monitor properties	Details
Execution of a SQL statements or other operation that spawns a database activity.	ACTIVITIES	<i>Uses of this event monitor</i>	To track the execution of individual statements and other activities to understand what activities are running in the system. Also to capture activities for diagnostic reasons, and to study the resource consumption of SQL.
		<i>Data collected</i>	<p>Activity level data, generally for activities involving workload management objects.</p> <ul style="list-style-type: none"> If WITH DETAILS was specified as part of COLLECT ACTIVITY DATA clause on the CREATE or ALTER statements for a workload management object, then information collected includes statement and compilation environment information for those activities that have it. If WITH SECTION is also specified, then statement, compilation environment, section environment data, and section actuals are also captured. If AND VALUES was also specified on the CREATE OR ALTER statement for the workload management object, the information collected will also include input data values for those activities that have it.
		<i>When event data is generated¹</i>	<ul style="list-style-type: none"> Upon completion of an activity that executed in a service class, workload or work class that had its COLLECT ACTIVITY DATA option turned on. When an activity violates a threshold that has the COLLECT ACTIVITY DATA option enabled. At the instant the WLM_CAPTURE_ACTIVITY_IN_PROGRESS stored procedure is executed. When an activity is executed by a connection for which activity collection has been enabled using the WLM_SET_CONN_ENV stored procedure.
Execution of an SQL statement	STATEMENTS	<i>Uses of this event monitor</i>	To see what requests are being made to the database as a result of the execution of SQL statements.
		<i>Data collected</i>	<p>Statement start or stop time, CPU used, text of dynamic SQL, SQLCA (return code of SQL statement), and other metrics such as fetch count. For partitioned databases: CPU used, execution time, table and table queue information.</p> <p>Notes:</p> <ul style="list-style-type: none"> When monitoring the execution of SQL procedures using statement event monitors, data manipulation language (DML) statements, such as INSERT, SELECT, DELETE, and UPDATE, generate events. Procedural statements, such as variable assignments and control structures (for example, WHILE or IF), do not generate events in a deterministic fashion. Statement start or stop time is unavailable when the Timestamp switch is off.
		<i>When event data is generated</i>	End of SQL statement ² ; for partitioned databases, End of subsection ²

Table 3. Event Types (continued)

Type of event to monitor	Event monitor name	Event monitor properties	Details
Completion of a unit of work (transaction)	UNIT OF WORK	<i>Uses of this event monitor</i>	To gather resource usage information and performance metrics for units of work that run on the system. This information can be used for purposes ranging from generating reports for billing or charge-back purposes of system resources used by an application, to troubleshooting performance problems caused by slow-running routines. Recommended over the TRANSACTIONS event monitor.
		<i>Data collected</i>	Information about units of work (transactions), such as start and stop time, the workload and service class under which they ran. Option to include information about packages or executable IDs for statements run as part of the unit of work, as well as request metrics.
		<i>When event data is generated¹</i>	Upon completion of a unit of work
Eviction of sections from the package cache	PACKAGE CACHE	<i>Uses of this event monitor</i>	To capture a history of statements (and related metrics) that are no longer in the package cache. This information can be used if you need to examine performance metrics for statements that are no longer available in memory.
		<i>Data collected</i>	Includes statement text and metrics aggregated over all executions of the section.
		<i>When event data is generated¹</i>	As entries are evicted from the package cache.
Connections to the database by applications	CONNECTIONS	<i>Uses of this event monitor</i>	To capture metrics and other monitor elements for each connection to the database by an application.
		<i>Data collected</i>	All application-level counters. For example, the time that the application connected to or disconnected from the database, or number of lock escalations that the application was involved with.
		<i>When event data is generated</i>	End of connection ²
Deactivation of database	DATABASE	<i>Uses of this event monitor</i>	To capture metrics and other monitor elements that reflect information about the database as whole, since activation.
		<i>Data collected</i>	All database level counters. For example, the number of connections made to a database, time spent waiting on locks, or rows of data inserted since its activation.
		<i>When event data is generated</i>	Database deactivation ²
	BUFFERPOOLS TABLESPACES	<i>Uses of this event monitor</i>	To capture metrics related to buffer pools and table spaces.
		<i>Data collected</i>	Counters for buffer pools, prefetchers, page cleaners and direct I/O for each buffer pool.
		<i>When event data is generated</i>	Database deactivation ²
	TABLES	<i>Uses of this event monitor</i>	To capture metrics related to tables that have changed since database activation.
		<i>Data collected</i>	Table level counters, such as rows read or written, or disk pages used by data,LOB or index objects.
		<i>When event data is generated</i>	Database deactivation ²

Table 3. Event Types (continued)

Type of event to monitor	Event monitor name	Event monitor properties	Details
Statistics and metrics on workload management objects	STATISTICS	<i>Uses of this event monitor</i>	To capture processing metrics related to workload management objects (for example service superclasses, or workloads) in the database. For example, you could use a statistics event monitor to check on CPU utilization over time for a given workload.
		<i>Data collected</i>	Statistics computed from the activities that executed within each service class, workload, or work class that exists on the system.
		<i>When event data is generated</i>	Statistics can be collected automatically at regular intervals. This interval is defined with the wlm_collect_int database configuration parameter. Data can also be collected manually, using the WLM_COLLECT_STATS stored procedure. Note: With either collection mechanism, the values of statistics monitor elements are reset to 0 after collection has taken place.
Exceeding a workload manager threshold	THRESHOLD VIOLATIONS	<i>Uses of this event monitor</i>	To determine when specific thresholds that you set are exceeded during database operations. Thresholds can be set for a variety of things, ranging from CPU time to the number of database connections, to the execution of specific statements. Data collected can be used for a variety of purposes, including monitoring for potential problems (such as approaching limits on temporary table space).
		<i>Data collected</i>	Threshold violation information.
		<i>When event data is generated</i>	Upon detection of a threshold violation. Thresholds are defined using the CREATE THRESHOLD statement.
Changes to database or database manager configuration	CHANGE HISTORY	<i>Uses of this event monitor</i>	To capture change to database and database manager configuration and registry settings, execution of DDL statements, and execution of utilities
		<i>Data collected</i>	Database and database manager configuration parameter changes, registry variable changes, execution of DDL statements, execution of certain DB2 utilities and commands, and change history event monitor startup. Note: Generally, information related to events that occur while the change history event monitor is inactive or the database is offline are not captured. However, changes to registry variables and configuration parameters are recorded.
		<i>When event data is generated¹</i>	Upon monitor startup, when a parameter or variable changes, or when a command, DDL, or utility completes.
Notes:			
<ol style="list-style-type: none"> 1. If a database is deactivated while an activity event monitor is active, backlogged activity records in the queue are discarded. To ensure that you obtain all activities event monitor records and that none are discarded, deactivate the activities event monitor before deactivating the database. When an activities event monitor is explicitly deactivated, all backlogged activity records in the queue are processed before the event monitor deactivates. 2. In addition to the defined times where data collection automatically occurs, you can use the FLUSH EVENT MONITOR SQL statement to generate events. The events generated by this method are written with the current database monitor values for all the monitor types (except for DEADLOCKS and DEADLOCKS WITH DETAILS) associated with the flushed event monitor. 			

Table 4. Event Types For Deprecated Event Monitors

Type of event to monitor	Event monitor name	Event monitor properties	Details
Deadlocks	DEADLOCKS ²	<i>Uses of this event monitor</i>	To determine when deadlocks occur, and the applications that are involved.
		<i>Data collected</i>	Applications involved, and locks in contention.
		<i>When event data is generated</i>	Detection of a deadlock
	DEADLOCKS WITH DETAILS ²	<i>Uses of this event monitor</i>	To determine when deadlocks occur, and the applications that are involved.
		<i>Data collected</i>	Comprehensive information regarding applications involved, including the identification of participating statements (and statement text) and a list of locks being held. Using a DEADLOCKS WITH DETAILS event monitor instead of a DEADLOCKS event monitor will incur a performance cost when deadlocks occur, due to the extra information that is collected.
		<i>When event data is generated</i>	Detection of a deadlock
	DEADLOCKS WITH DETAILS HISTORY ²	<i>Uses of this event monitor</i>	To determine when deadlocks occur, and the applications that are involved.
		<i>Data collected</i>	All information reported in a DEADLOCKS WITH DETAILS event monitor, along with the statement history for the current unit of work of each application owning a lock participating in a deadlock scenario for the database partition where that lock is held. Using a DEADLOCKS WITH DETAILS HISTORY event monitor will incur a minor performance cost when activated due to statement history tracking.
		<i>When event data is generated</i>	Detection of a deadlock
DEADLOCKS WITH DETAILS HISTORY VALUES ²	<i>Uses of this event monitor</i>		
	<i>Data collected</i>	All information reported in a deadlock with details and history, along with the values provided for any parameter markers at the time of execution of a statement. Using a DEADLOCKS WITH DETAILS HISTORY VALUES event monitor will incur a more significant performance cost when activated due to extra copying of data values.	
	<i>When event data is generated</i>	Detection of a deadlock	
Completion of a unit of work (transaction)	TRANSACTIONS ³	<i>Uses of this event monitor</i>	
		<i>Data collected</i>	UOW work start or stop time, previous UOW time, CPU consumed, locking and logging metrics. Transaction records are not generated if running with XA.
		<i>When event data is generated</i>	Upon completion of a unit of work ¹
Notes:			
1. In addition to the defined times where data collection automatically occurs, you can use the FLUSH EVENT MONITOR SQL statement to generate events. The events generated by this method are written with the current database monitor values for all the monitor types (except for DEADLOCKS and DEADLOCKS WITH DETAILS) associated with the flushed event monitor.			
2. This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.			
3. This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR UNIT OF WORK statement to monitor transaction events.			

Note: A detailed deadlock event monitor is created for each newly created database. This event monitor, named DB2DETAILDEADLOCK, starts when the database is activated and will write to files in the database directory. You can avoid the additional processor time this event monitor requires by dropping it. The DB2DETAILDEADLOCK event monitor is deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Working with event monitors

Generally, the process of creating and using event monitors to capture information about the system when certain events occur is similar for all event monitor types. First you create the event monitor, then you enable data collection, and finally, you access the data gathered.

About this task

This topic provides an outline of the general steps to follow when working with event monitors.

Procedure

To use an event monitor to capture event information:

1. Create the event monitor. To create an event monitor, use the appropriate version of the CREATE EVENT MONITOR statement. When you create an event monitor, you must choose how to record the data the event monitor collects. All event monitors can write their output to relational tables; however, depending on your specific purposes, there are different options that might be more appropriate.
2. Activate the event monitor. To activate the event monitor, use the SET EVENT MONITOR STATE statement. For example, for an event monitor called **capturestats**, use the following command:

```
SET EVENT MONITOR capturestats STATE 1
```

To turn off data collection by the event monitor, use the following statement:

```
SET EVENT MONITOR capturestats STATE 0
```

By default, some event monitors activate automatically upon database activation; others require that you activate them manually. However, an event monitor created with the AUTOSTART option will not automatically be activated until the next database activation. Use the SET EVENT MONITOR STATE statement to force a recently-created event monitor into the active state. To determine whether an event monitor starts automatically, refer to the reference information for the relevant CREATE EVENT MONITOR statement.

3. Enable the collection of data. (Only for LOCKING, ACTIVITIES, STATISTICS, UNIT OF WORK and PACKAGE CACHE event monitors) Enabling data collection involves configuring the database manager to gather specific types of data to be recorded by event monitors.

Not all event monitors require data collection to be enabled; for those that do not, such as the TABLE event monitor, creating and activating them is sufficient to cause data to be collected. The threshold violations event monitor also starts data collection automatically; however, in this case, you must also define the thresholds for which you want data captured using the CREATE THRESHOLD statement.

For those event monitors that require data collection to be enabled, there are different options available to you. Depending on the type of event monitor you are working with, you might set a database configuration parameter to enable data collection across the entire database. Alternatively, you might choose to enable the collection of specific kinds of data for specific types of workload objects. For example, to configure the collection of basic information for a unit of work event monitor when any unit of work in the system finishes, you can set the `mon_uow_data` parameter to `BASE`. Alternatively, to capture unit of work information only for a specific workload, you can specify the `COLLECT UNIT OF WORK DATA BASE` clause as part of the `CREATE WORKLOAD` or `ALTER WORKLOAD` statements.

4. Run your applications or queries. After the event monitor has been created, and activated, and you have enabled data collection, run the applications or queries for which you want to collect data.
5. Optional: Deactivate the event monitor. After you run the applications or queries for which you want data collected, you can deactivate the event monitor using the `SET EVENT MONITOR STATE` statement. (see step 2 on page 38). Deactivating the event monitor is not necessary before proceeding to the next step, however leaving the event monitor active will result in disk space being used for data that you might not be interested in looking at.
6. Examine the data collected by the event monitor. Depending on the type of output the event monitor creates, there are different options for accessing the data collected. If the data is written directly to a relational table, you can use SQL to access the data contained in the table columns. On the other hand, if the event monitor writes to an unformatted event (UE) table, you must post-process the UE table using a command like `db2evmonfmt` or a procedure like `EVMON_FORMAT_UE_TO_TABLES` before you can view the event data.
7. Optional: Prune data that is no longer needed from the event monitor tables. For event monitors that you use on a regular basis, you might want to prune unneeded data from the tables. For example, if you use a unit of work event monitor to generate daily accounting reports about the system resources used by different applications, you might want to delete the current day's data from the event monitor tables once the reports have been generated.

Tip: If you need to prune event monitor output regularly, consider using an unformatted event (UE) table to record event monitor output. Starting in DB2 Version 10.1, UE tables can be pruned automatically after data is transferred to regular tables.

Creating event monitors

You create different types of event monitors by using variations on the `CREATE EVENT MONITOR` statement. You can use the options for that statement to specify the type of data that event monitors collect and how the event monitors produce their output.

The sections that follow describe the different output options and how to create event monitors that produce these types of output.

Before you begin

Before creating an event monitor, it is important to understand the different options for the output that event monitors can produce. Most event monitors can produce output in at least two formats; some let you choose from up to four formats.

Procedure

To create an event monitor:

1. Determine what kind of event monitor you need.
2. Decide what type of output you want from the event monitor. Do you want data to be written to a regular table, an unformatted event table, a file, or a pipe?
3. Issue a CREATE EVENT MONITOR statement.
4. Optional: If the type of event monitor that you created requires activation, activate it by issuing the SET EVENT MONITOR STATE statement.

Output options for event monitors

Event monitors can report the data they collect in a number of ways. All event monitors can write the data they collect to tables; some write to unformatted event (UE) tables, which can help improve performance. Others can also write directly to a file or named pipe.

Depending on how you want to use the information collected by event monitors, and on the type of event monitor, you can choose to have the output that the event monitors collect produced in different ways. The output types available include:

Regular tables

As of DB2 Version 10.1, all event monitors can write to regular tables that can be queried directly using SQL. For a given event, each of the monitor elements or metrics collected for the event is written to its own column in the table. This makes it possible to use a SELECT statement query the output to examine the values for a specific monitor element.

To create an event monitor that writes to tables, specify the WRITE TO TABLE clause in the CREATE EVENT MONITOR statement. Depending on the event monitor, one or more tables are created to contain the output, each table containing monitor elements that belong to a single logical group. See “Target tables, control tables, and event monitor table management” on page 110 for details about the specific table produced for each logical group.

Tables can be stored in a table space of your choosing; however the target table of a CREATE EVENT MONITOR statement must be a non-partitioned table.

Note: There are two types of event monitors that write to tables. The first type includes event monitors created in Version 9.7 and later releases. These include the unit of work, package cache, locking and change history event monitor. As of DB2 Version 10.1, the first three of these event monitors can write their output to regular tables as an alternative to UE tables. The change history event monitor writes only to regular tables.

The second type are the event monitors implemented before DB2 Version 9.7. These include all other event monitors.

Generally, after an event monitor of either type has been created, they work in much the same way. That is, you can use SQL to directly access the data in the tables that they produce. However, the older event monitors in the second category have additional options that you can specify when creating the event monitor. In addition, only event monitors in the second category are capable of writing also to files and named pipes.

Unformatted event (UE) tables

UE tables were introduced in DB2 Version 9.7 for the new event monitors added in that release. UE tables are relational tables, however, they have only a limited number of columns. Most of the data associated with each event is written to a column containing an inline binary (BLOB) object. Writing event data in binary format reduces the time it takes to write each record to the table. For this reason, UE tables are particularly useful where event monitor performance is important, which might be the case on highly I/O or CPU-bound systems.

However, because the event data is written in binary format, you cannot use SQL to extract legible data. You must perform post-processing on the UE table to extract the data stored in binary format. Another benefit of using UE tables is that you can have UE table data pruned automatically during post-processing. The `EVMON_FORMAT_UE_TO_TABLES` procedure has an option to delete data from the UE table after it has been successfully extracted.

To create an event monitor that writes to an unformatted event table, specify the `WRITE TO UNFORMATTED EVENT TABLE` clause in the `CREATE EVENT MONITOR` statement. Only one UE table is created per event monitor.

Files Some event monitors support sending their output directly to files maintained by the file system. This type of output is useful if you do not want the event monitor output to be subject to the additional processing time caused when being managed within the database, or if you want to look at the data while the database is offline. To create an event monitor that writes to files, specify the `WRITE TO FILE` clause in the `CREATE EVENT MONITOR` statement.

Named pipes

If you want to have an application process event data as it is generated, you can use a named pipe event monitor. These types of event monitors send their output directly to a named pipe so that the data can be used by another application immediately. This might be useful if you need to manipulate event data in real time.

To create an event monitor that writes to a named pipe, specify the `WRITE TO PIPE` clause in the `CREATE EVENT MONITOR` statement.

Depending on your needs, one type of event monitor output might be more appropriate than another. Table 5 provides an summary of when specific output types are particularly useful.

Table 5. Summary of different event monitor output types

Output type	Scenarios where this output type is useful
Regular tables	<ul style="list-style-type: none">• When you want to examine monitoring data at a later point in time• In systems that are not approaching the maximum capacity for CPU, log file or disk storage• Where immediate access to data using SQL is desirable
Unformatted event (UE) tables	<ul style="list-style-type: none">• When you want to examine monitoring data at a later point in time• In systems where event monitor performance is a priority, or where there are constraints on CPU, log file or disk usage• Where the added step of post-processing of data is not an issue

Table 5. Summary of different event monitor output types (continued)

Output type	Scenarios where this output type is useful
Files	<ul style="list-style-type: none"> • In systems where you do not want or need to manage monitor data as part of the database. (Eliminates the additional processing time of logging, inserts, maintaining consistency) • When you want to store the data outside of the database being monitored • When you want to examine the data offline at later point in time
Pipes	<ul style="list-style-type: none"> • Streaming event data to an application that processes it immediately. • When there is no need to access event data at a later point in time.

Not all event monitors support all output types. For example, only the unit of work, package cache and locking event monitor can produce a UE table. Table 6 shows what output options are available for different types of event monitors:

Table 6. Output options for event monitors

Event monitor type	Regular table	Unformatted event table	File	Named pipe
Activity	Yes		Yes	Yes
Buffer pool	Yes		Yes	Yes
Change history	Yes			
Connections	Yes		Yes	Yes
Database	Yes		Yes	Yes
Deadlocks* (all variations)	Yes		Yes	Yes
Locking	Yes	Yes		
Package cache	Yes	Yes		
Statement	Yes		Yes	Yes
Statistics	Yes		Yes	Yes
Table space	Yes		Yes	Yes
Table	Yes		Yes	Yes
Threshold violations	Yes		Yes	Yes
Transaction*	Yes		Yes	Yes
Unit of work	Yes	Yes		
* Deprecated event monitor.				

Event monitors that write to tables

Starting in DB2 Version 10.1, all event monitors can write output to regular tables that can be queried directly using SQL.

In addition, starting with DB2 Version 10.1, you can use the procedure `EVMON_UPGRADE_TABLES` to upgrade the tables produced by event monitors in earlier releases. This capability lets you more easily retain event monitor data as you upgrade your DB2 product.

Creating event monitors that write to tables:

To create an event monitor, use the CREATE EVENT MONITOR STATEMENT. There are different forms of this statement that you use, depending on the type of events that you intend to monitor.

Before you begin

- You need SQLADM or DBADM authority to create a table event monitor.
- The target table of a CREATE EVENT MONITOR statement - that is, the table to which the event monitor writes its output - must be a non-partitioned table.

About this task

The various options for table event monitors are set in the CREATE EVENT MONITOR statement. For further assistance in generating CREATE EVENT MONITOR SQL statements for write-to-table event monitors, you can use the **db2evtb1** command. Simply provide the name of the event monitor and the required event type (or types), and the CREATE EVENT MONITOR statement is generated, complete with listings of all the target tables. You can then copy the generated statement, make modifications, and then execute the statement from the command line processor.

Procedure

To create an event monitor that writes its output to a regular table, perform the following steps:

1. Formulate a CREATE EVENT MONITOR statement using the WRITE TO TABLE clause to indicate that event monitor data is to be collected in a table (or set of tables).

```
CREATE EVENT MONITOR evmon-name FOR eventtype
WRITE TO TABLE
```

Where evmon-name is the name of the event monitor, and eventtype is one of the following values:

- ACTIVITIES
- BUFFERPOOLS
- CHANGE HISTORY
- CONNECTIONS
- DATABASE
- DEADLOCKS
- LOCKING
- PACKAGE CACHE
- STATEMENTS
- STATISTICS
- TABLE
- TABLESPACE
- THRESHOLD VIOLATIONS
- TRANSACTIONS
- UNIT OF WORK

For example, to create a unit of work event monitor called myevmon, use a statement like the one that follows:

```
CREATE EVENT MONITOR myevmon FOR UNIT OF WORK
WRITE TO TABLE
```

The preceding statement creates a unit of work event monitor that uses defaults for the logical groups of monitor elements collected, the corresponding output

table names, and the target table spaces for the tables. For more information on these defaults, refer to the documentation for the appropriate CREATE EVENT MONITOR statement.

- Optional: Specify the logical groups for which you want data collected. By default, event data is collected for all logical data groups for the event monitor type. (See “Target tables, control tables, and event monitor table management” on page 110 for details.) If you want only data for selected logical groups collected, you can specify the names of the logical groups to include in the CREATE EVENT MONITOR statement. For example, with a locking event monitor, you might want to collect only the information associated with the LOCK and PARTICIPANT logical groups. To include only these logical groups, you can use a statement like the one that follows:

```
CREATE EVENT MONITOR mylocks FOR LOCKING
WRITE TO TABLE
LOCK, PARTICIPANTS
```

- Optional: Specify the table names to use for the output tables. Unless you specify otherwise, default names are used for the tables for each logical group of monitor elements. The default name used is derived by concatenating the logical group name with the name of the event monitor. For example, for the locking event monitor created by the statement in the preceding step, the unqualified names for the tables produced are LOCK_MYLOCKS and PARTICIPANTS_MYLOCKS. To override the default names, include the table names to use when specifying the logical groups:

```
CREATE EVENT MONITOR mylocks FOR LOCKING
WRITE TO TABLE
LOCK(TABLE LOCKDATA), PARTICIPANTS(TABLE PARTICIP)
```

In the preceding example, the names used for the tables for the LOCK and PARTICIPANTS logical groups are LOCKDATA_MYLOCKS and PARTICIP_MYLOCKS.

You can also override the table space to be used for each table by including the name of the table space to use:

```
CREATE EVENT MONITOR mylocks FOR LOCKING
WRITE TO TABLE
LOCK(TABLE LOCKDATA IN EVMONSPACE), PARTICIPANTS(TABLE PARTICIP IN EVMONSPACE)
```

In the preceding example, the EVMONSPACE table space is used for both output tables.

Additional options

Different event monitors provide different configuration options. For details on the options available for a specific type of event monitor, refer to the documentation for the CREATE EVENT MONITOR statement for the type of event monitor you want to use. The examples that follow show some of the configuration options you can choose for different event monitors:

Capturing multiple event types with a single event monitor

Some types² of event monitors can capture different types of events with a single event monitor. If you want to capture multiple types of events with this event monitor, specify additional values for eventtype, separated by a comma. For example, you might want to combine bufferpool and table space monitoring in a single event monitor:

2. Event monitors for BUFFERPOOLS, CONNECTIONS, DATABASE, DEADLOCKS, STATEMENTS, TABLES, and TABLESPACES support this option.

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
WRITE TO TABLE
```

This event monitor will monitor for the BUFFERPOOL and TABLESPACE event types. Assuming that the previously listed statement was issued by the user dbadmin, the derived names and table spaces of the target tables are as follows:

- DBADMIN.BUFFERPOOL_MYEVMON
- DBADMIN.TABLESPACE_MYEVMON
- DBADMIN.CONTROL_,MYEVMON

Adjusting the size of event monitor output buffers

You can alter the size of the table event monitor buffers (in 4K pages) for some types² of event monitors by adjusting the BUFFERSIZE value. For example, in the following statement:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
WRITE TO TABLE BUFFERSIZE 8
```

8 is the combined capacity (in 4K pages) of the two event table buffers. This adds up to 32K of buffer space; 16K for each buffer.

The default size of each buffer is 4 pages (two 16K buffers are allocated). The minimum size is 1 page. The maximum size of the buffers is limited by the size of the monitor heap, because the buffers are allocated from that heap. For performance reasons, highly active event monitors should have larger buffers than relatively inactive event monitors.

Controlling whether event monitor output is blocked or non-blocked

Some event monitors² let you control how to proceed when event monitor output buffers are full. For blocked event monitors, each agent that generates an event will wait for the event buffers to be written to table if they are full. This can degrade database performance, as the suspended agent and any dependent agents cannot run until the buffers are clear. Use the BLOCKED clause to ensure no losses of event data:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
WRITE TO TABLE BUFFERSIZE 8 BLOCKED
```

If database performance is of greater importance than collecting every single event record, use non-blocked event monitors. In this case, each agent that generates an event will not wait for the event buffers to be written to table if they are full. As a result, non-blocked event monitors are subject to data loss on highly active systems. Use the NONBLOCKED clause to minimize the additional processing time caused by event monitoring:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
WRITE TO TABLE BUFFERSIZE 8 NONBLOCKED
```

Note: See “Target tables, control tables, and event monitor table management” on page 110 and “Write-to-table and file event monitor buffering” on page 128 for additional information about how information about discarded events is written to the control table for the event monitor.

Controlling what monitor elements for which data is collected

Which monitor elements to collect data for. If you are interested in only a few monitor elements, you can specify which ones you want to collect for some event monitors² by specifying the element name in the CREATE EVENT MONITOR statement:

```
CREATE EVENT MONITOR myevmon FOR DATABASE, BUFFERPOOLS, TABLESPACES
    WRITE TO TABLE DB, DBMEMUSE,
    BUFFERPOOL (EXCLUDES(db_path, files_closed)),
    TABLESPACE (INCLUDES
        (tablespace_name, direct_reads, direct_writes))
    BUFFERSIZE 8 NONBLOCKED
```

All the monitor elements for the DB and DBMEMUSE logical data groups are captured (this is the default behavior). For BUFFERPOOL, all monitor elements except **db_path** and **files_closed** are captured. And finally, for TABLESPACE, **tablespace_name**, **direct_reads** and **direct_writes** are the only monitor elements captured.

Setting a threshold for deactivating an event monitor based on table space used

All event monitors provide the option to specify how full the table space can get before the event monitor automatically deactivates:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
    PCTDEACTIVATE 90
```

When the table space reaches 90% capacity, the myevmon event monitor automatically shuts off. The PCTDEACTIVATE clause can only be used for DMS table spaces. If the target table space has auto-resize enabled, set the PCTDEACTIVATE clause to 100.

What to do next

By default, event monitors that were introduced in Version 9.7 or later are created as AUTOSTART event monitors. They are activated automatically when the database is next activated, and on subsequent database activations thereafter. If you want to activate the event monitor immediately, before the next database activation, use the SET EVENT MONITOR STATE statement to manually start the event monitor. In addition for each of the locking, unit of work and package cache event monitors, you must also enable data collection.

Event monitor logical data groups and monitor elements:

Monitor elements that are often useful to examine together are grouped in *logical data groups*.

All event monitors use logical data groups in one way or another. For some event monitor types, you can specify what information you want to collect by specifying the logical data groups for which you want information recorded. Logical data groups are also used to group data together in the output event monitors generate; for example, event monitors that write to tables generally create one table for each logical data group of monitor elements.

The following table lists the logical data groupings and monitor elements that can be returned by event monitoring.

- “changesummary logical data group” on page 48
- “dbdbmcfg logical data group” on page 48
- “ddlstmtexec logical data group” on page 48
- “dllock logical data group” on page 49
- “event_activity logical data group” on page 49
- “event_activitymetrics logical data group” on page 51
- “event_activitystmt logical data group” on page 54
- “event_activityvals logical data group” on page 55

- “event_bufferpool logical data group” on page 55
- “event_conn logical data group” on page 57
- “event_connheader logical data group” on page 59
- “event_connmemuse logical data group” on page 60
- “event_data_value logical data group” on page 60
- “event_db logical data group” on page 60
- “event_dbheader logical data group” on page 64
- “event_dbmemuse logical data group” on page 64
- “event_deadlock logical data group” on page 65
- “event_detailed_dlconn logical data group” on page 65
- “event_dlconn logical data group” on page 66
- “event_histogrambin logical data group” on page 67
- “event_log_header logical data group” on page 67
- “event_overflow logical data group” on page 67
- “event_qstats logical data group” on page 67
- “event_scmetrics logical data group” on page 68
- “event_scstats logical data group” on page 76
- “event_start logical data group” on page 77
- “event_stmt logical data group” on page 77
- “event_stmt_history logical data group” on page 78
- “event_subsection logical data group” on page 79
- “event_table logical data group” on page 79
- “event_tablespace logical data group” on page 80
- “event_thresholdviolations logical data group” on page 81
- “event_wcstats logical data group” on page 82
- “event_wlmetrics logical data group” on page 83
- “event_wlstats logical data group” on page 90
- “event_xact logical data group” on page 91
- “evmonstart logical data group” on page 92
- “lock logical data group” on page 92
- “lock_participants logical data group” on page 94
- “lock_participant_activities logical data group” on page 93
- “lock_activity_values logical data group” on page 92
- “pkgcache logical data group” on page 95
- “pkgcache_metrics logical data group” on page 96
- “pkgcache_stmt_args logical data group” on page 100
- “regvar logical data group” on page 100
- “sqlca logical data group” on page 101
- “txncompletion logical data group” on page 101
- “uow logical data group” on page 101
- “uow_metrics logical data group” on page 103
- “uow_package_list logical data group” on page 109
- “uow_executable_list logical data group” on page 102
- “utillocation logical data group” on page 109
- “utilphase logical data group” on page 109

- “utilstart logical data group” on page 109
- “utilstop logical data group” on page 110

changesummary logical data group

- “event_id - Event ID monitor element” on page 879
- “event_type - Event Type monitor element” on page 881
- “event_timestamp - Event timestamp monitor element” on page 880
- “member - Database member monitor element” on page 1044
- “coord_member - Coordinator member monitor element” on page 814
- “utility_invocation_id - Utility invocation ID” on page 1528
- “utility_type - Utility Type” on page 1533
- “appl_id - Application ID monitor element” on page 727
- “appl_name - Application name monitor element” on page 731
- “application_handle - Application handle monitor element” on page 736
- “system_auth_id - System authorization identifier monitor element” on page 1371
- “session_auth_id - Session authorization ID monitor element” on page 1312
- “client_platform - Client operating platform monitor element” on page 778
- “client_protocol - Client communication protocol monitor element” on page 780
- “client_port_number - Client port number monitor element” on page 779
- “client_pid - Client process ID monitor element” on page 778
- “client_hostname - Client hostname monitor element” on page 776
- “client_wrkstname - Client workstation name monitor element” on page 782
- “client_acctng - Client accounting string monitor element” on page 773
- “client_userid - Client user ID monitor element” on page 781
- “client_applname - Client application name monitor element” on page 774
- “backup_timestamp - Backup timestamp” on page 751

dbdbmcfg logical data group

- “event_id - Event ID monitor element” on page 879
- “event_timestamp - Event timestamp monitor element” on page 880
- “member - Database member monitor element” on page 1044
- “event_type - Event Type monitor element” on page 881
- “cfg_name - Configuration name” on page 769
- “cfg_value - Configuration value” on page 770
- “cfg_value_flags - Configuration value flags” on page 770
- “cfg_old_value - Configuration old value” on page 769
- “cfg_old_value_flags - Configuration old value flags” on page 770
- “cfg_collection_type - Configuration collection type” on page 768
- “deferred - Deferred” on page 851

ddlstmexec logical data group

- “event_id - Event ID monitor element” on page 879
- “event_timestamp - Event timestamp monitor element” on page 880
- “member - Database member monitor element” on page 1044
- “event_type - Event Type monitor element” on page 881

"global_transaction_id - Global transaction identifier monitor element" on page 925

"local_transaction_id - Local transaction identifier monitor element" on page 984

"savepoint_id - Savepoint ID" on page 1299

"uow_id - Unit of work ID monitor element" on page 1517

"ddl_classification - DDL classification" on page 846

"stmt_text - SQL statement text monitor element" on page 1358

dllock logical data group

"data_partition_id - Data partition identifier monitor element" on page 833

"lock_attributes - Lock attributes monitor element" on page 985

"lock_count - Lock count monitor element" on page 986

"lock_current_mode - Original lock mode before conversion monitor element" on page 987

"lock_escalation - Lock escalation monitor element" on page 988

"lock_hold_count - Lock hold count monitor element" on page 995

"lock_mode - Lock mode monitor element" on page 996

"lock_name - Lock name monitor element" on page 999

"lock_object_name - Lock Object Name" on page 1000

"lock_object_type - Lock object type waited on monitor element" on page 1000

"lock_release_flags - Lock release flags monitor element" on page 1002

"lock_status - Lock status monitor element" on page 1003

"node_number - Node Number" on page 1058

"table_file_id - Table file ID monitor element" on page 1372

"table_name - Table name monitor element" on page 1373

"table_schema - Table schema name monitor element" on page 1375

"tablespace_name - Table space name monitor element" on page 1383

Note: The underlying implementation for this logical data group is the snapshot monitor LOCK logical data group. If you examine the output for this logical group in the self-describing stream used for the file and pipe output options, you can see that the LOCK group is used to generate the output.

event_activity logical data group

"act_exec_time - Activity execution time monitor element" on page 699

"activate_timestamp - Activate timestamp monitor element" on page 704

"activity_id - Activity ID monitor element" on page 706

"activity_secondary_id - Activity secondary ID monitor element" on page 706

"activity_type - Activity type monitor element" on page 708

"address - IP address from which the connection was initiated" on page 710

"agent_id - Application handle (agent ID) monitor element" on page 710

"appl_id - Application ID monitor element" on page 727

"appl_name - Application name monitor element" on page 731

"arm_correlator - Application response measurement correlator monitor element" on page 738

"coord_partition_num - Coordinator partition number monitor element" on page 815

"db_work_action_set_id - Database work action set ID monitor element" on page 843

"db_work_class_id - Database work class ID monitor element" on page 843

"details_xml - Details XML monitor element" on page 853

"intra_parallel_state - Current state of intrapartition parallelism monitor element" on page 969

"num_remaps - Number of remaps monitor element" on page 1069

"parent_activity_id - Parent activity ID monitor element" on page 1102

"parent_uow_id - Parent unit of work ID monitor element" on page 1103

"partial_record - Partial Record monitor element" on page 1103

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element" on page 1261

"sc_work_action_set_id - Service class work action set ID monitor element" on page 1300

"sc_work_class_id - Service class work class ID monitor element" on page 1300

"section_actuals - Section actuals monitor element" on page 1302

"service_subclass_name - Service subclass name monitor element" on page 1310

"service_superclass_name - Service superclass name monitor element" on page 1311

"session_auth_id - Session authorization ID monitor element" on page 1312

"sort_overflows - Sort overflows monitor element" on page 1326

"sqlca - SQL Communications Area (SQLCA)" on page 1332

"time_completed - Time completed monitor element" on page 1413

"time_created - Time created monitor element" on page 1413

"time_started - Time started monitor element" on page 1414

"total_sort_time - Total sort time monitor element" on page 1487

"total_sorts - Total sorts monitor element" on page 1488

"tpmon_acc_str - TP monitor client accounting string monitor element" on page 1502

"tpmon_client_app - TP monitor client application name monitor element" on page 1503

"tpmon_client_userid - TP monitor client user ID monitor element" on page 1503

"tpmon_client_wkstn - TP monitor client workstation name monitor element" on page 1504

"uow_id - Unit of work ID monitor element" on page 1517

"workload_id - Workload ID monitor element" on page 1542

"workload_occurrence_id - Workload occurrence identifier monitor element" on page 1544

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210
 "pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212
 "pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214
 "pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216
 "pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218
 "pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220
 "pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
 "pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
 "prep_time - Preparation time monitor element" on page 1253
 "query_card_estimate - Query Number of Rows Estimate" on page 1261
 "query_cost_estimate - Query cost estimate monitor element" on page 1262
 "rows_fetched - Rows fetched monitor element" on page 1289
 "rows_modified - Rows modified monitor element" on page 1290
 "rows_returned - Rows returned monitor element" on page 1294
 "system_cpu_time - System CPU time monitor element" on page 1371
 "user_cpu_time - User CPU time monitor element" on page 1527
 "wl_work_action_set_id - Workload work action set identifier monitor element" on page 1536
 "wl_work_class_id - Workload work class identifier monitor element" on page 1536
 "mon_interval_id - Monitor interval identifier monitor element" on page 1055
 "member - Database member monitor element" on page 1044
 "query_data_tag_list - Estimated query data tag list monitor element" on page 1262
 "total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491
 "total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492
 "total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496
 "total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494

event_activitymetrics logical data group

"audit_events_total - Total audit events monitor element" on page 740
 "audit_file_writes_total - Total audit files written monitor element" on page 743
 "audit_subsystem_wait_time - Audit subsystem wait time monitor element" on page 745
 "audit_subsystem_waits_total - Total audit subsystem waits monitor element" on page 747

"coord_stmt_exec_time - Execution time for statement by coordinator agent monitor element" on page 816

"deadlocks - Deadlocks detected monitor element" on page 849

"diaglog_write_wait_time - Diagnostic log file write wait time monitor element" on page 854

"diaglog_writes_total - Total diagnostic log file writes monitor element" on page 856

"direct_read_reqs - Direct read requests monitor element" on page 858

"direct_read_time - Direct read time monitor element" on page 860

"direct_reads - Direct reads from database monitor element" on page 862

"direct_write_reqs - Direct write requests monitor element" on page 864

"direct_write_time - Direct write time monitor element" on page 866

"direct_writes - Direct writes to database monitor element" on page 868

"fcm_message_rcv_volume - FCM message received volume monitor element" on page 893

"fcm_message_rcv_wait_time - FCM message received wait time monitor element" on page 894

"fcm_message_rcvs_total - Total FCM message receives monitor element" on page 896

"fcm_message_send_volume - FCM message send volume monitor element" on page 898

"fcm_message_send_wait_time - FCM message send wait time monitor element" on page 899

"fcm_message_sends_total - Total FCM message sends monitor element" on page 901

"fcm_rcv_volume - FCM received volume monitor element" on page 902

"fcm_rcv_wait_time - FCM received wait time monitor element" on page 904

"fcm_rcvs_total - FCM receives total monitor element" on page 905

"fcm_send_volume - FCM send volume monitor element" on page 907

"fcm_send_wait_time - FCM send wait time monitor element" on page 908

"fcm_sends_total - FCM sends total monitor element" on page 910

"fcm_tq_rcv_volume - FCM table queue received volume monitor element" on page 911

"fcm_tq_rcv_wait_time - FCM table queue received wait time monitor element" on page 913

"fcm_tq_rcvs_total - FCM table queue receives total monitor element" on page 914

"fcm_tq_send_volume - FCM table queue send volume monitor element" on page 916

"fcm_tq_send_wait_time - FCM table queue send wait time monitor element" on page 917

"fcm_tq_sends_total - FCM table queue send total monitor element" on page 919

"lock_escals - Number of lock escalations monitor element" on page 989

"lock_timeouts - Number of lock timeouts monitor element" on page 1005

"lock_wait_time - Time waited on locks monitor element" on page 1009

"lock_waits - Lock waits monitor element" on page 1014

"log_buffer_wait_time - Log buffer wait time monitor element" on page 1019

"log_disk_wait_time - Log disk wait time monitor element" on page 1021

"log_disk_waits_total - Total log disk waits monitor element" on page 1022

"num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element" on page 1063

"num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element" on page 1067

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"pool_data_writes - Buffer pool data writes monitor element" on page 1144

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_index_writes - Buffer pool index writes monitor element" on page 1177

"pool_read_time - Total buffer pool physical read time monitor element" on page 1207

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212

"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214

"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216

"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218

"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220

"pool_write_time - Total buffer pool physical write time monitor element" on page 1223

"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232

"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236

"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238

"post_shrthreshold_sorts - Post shared threshold sorts monitor element" on page 1241

"post_threshold_sorts - Post threshold sorts monitor element" on page 1248

"rows_modified - Rows modified monitor element" on page 1290

"rows_read - Rows read monitor element" on page 1292

"rows_returned - Rows returned monitor element" on page 1294

"sort_overflows - Sort overflows monitor element" on page 1326

"stmt_exec_time - Statement execution time monitor element" on page 1348

"thresh_violations - Number of threshold violations monitor element" on page 1408

"total_act_time - Total activity time monitor element" on page 1415

"total_act_wait_time - Total activity wait time monitor element" on page 1417
 "total_app_section_executions - Total application section executions monitor element" on page 1422
 "total_cpu_time - Total CPU time monitor element" on page 1436
 "total_routine_invocations - Total routine invocations monitor elements" on page 1465
 "total_routine_non_sect_proc_time - Non-section processing time monitor element" on page 1467
 "total_routine_non_sect_time - Non-section routine execution time monitor elements" on page 1467
 "total_routine_time - Total routine time monitor element" on page 1468
 "total_routine_user_code_proc_time - Total routine user code processing time monitor element" on page 1470
 "total_routine_user_code_time - Total routine user code time monitor element" on page 1471
 "total_section_proc_time - Total section processing time monitor element" on page 1479
 "total_section_sort_proc_time - Total section sort processing time monitor element" on page 1480
 "total_section_sort_time - Total section sort time monitor element" on page 1482
 "total_section_sorts - Total section sorts monitor element" on page 1484
 "total_section_time - Total section time monitor element" on page 1485
 "total_sorts - Total sorts monitor element" on page 1488
 "tq_tot_send_spills - Total number of table queue buffers overflowed monitor element" on page 1511
 "wlm_queue_assignments_total - Workload manager total queue assignments monitor element" on page 1537
 "wlm_queue_time_total - Workload manager total queue time monitor element" on page 1538

event_activitystmt logical data group

"activate_timestamp - Activate timestamp monitor element" on page 704
 "activity_id - Activity ID monitor element" on page 706
 "activity_secondary_id - Activity secondary ID monitor element" on page 706
 "appl_id - Application ID monitor element" on page 727
 "comp_env_desc - Compilation environment monitor element" on page 786
 "creator - Application Creator" on page 829
 "eff_stmt_text - Effective statement text monitor element" on page 874
 "executable_id - Executable ID monitor element" on page 888
 "intra_parallel_state - Current state of intrapartition parallelism monitor element" on page 969
 "package_name - Package name monitor element" on page 1095
 "num_routines - Number of routines monitor element" on page 1070
 "package_version_id - Package version monitor element" on page 1096
 "query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element" on page 1261
 "routine_id - Routine ID monitor element" on page 1286
 "section_env - Section environment monitor element" on page 1302

"section_number - Section number monitor element" on page 1303
"stmt_first_use_time - Statement first use timestamp monitor element" on page 1349
"stmt_invocation_id - Statement invocation identifier monitor element" on page 1350
"stmt_isolation - Statement isolation" on page 1351
"stmt_last_use_time - Statement last use timestamp monitor element" on page 1351
"stmt_lock_timeout - Statement lock timeout monitor element" on page 1352
"stmt_nest_level - Statement nesting level monitor element" on page 1352
"stmt_pkgcache_id - Statement package cache identifier monitor element" on page 1354
"stmt_query_id - Statement query identifier monitor element" on page 1355
"stmt_source_id - Statement source identifier" on page 1356
"stmt_text - SQL statement text monitor element" on page 1358
"stmt_type - Statement type monitor element" on page 1359
"stmtno - Statement number monitor element" on page 1365
"uow_id - Unit of work ID monitor element" on page 1517

event_activityvals logical data group

"activate_timestamp - Activate timestamp monitor element" on page 704
"activity_id - Activity ID monitor element" on page 706
"activity_secondary_id - Activity secondary ID monitor element" on page 706
"appl_id - Application ID monitor element" on page 727
"intra_parallel_state - Current state of intrapartition parallelism monitor element" on page 969
"query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element" on page 1261
"stmt_value_data - Value data" on page 1362
"stmt_value_index - Value index" on page 1362
"stmt_value_isnull - Value has null value monitor element" on page 1363
"stmt_value_isreopt - Variable used for statement reoptimization monitor element" on page 1363
"stmt_value_type - Value type monitor element" on page 1364
"uow_id - Unit of work ID monitor element" on page 1517

event_bufferpool logical data group

"bp_id - Buffer pool identifier monitor element" on page 755
"bp_name - Buffer pool name monitor element" on page 756
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840
"direct_read_reqs - Direct read requests monitor element" on page 858
"direct_read_time - Direct read time monitor element" on page 860
"direct_reads - Direct reads from database monitor element" on page 862
"direct_write_reqs - Direct write requests monitor element" on page 864
"direct_write_time - Direct write time monitor element" on page 866
"direct_writes - Direct writes to database monitor element" on page 868

“event_time - Event Time” on page 880

“evmon_activates - Number of event monitor activations” on page 882

“evmon_flushes - Number of Event Monitor Flushes” on page 889

“files_closed - Database files closed monitor element” on page 921

“partial_record - Partial Record monitor element” on page 1103

“pool_async_data_read_reqs - Buffer pool asynchronous read requests monitor element” on page 1116

“pool_async_data_reads - Buffer pool asynchronous data reads monitor element” on page 1117

“pool_async_data_writes - Buffer pool asynchronous data writes monitor element” on page 1118

“pool_async_index_reads - Buffer pool asynchronous index reads monitor element” on page 1122

“pool_async_index_writes - Buffer pool asynchronous index writes monitor element” on page 1123

“pool_async_read_time - Buffer Pool Asynchronous Read Time” on page 1123

“pool_async_write_time - Buffer pool asynchronous write time monitor element” on page 1124

“pool_data_l_reads - Buffer pool data logical reads monitor element” on page 1139

“pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142

“pool_data_writes - Buffer pool data writes monitor element” on page 1144

“pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173

“pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175

“pool_index_writes - Buffer pool index writes monitor element” on page 1177

“pool_read_time - Total buffer pool physical read time monitor element” on page 1207

“pool_write_time - Total buffer pool physical write time monitor element” on page 1223

“block_ios - Number of block I/O requests monitor element” on page 753

“pages_from_block_ios - Total number of pages read by block I/O monitor element” on page 1100

“pages_from_vectored_ios - Total number of pages read by vectored I/O monitor element” on page 1101

“pool_async_index_read_reqs - Buffer pool asynchronous index read requests monitor element” on page 1121

“pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests monitor element” on page 1128

“pool_async_xda_reads - Buffer pool asynchronous XDA data reads monitor element” on page 1128

“pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element” on page 1129

“pool_no_victim_buffer - Buffer pool no victim buffers monitor element” on page 1180

“pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232

“pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236
“pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238
“unread_prefetch_pages - Unread prefetch pages monitor element” on page 1514
“vectored_ios - Number of vectored I/O requests monitor element” on page 1534

event_conn logical data group

“acc_curs_blk - Accepted Block Cursor Requests” on page 696
“agent_id - Application handle (agent ID) monitor element” on page 710
“appl_id - Application ID monitor element” on page 727
“appl_priority - Application Agent Priority” on page 732
“appl_priority_type - Application Priority Type” on page 733
“appl_section_inserts - Section Inserts monitor element” on page 733
“appl_section_lookups - Section Lookups” on page 734
“authority_bitmap - User authorization level monitor element” on page 749
“authority_lvl - User authorization level monitor element” on page 750
“binds_precompiles - Binds/Precompiles Attempted” on page 752
“cat_cache_inserts - Catalog cache inserts monitor element” on page 761
“cat_cache_lookups - Catalog cache lookups monitor element” on page 763
“cat_cache_overflows - Catalog Cache Overflows” on page 764
“commit_sql_stmts - Commit Statements Attempted” on page 786
“ddl_sql_stmts - Data Definition Language (DDL) SQL Statements” on page 847
“deadlocks - Deadlocks detected monitor element” on page 849
“direct_read_reqs - Direct read requests monitor element” on page 858
“direct_read_time - Direct read time monitor element” on page 860
“direct_reads - Direct reads from database monitor element” on page 862
“direct_write_reqs - Direct write requests monitor element” on page 864
“direct_write_time - Direct write time monitor element” on page 866
“direct_writes - Direct writes to database monitor element” on page 868
“disconn_time - Database Deactivation Timestamp” on page 872
“dynamic_sql_stmts - Dynamic SQL Statements Attempted” on page 873
“failed_sql_stmts - Failed Statement Operations” on page 891
“hash_join_overflows - Hash Join Overflows” on page 940
“hash_join_small_overflows - Hash Join Small Overflows” on page 940
“int_auto_rebinds - Internal Automatic Rebinds” on page 962
“int_commits - Internal commits monitor element” on page 962
“int_deadlock_rollbacks - Internal Rollbacks Due To Deadlock” on page 964
“int_rollbacks - Internal rollbacks monitor element” on page 965
“int_rows_deleted - Internal Rows Deleted” on page 967
“int_rows_inserted - Internal Rows Inserted” on page 967
“int_rows_updated - Internal Rows Updated” on page 968
“lock_escalation - Lock escalation monitor element” on page 988
“lock_timeouts - Number of lock timeouts monitor element” on page 1005
“lock_wait_time - Time waited on locks monitor element” on page 1009

"lock_waits - Lock waits monitor element" on page 1014

"olap_func_overflows - OLAP Function Overflows monitor element" on page 1086

"partial_record - Partial Record monitor element" on page 1103

"int_rows_updated - Internal Rows Updated" on page 968

"pkg_cache_inserts - Package cache inserts monitor element" on page 1109

"pkg_cache_lookups - Package cache lookups monitor element" on page 1111

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"pool_data_writes - Buffer pool data writes monitor element" on page 1144

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_index_writes - Buffer pool index writes monitor element" on page 1177

"pool_read_time - Total buffer pool physical read time monitor element" on page 1207

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212

"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214

"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216

"pool_write_time - Total buffer pool physical write time monitor element" on page 1223

"prefetch_wait_time - Time waited for prefetch monitor element" on page 1249

"priv_workspace_num_overflows - Private Workspace Overflows" on page 1255

"priv_workspace_section_inserts - Private Workspace Section Inserts" on page 1255

"priv_workspace_section_lookups - Private Workspace Section Lookups" on page 1256

"priv_workspace_size_top - Maximum Private Workspace Size" on page 1257

"rej_curs_blk - Rejected Block Cursor Requests" on page 1272

"rollback_sql_stmts - Rollback Statements Attempted" on page 1283

"rows_read - Rows read monitor element" on page 1292

"rows_selected - Rows Selected" on page 1296

"rows_written - Rows Written" on page 1298

"select_sql_stmts - Select SQL Statements Executed" on page 1304

"sequence_no - Sequence number monitor element" on page 1306

"shr_workspace_num_overflows - Shared Workspace Overflows" on page 1313

"shr_workspace_section_inserts - Shared Workspace Section Inserts" on page 1314

"shr_workspace_section_lookups - Shared Workspace Section Lookups" on page 1314

“shr_workspace_size_top - Maximum Shared Workspace Size” on page 1315
 “sort_overflows - Sort overflows monitor element” on page 1326
 “static_sql_stmts - Static SQL Statements Attempted” on page 1344
 “system_cpu_time - System CPU time monitor element” on page 1371
 “total_hash_joins - Total Hash Joins” on page 1445
 “total_hash_loops - Total Hash Loops” on page 1446
 “total_olap_funcs - Total OLAP Functions monitor element” on page 1455
 “total_sec_cons - Secondary Connections” on page 1478
 “total_sort_time - Total sort time monitor element” on page 1487
 “total_sorts - Total sorts monitor element” on page 1488
 “uid_sql_stmts - Update/Insert/Delete SQL Statements Executed” on page 1514
 “unread_prefetch_pages - Unread prefetch pages monitor element” on page 1514
 “user_cpu_time - User CPU time monitor element” on page 1527
 “x_lock_escals - Exclusive lock escalations monitor element” on page 1545
 “xquery_stmts - XQuery Statements Attempted” on page 1548
 “appl_status - Application status monitor element” on page 734
 “cat_cache_size_top - Catalog cache high watermark monitor element” on page 765
 “coord_node - Coordinating Node” on page 815
 “elapsed_exec_time - Statement Execution Elapsed Time” on page 876
 “evmon_flushes - Number of Event Monitor Flushes” on page 889
 “lock_escals - Number of lock escalations monitor element” on page 989
 “pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218
 “pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220
 “pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232
 “pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236
 “pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238
 “rows_deleted - Rows deleted monitor element” on page 1289
 “rows_inserted - Rows inserted monitor element” on page 1290
 “rows_updated - Rows updated monitor element” on page 1297
 “cat_cache_heap_full - Catalog cache heap full monitor element monitor element” on page 761

event_connheader logical data group

“agent_id - Application handle (agent ID) monitor element” on page 710
 “appl_id - Application ID monitor element” on page 727
 “appl_name - Application name monitor element” on page 731
 “auth_id - Authorization ID” on page 748
 “client_db_alias - Database Alias Used by Application” on page 775
 “client_pid - Client process ID monitor element” on page 778
 “client_platform - Client operating platform monitor element” on page 778
 “client_prdid - Client product and version ID monitor element” on page 780

"client_protocol - Client communication protocol monitor element" on page 780
"codepage_id - ID of Code Page Used by Application" on page 783
"conn_time - Time of database connection monitor element" on page 801
"corr_token - DRDA Correlation Token" on page 816
"execution_id - User Login ID" on page 890
"node_number - Node Number" on page 1058
"sequence_no - Sequence number monitor element" on page 1306
"territory_code - Database Territory Code" on page 1407
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event_connmemuse logical data group

"node_number - Node Number" on page 1058
"pool_config_size - Configured Size of Memory Pool" on page 1130
"pool_cur_size - Current Size of Memory Pool" on page 1131
"pool_id - Memory Pool Identifier" on page 1164
"pool_secondary_id - Memory Pool Secondary Identifier" on page 1209
"pool_watermark - Memory Pool Watermark" on page 1222
"appl_id - Application ID monitor element" on page 727
"evmon_flushes - Number of Event Monitor Flushes" on page 889
POOL_LIST_ID
POOL_MAX_SIZE

event_data_value logical data group

"deadlock_id - Deadlock Event Identifier" on page 848
"deadlock_node - Partition Number Where Deadlock Occurred" on page 848
"evmon_activates - Number of event monitor activations" on page 882
"participant_no - Participant within Deadlock" on page 1104
"stmt_history_id - Statement history identifier" on page 1349
"stmt_value_data - Value data" on page 1362
"stmt_value_index - Value index" on page 1362
"stmt_value_isnull - Value has null value monitor element" on page 1363
"stmt_value_isreopt - Variable used for statement reoptimization monitor element" on page 1363
"stmt_value_type - Value type monitor element" on page 1364

event_db logical data group

"active_hash_joins - Active hash joins" on page 705
"appl_section_inserts - Section Inserts monitor element" on page 733
"appl_section_lookups - Section Lookups" on page 734
"async_runstats - Total number of asynchronous RUNSTATS requests monitor element" on page 739
"binds_precompiles - Binds/Precompiles Attempted" on page 752
"blocks_pending_cleanup - Pending cleanup rolled-out blocks monitor element" on page 754
"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
"cat_cache_overflows - Catalog Cache Overflows" on page 764

"cat_cache_size_top - Catalog cache high watermark monitor element" on page 765

"catalog_node - Catalog Node Number" on page 766

"catalog_node_name - Catalog Node Network Name" on page 766

"commit_sql_stmts - Commit Statements Attempted" on page 786

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event_start logical data group

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event_stmt logical data group

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“pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173
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event_stmt_history logical data group

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 "deadlock_id - Deadlock Event Identifier" on page 848
 "deadlock_node - Partition Number Where Deadlock Occurred" on page 848
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event_subsection logical data group

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 "appl_id - Application ID monitor element" on page 727
 "appl_name - Application name monitor element" on page 731
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 "thresholdid - Threshold ID monitor element" on page 1412
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event_wcstats logical data group

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 "coord_act_lifetime_avg - Coordinator activity lifetime average monitor element" on page 810
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 "cost_estimate_top - Cost estimate top monitor element" on page 817
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 "rows_returned_top - Actual rows returned top monitor element" on page 1296
 "statistics_timestamp - Statistics timestamp monitor element" on page 1344
 "temp_tablespace_top - Temporary table space top monitor element" on page 1407
 "work_action_set_id - Work action set ID monitor element" on page 1540
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 "work_class_id - Work class ID monitor element" on page 1541
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“member - Database member monitor element” on page 1044

event_wlmetrics logical data group

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“statistics_timestamp - Statistics timestamp monitor element” on page 1344

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“fcm_tq_rcv_wait_time - FCM table queue received wait time monitor element” on page 913

“fcm_message_rcv_wait_time - FCM message received wait time monitor element” on page 894

“fcm_tq_send_wait_time - FCM table queue send wait time monitor element” on page 917

“fcm_message_send_wait_time - FCM message send wait time monitor element” on page 899

“agent_wait_time - Agent wait time monitor element” on page 715

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“lock_wait_time - Time waited on locks monitor element” on page 1009

“lock_waits - Lock waits monitor element” on page 1014

“direct_read_time - Direct read time monitor element” on page 860

“direct_read_reqs - Direct read requests monitor element” on page 858

“direct_write_time - Direct write time monitor element” on page 866

“direct_write_reqs - Direct write requests monitor element” on page 864

“log_buffer_wait_time - Log buffer wait time monitor element” on page 1019

“num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element” on page 1063

“log_disk_wait_time - Log disk wait time monitor element” on page 1021

“log_disk_waits_total - Total log disk waits monitor element” on page 1022

“tcpip_rcv_wait_time - TCP/IP received wait time monitor element” on page 1402

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“client_idle_wait_time - Client idle wait time monitor element” on page 776

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“tcpip_send_wait_time - TCP/IP send wait time monitor element” on page 1405

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"fcm_send_volume - FCM send volume monitor element" on page 907

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"audit_events_total - Total audit events monitor element" on page 740

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“total_app_section_executions - Total application section executions monitor element” on page 1422

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“total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470

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“num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element” on page 1067

“total_routine_invocations - Total routine invocations monitor elements” on page 1465

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“reclaim_wait_time - Reclaim wait time monitor element” on page 1269

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“lock_escals_maxlocks - Number of maxlocks lock escalations monitor element” on page 994

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“pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element” on page 1133

“pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element” on page 1168

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“pool_index_lbp_pages_found - Local buffer pool index pages found monitor element” on page 1171

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“pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element” on page 1234

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“pool_queued_async_xda_reqs - XDA prefetch requests monitor element” on page 1205

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“stmt_value_isreopt - Variable used for statement reoptimization monitor element” on page 1363

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sqlerrml
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txncompletion logical data group

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“appl_id - Application ID monitor element” on page 727
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 "system_auth_id - System authorization identifier monitor element" on page 1371
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 UOW_CLIENT_PROTOCOL
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 "uow_log_space_used - Unit of work log space used monitor element" on page 1519
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"member - Database member monitor element" on page 1044
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"log_buffer_wait_time - Log buffer wait time monitor element" on page 1019
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"app_rqsts_completed_total - Total application requests completed monitor element" on page 726

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“fcm_send_volume - FCM send volume monitor element” on page 907

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“fcm_message_sends_total - Total FCM message sends monitor element” on page 901

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“tq_tot_send_spills - Total number of table queue buffers overflowed monitor element” on page 1511

“tcpip_send_volume - TCP/IP send volume monitor element” on page 1404

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“total_compile_proc_time - Total compile processing time monitor element” on page 1428

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“lock_timeouts_global - Lock timeouts global monitor element” on page 1006

“lock_escals_maxlocks - Number of maxlocks lock escalations monitor element” on page 994

“lock_escals_locklist - Number of locklist lock escalations monitor element” on page 993

“lock_escals_global - Number of global lock escalations monitor element” on page 991

“cf_wait_time - cluster caching facility wait time monitor element” on page 767

“cf_waits - Number of cluster caching facility waits monitor element” on page 767

“pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element” on page 1134

“pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element” on page 1136

“pool_data_lbp_pages_found - Local buffer pool found data pages monitor element” on page 1138

“pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element” on page 1133

“pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element” on page 1168

“pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements” on page 1169

“pool_index_lbp_pages_found - Local buffer pool index pages found monitor element” on page 1171

“pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element” on page 1166

“pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element” on page 1228

“pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element” on page 1230

“pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element” on page 1234

“pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element” on page 1226

“evmon_wait_time - Event monitor wait time monitor element” on page 883

“evmon_waits_total - Event monitor total waits monitor element” on page 885

“total_extended_latch_wait_time - Total extended latch wait time monitor element” on page 1441

“total_extended_latch_waits - Total extended latch waits monitor element” on page 1443

“total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element” on page 1490

“total_stats_fabrications - Total statistics fabrications monitor elements” on page 1492

“total_stats_fabrication_time - Total statistics fabrication time monitor element” on page 1491

“total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element” on page 1495

“total_sync_runstats - Total synchronous RUNSTATS activities monitor element” on page 1496

“total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements” on page 1494

“total_disp_run_queue_time - Total dispatcher run queue time monitor element” on page 1439

“pool_queued_async_data_reqs - Data prefetch requests monitor element” on page 1183

“pool_queued_async_index_reqs - Index prefetch requests monitor element” on page 1187

“pool_queued_async_xda_reqs - XDA prefetch requests monitor element” on page 1205

“pool_queued_async_data_pages - Data pages prefetch requests monitor element” on page 1181

“pool_queued_async_index_pages - Index pages prefetch requests monitor element” on page 1185

“pool_queued_async_xda_pages - XDA pages prefetch requests monitor element” on page 1203

“app_act_completed_total - Total successful external coordinator activities monitor element” on page 723

“app_act_aborted_total - Total failed external coordinator activities monitor element” on page 722

"app_act_rejected_total - Total rejected external coordinator activities monitor element" on page 724

uow_package_list logical data group

"partition_key - Partitioning key monitor element" on page 1105
"appl_id - Application ID monitor element" on page 727
"invocation_id - Invocation ID monitor element" on page 969
"nesting_level - Nesting level monitor element" on page 1055
"package_elapsed_time - Package elapsed time monitor element" on page 1094
"package_id - Package identifier monitor element" on page 1094
"routine_id - Routine ID monitor element" on page 1286
"uow_id - Unit of work ID monitor element" on page 1517
"member - Database member monitor element" on page 1044

utillocation logical data group

"event_id - Event ID monitor element" on page 879
"event_timestamp - Event timestamp monitor element" on page 880
"member - Database member monitor element" on page 1044
"event_type - Event Type monitor element" on page 881
"utility_invocation_id - Utility invocation ID" on page 1528
"utility_type - Utility Type" on page 1533
"device_type - Device type" on page 854
"location_type - Location type" on page 984
"location - Location" on page 984

utilphase logical data group

"event_id - Event ID monitor element" on page 879
"event_timestamp - Event timestamp monitor element" on page 880
"member - Database member monitor element" on page 1044
"event_type - Event Type monitor element" on page 881
"utility_invocation_id - Utility invocation ID" on page 1528
"utility_type - Utility Type" on page 1533
"utility_phase_type - Utility phase type" on page 1531
"phase_start_event_id - Phase start event ID" on page 1107
"phase_start_event_timestamp - Phase start event timestamp" on page 1108
"objtype - Object type monitor element" on page 1085
"object_schema - Object schema monitor element" on page 1081
"object_name - Object name monitor element" on page 1080
"utility_phase_detail - Utility phase detail" on page 1531

utilstart logical data group

"event_id - Event ID monitor element" on page 879
"event_timestamp - Event timestamp monitor element" on page 880
"member - Database member monitor element" on page 1044
"event_type - Event Type monitor element" on page 881
"utility_invocation_id - Utility invocation ID" on page 1528
"utility_type - Utility Type" on page 1533

“utility_operation_type - Utility operation type” on page 1529
“utility_invoker_type - Utility Invoker Type” on page 1529
“utility_priority - Utility Priority” on page 1531
“utility_start_type - Utility start type” on page 1532
“objtype - Object type monitor element” on page 1085
“object_schema - Object schema monitor element” on page 1081
“object_name - Object name monitor element” on page 1080
“num_tbsp - Number of table spaces monitor element” on page 1070
“tbsp_names - Table space names” on page 1400
“utility_detail - Utility detail” on page 1528

utilstop logical data group

“event_id - Event ID monitor element” on page 879
“event_timestamp - Event timestamp monitor element” on page 880
“member - Database member monitor element” on page 1044
“event_type - Event Type monitor element” on page 881
“utility_invocation_id - Utility invocation ID” on page 1528
“utility_type - Utility Type” on page 1533
“utility_stop_type - Utility stop type” on page 1533
“start_event_id - Start event ID” on page 1343
“start_event_timestamp - Start event timestamp” on page 1343
“sqlca - SQL Communications Area (SQLCA)” on page 1332

Target tables, control tables, and event monitor table management:

You can define an event monitor so that it stores its event records in SQL tables. To do this, use the CREATE EVENT MONITOR statement with the WRITE TO TABLE clause.

When you create a write-to-table event monitor, the event monitor creates target tables to store records for each of the logical data groups returning data. In each table, the column names match the monitor element names that they represent. By default, the event monitor creates the tables in the event monitor creator's schema and names the tables by concatenating their corresponding logical data group name to the event monitor name.

For example, consider the following statement, which creates an event monitor that captures STATEMENTS events:

```
CREATE EVENT MONITOR test FOR STATEMENTS WRITE TO TABLE
```

Event monitors using the STATEMENTS event type collect data from the event_connheader, event_stmt, and event_subsection logical data groups. Tables representing logical data groups that are specific to individual event types are created, along with a control table for every write-to-table event monitor. For the event monitor test, created by user riihi, the database manager creates the following tables:

- riihi.connheader_test
- riihi.stmt_test
- riihi.subsection_test
- riihi.control_test

The first three tables correspond to each of the logical data groups `event_connheader`, `event_stmt`, and `event_subsection`. The last table, `rihi.control_test`, is the control table. The control table contains event monitor metadata, specifically, from the `event_start`, `event_dbheader` (`conn_time` monitor element only), and `event_overflow` logical data groups.

Monitor elements are written to the overflow group only for *non-blocked* event monitors. With non-blocked event monitors, agents that generate events do not wait for the event buffers to be written to the table if the buffers are full. Instead, they discard monitor data coming from agents when data is coming faster than the event monitor can write the data. In this case, the event monitor records information in the control table to indicate that an overflow has taken place. Included in this information is the monitor element **message**, which in the event of an overflow contains the text `OVERFLOW:n`, where *n* represents the number of event records that were discarded because the event buffers were full.

Whenever a write-to-table event monitor is activated, it acquires an IN or IX table lock on each target table to prevent the table from being modified while the event monitor is active. Table locks are maintained on all tables while the event monitor is active. If exclusive access is required on any of the target tables (for example, to run a utility), deactivate the event monitor to release the table locks before attempting such access.

Each column name in a target table matches an event monitor element identifier. Any event monitor element that does not have a corresponding target table column is ignored.

You must manually prune write-to-table event monitor target tables, including the unformatted event (UE) tables. On highly active systems, event monitors can quickly fill disk space because of the high volume of data that they record. Unlike defining event monitors that write to files or named pipes, you can define write-to-table event monitors to record information from only certain logical data groups or monitor elements. You can use this feature to collect only the data that is relevant to your purposes and reduce the volume of data that event monitors generate. For example, the following statement defines an event monitor that captures connection events only from the `event_conn` logical data group and includes only the **lock_waits** monitor element:

```
CREATE EVENT MONITOR conn_monitor FOR CONNECTIONS WRITE TO TABLE
CONN(INCLUDES(lock_waits))
```

You might not want to have the target tables for an event monitor in the default schema, with default table names, in the default table space. If you anticipate high volumes of monitoring data, you might want the target tables to exist in their own table space. You can specify the schema, table, and table space names for the `CREATE EVENT MONITOR` statement. The schema name and table name form a derived name for the table. You can add the table space name after the table name by using the optional `IN` clause. Unlike the target tables, which the DB2 database manager automatically creates, a table space must exist if it you include it in an event monitor definition. If you do not specify a table space, a table space for which you have `USE` privileges is assigned.

A target table can be used by only a single event monitor. If you define a target table for another event monitor or if it cannot be created for any other reason, the `CREATE EVENT MONITOR` statement fails.

The table space name can be added after the table name with the optional IN clause. Unlike the target tables, which the DB2 database manager automatically creates, a table space must already exist if it is included in an event monitor definition. If no table space is specified, then a table space over which the definer has USE privileges will be assigned.

In a partitioned database environment, a write-to-table event monitor is active only on database partitions where the table space containing the event monitor table exists. If the target table space for an active event monitor does not exist on a particular database partition, the event monitor will be deactivated on that database partition, and an error is written to the **db2diag** command log file.

For increased performance in retrieving event monitor data, you can create indexes for the event tables. If you add table attributes such as triggers, relational integrity, and constraints, the event monitor ignores them.

For example, the following statement defines an event monitor that captures STATEMENTS events, using the event_connheader, event_stmt, and event_subsection logical data groups. Each of the three target tables has different schema, table and table space combinations:

```
CREATE EVENT MONITOR test FOR STATEMENTS
WRITE TO TABLE CONNHEADER,
STMT (TABLE mydept.statements),
SUBSECTION (TABLE subsections, IN mytablespace)
```

Assuming that the user riihi issued the previous statement, the derived names and table spaces of the target tables are as follows:

- CONNHEADER: riihi.connheader_test in the default table space
- STMT: mydept.statements in the default table space
- SUBSECTION: riihi.subsections in the mytablespace table space

If a target table does not exist when the event monitor activates, activation continues and data that would otherwise be inserted into the target table is ignored. Correspondingly, if a monitor element does not have a dedicated column in the target table, it is ignored.

For active write-to-table event monitors, there is a risk that the table spaces storing event records can reach their capacity. To control this risk for DMS table spaces, you can define the percentage of table space capacity at which the event monitor is deactivated. You can specify this value in the PCTDEACTIVATE clause for the CREATE EVENT MONITOR statement. For SMS table spaces, the value is set to 100. If you enabled the autoresize feature for the target table space, you should set the PCTDEACTIVATE value to 100.

In a non-partitioned database environment, all write-to-table event monitors are deactivated when the last application terminates (and the database has not been explicitly activated). In a partitioned database environment, write-to-table event monitors are deactivated when the catalog partition deactivates.

Logical data groups and event monitor output tables:

Monitor elements that are frequently used together are grouped into *logical data groups*. Event monitors that write to tables generally produce one output table for each logical data group of monitor elements that they capture.

The following table presents the default target table names by event type.

Table 7. Write-to-table event monitor logical data groups

Event type	Logical data group	Information in logical group	Name of table to which elements belonging to logical group are written
DEADLOCKS ¹	event_connheader	Connection metadata.	CONNHEADER_evmon-name
	event_deadlock	Deadlock data.	DEADLOCK_evmon-name
	event_dlconn	Applications and locks that are involved in deadlock.	DLCONN_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
DEADLOCKS WITH DETAILS ¹	event_connheader	Connection metadata.	CONNHEADER_evmon-name
	event_deadlock	Deadlock data.	DEADLOCK_evmon-name
	event_detailed_dlconn	Applications that are involved in deadlock.	DLCONN_evmon-name
	dllock	Locks that are involved in deadlock.	DLLOCK_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
DEADLOCKS WITH DETAILS HISTORY ¹	event_connheader	Connection metadata.	CONNHEADER_evmon-name
	event_deadlock	Deadlock data.	DEADLOCK_evmon-name
	event_detailed_dlconn	Applications that are involved in deadlock.	DLCONN_evmon-name
	dllock	Locks that are involved in deadlock.	DLLOCK_evmon-name
	event_stmt	List of the previous statements in the unit of work.	STMTHIST_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
DEADLOCKS WITH DETAILS HISTORY VALUES ¹	event_connheader	Connection metadata.	CONNHEADER_evmon-name
	event_deadlock	Deadlock data.	DEADLOCK_evmon-name
	event_detailed_dlconn	Applications that are involved in deadlock.	DLCONN_evmon-name
	dllock	Locks that are involved in deadlock.	DLLOCK_evmon-name
	event_stmt_history	List of the previous statements in the unit of work.	STMTHIST_evmon-name
	STMTVALS	Input data values of statements in STMTHIST table.	STMTVALS_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name

Table 7. Write-to-table event monitor logical data groups (continued)

Event type	Logical data group	Information in logical group	Name of table to which elements belonging to logical group are written
STATEMENT	event_connheader	Connection metadata.	CONNHEADER_ <i>evmon-name</i>
	event_stmt	Statement data.	STMT_ <i>evmon-name</i>
	event_subsection	Statement data that is specific to subsection.	SUBSECTION_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
TRANSACTIONS ³	event_connheader	Connection metadata.	CONNHEADER_ <i>evmon-name</i>
	event_xact	Transaction data.	XACT_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
CONNECTIONS	event_connheader	Connection metadata.	CONNHEADER_ <i>evmon-name</i>
	event_conn	Connection data.	CONN_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
	event_connmemuse	Memory pool metadata.	CONNMEMUSE_ <i>evmon-name</i>
DATABASE	event_db	Database manager data.	DB_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
	event_dbmemuse	Memory pool metadata.	DBMEMUSE_ <i>evmon-name</i>
BUFFERPOOLS	event_bufferpool	Buffer pool data.	BUFFERPOOL_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
TABLESPACES	event_tablespace	Table space data.	TABLESPACE_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>
TABLES	event_table	Table data.	TABLE_ <i>evmon-name</i>
	CONTROL ²	Event monitor metadata.	CONTROL_ <i>evmon-name</i>

Table 7. Write-to-table event monitor logical data groups (continued)

Event type	Logical data group	Information in logical group	Name of table to which elements belonging to logical group are written
ACTIVITIES	event_activity	Activities that completed executing or were captured in progress.	ACTIVITY_evmon-name
	event_activitystmt	Statement information for activities that are statements.	ACTIVITYSTMT_evmon-name
	event_activityvals	Input data values for activities that have them. The following data types are not reported: CLOB, REF, BOOLEAN, STRUCT, DATALINK, LONG VARGRAPHIC, LONG, XMLLOB, and DBCLOB.	ACTIVITYVALS_evmon-name
	activity_metrics	Activities metrics.	ACTIVITYMETRICS_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
STATISTICS	event_scstats	Statistics that are computed from the activities that executed within each service class, work class, or workload in the system.	SCSTATS_evmon-name
	event_wcstats		WCSTATS_evmon-name
	event_wlstats		WLSTATS_evmon-name
	event_histogrambin		HISTOGRAMBIN_evmon-name
	event_qstats		QSTATS_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
THRESHOLD VIOLATIONS	event_thresholdviolations	List of thresholds that were violated and the times of violations.	THRESHOLDVIOLATIONS_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name
LOCKING	lock	Summary lock wait, lock timeout or deadlock event information.	LOCK_EVENTevmon-name
	lock_participants	Information about lock participants.	LOCK_PARTICIPANTS_evmon-name
	lock_participant_activities	Activity data for each lock participant.	LOCK_PARTICIPANT_ACTIVITIES_evmon-name
	lock_activity_values	Details about the specific data being processed by a specific activity.	LOCK_ACTIVITY_VALUES_evmon-name
	CONTROL ²	Event monitor metadata.	CONTROL_evmon-name

Table 7. Write-to-table event monitor logical data groups (continued)

Event type	Logical data group	Information in logical group	Name of table to which elements belonging to logical group are written
PACKAGE CACHE	pkgcache	Summary package cache event information. This information includes detailed metrics in XML format in the METRICS column.	PKGCACHE_EVENT _{evmon-name}
	pkgcache_metrics	Table containing the same metrics that are included in the METRICS column of the PKGCACHE table.	PKGCACHE_METRICS_ _{evmon-name}
	CONTROL ²	Event monitor metadata.	CONTROL_ _{evmon-name}
UNIT OF WORK	uow	Summary unit of work event information. This information includes detailed metrics in XML format in the METRICS column.	UOW_EVENT _{evmon-name}
	uow_metrics	Table containing the same metrics that are included in the METRICS column of the PKGCACHE table.	UOW_METRICS_ _{evmon-name}
	uow_package_list	Package list detail information. ⁴	UOW_PACKAGE_LIST_ _{evmon-name}
	uow_executable_list	Executable list information. ⁴	UOW_EXECUTABLE_LIST_ _{evmon-name}
	CONTROL ²	Event monitor metadata.	CONTROL_ _{evmon-name}
1	This option has been deprecated and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.		
2	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.		
3	This option has been deprecated and might be removed in a future release. Use the CREATE EVENT MONITOR FOR UNIT OF WORK statement to monitor transaction events.		
4	Unless you explicitly specify which output tables to create for the unit of work event monitor, this table is included by default. If you do not set the configuration parameter for collecting the related information (mon_uow_pkglist or mon_uow_execlist) to ON, the table is created, but it contains no data.		

The following logical data groups are not collected for write-to-table event monitors:

- log_stream_header
- log_header

- dbheader (only the **conn_time** monitor element is collected)

The data type of each column in an event monitor table corresponds to the data type of the monitor element represented by the column. The following table contains a set of data type mappings that correspond the original system monitor data types of the monitor elements (found in `sqlmon.h` file) to the SQL data types of the table columns.

Table 8. System Monitor Data Type Mappings

System monitor data type	SQL data type
SQLM_TYPE_STRING	CHAR[n], VARCHAR[n], CLOB[n]
SQLM_TYPE_U8BIT and SQLM_TYPE_8BIT	SMALLINT, INTEGER, or BIGINT
SQLM_TYPE_U16BIT and SQLM_TYPE_16BIT	SMALLINT, INTEGER, or BIGINT
SQLM_TYPE_U32BIT and SQLM_TYPE_32BIT	INTEGER or BIGINT
SQLM_TYPE_U64BIT and SQLM_TYPE_64BIT	BIGINT
SQLM_TIMESTAMP	TIMESTAMP
SQLM_TIME	BIGINT
SQLCA: SQLERRMC	VARCHAR[72]
SQLCA: SQLSTATE	CHAR[5]
SQLCA: SQLWARN	CHAR[11]
SQLCA: other fields	INTEGER or BIGINT
SQLM_TYPE_HANDLE	BLOB[n]

Note:

1. All columns are NOT NULL.
2. Because the performance of tables with CLOB columns is inferior to tables that have VARCHAR columns, consider using the TRUNC keyword when specifying the `stmt evmGroup` (or `dlconn evmGroup`, when using deadlocks with details).
3. `SQLM_TYPE_HANDLE` is used to represent the compilation environment handle object.

Creating event monitors that write to unformatted event (UE) tables

If the performance of event monitor data collection is particularly important, you might choose to have your event monitor write its output to an unformatted event (UE) table. Most of the data written to a UE table is written as inline binary data, which allows for faster I/O as data is collected.

Another advantage of UE tables over regular tables for event monitors is that you generally do not have to be concerned at event monitor creation time with different options such as what buffer size to use, whether the event monitor is blocked or unblocked, or what types of data (logical groups) must be collected. However, because most of the data collected is in binary format, you must post-process the UE table to be able to examine the event data.

Note: Starting in IBM DB2 10.1 Version 10.1, the following features related to the UE tables are available:

- You can use the procedure `EVMON_UPGRADE_TABLES` to upgrade the UE tables produced by event monitors in earlier releases. This capability lets you more easily retain event monitor data as you upgrade your DB2 product.
- All event monitors that can write their output to UE tables can also write to regular tables.
- You can prune unneeded data from UE tables using the option `PRUNE_UE_TABLE` of the procedure `EVMON_FORMAT_UE_TO_TABLES`.

Before you begin

Keep the following considerations in mind when creating an event monitor that writes to an unformatted event table:

- You need `SQLADM` or `DBADM` authority to create an event monitor that writes to a UE table.
- Use a table space for your unformatted event tables that is optimized for performance. When you create the table space, keep the following guidelines in mind:
 - Specify a page size (`PAGESIZE`) as large as possible, up to 32KB. A large page size ensures that the BLOB containing the event data can be written inline with the table row. If the page size is too small to allow the BLOB to be inlined, performance of the event monitor might be diminished. The database manager attempts to inline the `event_data` BLOB column in the unformatted event table, but this is not always possible. To check that the rows in the unformatted event table have been inlined, use the `ADMIN_IS_INLINED` function. If the rows have not been inlined, use the `ADMIN_EST_INLINE_LENGTH` functions to determine how much space the rows need.
 - Specify the `NO FILE CACHING SYSTEM` option.
- In a partitioned database environment, consider on which partitions the table space exists. If a table space for a target unformatted event table does not exist on some database partition, data for that target unformatted event table is ignored. This behavior allows users to choose a subset of database partitions for monitoring to be chosen, by creating a table space that exists only on certain database partitions.

About this task

The following event monitor types support the use of UE tables:

- Unit of work
- Package Cache
- Locking

Note: Despite their name, unformatted event tables are still relational tables. The main difference between a UE table produced by, say, a locking event monitor and a regular table produced by a locking event monitor is that most of the data in a UE table is written in binary format in the `EVENT_DATA` column. See “Unformatted event table column definitions” on page 119 for more information about the structure of UE tables.

Procedure

To create an event monitor that writes to a UE table:

- Formulate a CREATE EVENT MONITOR statement, using the WRITE TO UNFORMATTED EVENT TABLE clause. For example, to create a unit of work event monitor called uowmon, you might use a statement like the one that follows:

```
CREATE EVENT MONITOR uowmon FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
```

By default, the name of the UE table that the event monitor creates is the same as the name of the event monitor.

- To specify an alternative to the default table name, use the TABLE clause. For example, if you want to have the UE table called myunitsofwork, construct the statement as follows:

```
CREATE EVENT MONITOR uowmon FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
TABLE myunitsofwork
```

You can also specify the table space in which to store the UE table using the IN *tablespace-name* clause:

```
CREATE EVENT MONITOR uowmon FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
TABLE myunitsofwork
IN mytablespace
```

or

```
CREATE EVENT MONITOR uowmon FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
IN mytablespace
```

The first example places the UE table myunitsofwork in table space mytablespace; the second example places a UE table named uowmon (the default, as no table name is specified) in table space mytablespace.

- By default, any event monitor that writes to a UE table is created to activate automatically on database activation. You can override this behaviour using the MANUALSTART clause:

```
CREATE EVENT MONITOR uowmon FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
MANUALSTART
```

In the preceding example, the event monitor uowmon must always be activated manually, using the SET EVENT MONITOR STATE statement.

What to do next

By default, event monitors that were introduced in Version 9.7 or later are created as AUTOSTART event monitors. They are activated automatically when the database is next activated, and on subsequent database activations thereafter. If you want to activate the event monitor immediately, before the next database activation, use the SET EVENT MONITOR STATE statement to manually start the event monitor. In addition for each of the locking, unit of work and package cache event monitors, you must also enable data collection.

Unformatted event table column definitions:

An unformatted event table is created when you issue a CREATE EVENT MONITOR statement that includes the clause WRITE TO UNFORMATTED EVENT

TABLE. The column definitions are useful when you want to extract data to analyze or prune a table of unneeded data.

The column definitions for the unformatted event table are useful when you want to extract data from an unformatted event table using one of the following routines:

- `EVMON_FORMAT_UE_TO_XML` - extracts data from an unformatted event table into an XML document.
- `EVMON_FORMAT_UE_TO_TABLES` - extracts data from an unformatted event table into a set of relational tables.

The call to these routines accepts a `SELECT` statement that specifies the rows that you want to extract. Use the unformatted event table column definitions to assist with composing your `SELECT` statement.

There is no automatic purging of the event data written to an unformatted event table. You must manually purge data from the table. The column definitions for the unformatted event table are useful when you want to purge a targeted set of records. Another option is to remove all the table rows using the `TRUNCATE TABLE` statement.

As part of the `CREATE EVENT MONITOR` statement, you can specify what to name the associated unformatted event table. If not specified, the name defaults to the same name as the event monitor. The `SYSCAT.EVENTTABLES` catalog view lists event monitors, their associated unformatted table, and other details.

The following table describes the columns in the unformatted event table. The key column is the `event_data` column. The other columns represent identifiers that you can use to locate events of interest. For further attributes of table columns, issue a `DESCRIBE` statement.

Table 9. Unformatted event table column definitions

Column name	Column data type	Column description
<code>appl_id</code>	VARCHAR	<code>appl_id</code> - Application ID monitor element
<code>appl_name</code>	VARCHAR	<code>appl_name</code> - Application name monitor element
<code>event_correlation_id</code>	BIT DATA	An optional event correlation ID. A NULL value indicates that the event correlation ID was not available. The value is based on the event monitor type: <ul style="list-style-type: none"> • LOCKING - Reserved for future use • UOW- Reserved for future use
<code>event_data</code>	BLOB	The entire event record data for an event captured by the event monitor, stored in its original binary form.
<code>event_id</code>	INTEGER	<code>event_id</code> - Event ID monitor element

Table 9. Unformatted event table column definitions (continued)

Column name	Column data type	Column description
event_timestamp	TIMESTAMP	event_timestamp - Event timestamp monitor element
event_type	VARCHAR	event_type - Event Type monitor element monitor element
member	SMALLINT	member - Database member monitor element
partitioning_key	INTEGER	The partitioning key for the table, so that insert operations are performed locally on the database partition where the event monitor is running.
record_seq_num	INTEGER	The sequence number of the record that is stored within the event_data column.
record_type	INTEGER	The type of record that is stored within the event_data column.
service_subclass_name	VARCHAR	service_subclass_name - Service subclass name monitor element
service_superclass_name	VARCHAR	service_superclass_name - Service superclass name monitor element
workload_name	VARCHAR	workload_name - Workload name monitor element
mon_interval_id	BIGINT	mon_interval_id - Monitor interval identifier monitor element

Differences between regular and UE table output:

Generally speaking, the event monitors that can write to both regular and unformatted event (UE) tables capture the same data. However, there are some minor differences to be aware of.

Order of columns

The first difference pertains to the order of the columns of the tables. When the event monitor generates regular tables, compared to the output produced by running `EVMON_FORMAT_UE_TO_TABLES` against a UE table, columns are generally presented in alphabetical order, with two exceptions:

- If a `PARTITION_KEY` column is included in the output, it is the first column.
- For tables that report metrics, related columns are grouped together. For example, columns that report time spent in the system are grouped together.

Columns returned

The other pertains to data types of columns. In most cases, the columns in write-to-table event monitors are the same as the columns produced by running

EVMON_FORMAT_UE_TO_TABLES against a UE table. There are some differences however. These differences are summarized in Table 10.

Table 10. Summary of differences in returned columns

Logical data group	Columns returned in regular tables	Columns returned from EVMON_FORMAT_UE_TO_TABLES
All groups	PARTITION_KEY column included	
uow	TYPE column included	TYPE column excluded
uow_package_list	ROUTINE_ID data type is BIGINT	ROUTINE_ID data type is INTEGER
pkgcache	XMLID column excluded	XMLID column included
lock	DL_CONNS data type is BIGINT	DL_CONNS data type is INTEGER
	ROLLED_BACK_PARTICIPANT_NO data type is SMALLINT	ROLLED_BACK_PARTICIPANT_NO data type is INTEGER
	XMLID column excluded	XMLID column included
lock_participants	AGENT_STATUS data type is BIGINT	AGENT_STATUS data type is INTEGER
	APPL_ID data type is VARCHAR(64)	APPL_ID data type is VARCHAR(128)
	APPL_NAME data type is VARCHAR(255)	APPL_NAME data type is VARCHAR(128)
	CLIENT_ACCTING data type is VARCHAR(200)	CLIENT_ACCTNG data type is VARCHAR(255)
	TABLESPACE_NAME data type is VARCHAR(18)	TABLESPACE_NAME data type is VARCHAR(128)
	XMLID column excluded	XMLID column included
	INTERNAL_DATA column included	Data contained in INTERNAL_DATA is not included.
lock_participant_activities	ACTIVITY_ID data type is BIGINT	ACTIVITY_ID data type is INTEGER
	Includes EVENT_ID, EVENT_TYPE and EVENT_TIMESTAMP rather than XMLID ¹	XMLID column included
	CONSISTENCY_TOKEN is CHAR(8)	CONSISTENCY_TOKEN is VARCHAR(8)
lock_activity_values	ACTIVITY_ID data type is BIGINT	ACTIVITY_ID data type is INTEGER
	PARTICIPANT_NO data type is SMALLINT	PARTICIPANT_NO data type is INTEGER
	Includes EVENT_ID, EVENT_TYPE and EVENT_TIMESTAMP instead of XMLID. ¹	XMLID column included

Table 10. Summary of differences in returned columns (continued)

Logical data group	Columns returned in regular tables	Columns returned from EVMON_FORMAT_UE_TO_TABLES
	1. The XMLID column represents a compound monitor element made up of the concatenation of the event_header, event_id, event_type, event_timestamp and partition monitor elements.	

Creating a file event monitor

When creating an event monitor you must determine where the information it collects is to be stored. File event monitors store event records in files. File event monitors and their options are defined by the CREATE EVENT MONITOR statement.

Before you begin

You will need SQLADM or DBADM authority to create a file event monitor.

About this task

A file event monitor streams event records to a series of 8-character numbered files with the extension "evt" (for example, 00000000.evt, 00000001.evt, and 00000002.evt). The data should be considered to be one logical file even though the data is broken up into smaller pieces (that is, the start of the data stream is the first byte in the file 00000000.evt; the end of the data stream is the last byte in the file nnnnnnnn.evt). An event monitor will never span a single event record across two files.

Procedure

1. Indicate that event monitor data is to be collected in a file (or set of files), and provide a directory location where event files are to be stored.

```
CREATE EVENT MONITOR dlmon FOR eventtype
        WRITE TO FILE '/tmp/dlevents'
```

dlmon is the name of the event monitor.

/tmp/dlevents is the name of the directory path (on UNIX systems) where the event monitor is to write the event files.

2. Specify the types of events to be monitored. You can monitor one or more event types with a single event monitor.

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
        WRITE TO FILE '/tmp/dlevents'
```

This event monitor will monitor for the CONNECTIONS and DEADLOCKS WITH DETAILS event types.

3. Specify the size of the file event monitor buffers (in 4K pages) by adjusting the BUFFERSIZE value:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
        WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
```

8 is the capacity in 4K pages of the two event file buffers.

The default size of each buffer is 4 pages (two 16K buffers are allocated). The minimum size is 1 page. The maximum size of the buffers is limited by the size of the monitor heap, because the buffers are allocated from that heap. For performance reasons, highly active event monitors should have larger buffers than relatively inactive event monitors.

4. Indicate if you need the event monitor to be blocked or non-blocked. For blocked event monitors, each agent that generates an event will wait for the event buffers to be written to file if they are full. This can degrade database performance, as the suspended agent and any dependent agents cannot run until the buffers are clear. Use the `BLOCKED` clause to ensure no losses of event data:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    BLOCKED
```

Event monitors are blocked by default. If database performance is of greater importance than collecting every single event record, use non-blocked event monitors. In this case, each agent that generates an event will not wait for the event buffers to be written to file if they are full. As a result, non-blocked event monitors are subject to data loss on highly active systems. Use the `NONBLOCKED` clause to minimize the additional processing time caused by event monitoring:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED
```

5. Specify the maximum number of event files that can be collected for an event monitor. If this limit is reached, the event monitor will deactivate itself.

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED MAXFILES 5
```

5 is the maximum number of event files that will be created.

You can also specify that there is no limit to the number of event files that the event monitor can create:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED MAXFILES NONE
```

6. Specify the maximum size (in 4K pages) for each event file created by an event monitor. If this limit is reached, a new file is created.

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED MAXFILES 5 MAXFILESIZE 32
```

32 is the maximum number of 4K pages that an event file can contain.

This value must be greater than the value specified by the `BUFFERSIZE` parameter. You can also specify that there is to be no limit on an event file's size:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED MAXFILES NONE MAXFILESIZE NONE
```

7. Specify if the event monitor is to be activated automatically each time the database starts. By default, event monitors (with the exception of the WLM event monitors) are not activated automatically when the database starts.
 - To create an event monitor that starts automatically when the database starts, issue the following statement:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
    WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
    NONBLOCKED AUTOSTART
```
 - To create an event monitor that does not start automatically when the database starts, issue the following statement:

```
CREATE EVENT MONITOR dlmon FOR CONNECTIONS, DEADLOCKS WITH DETAILS
WRITE TO FILE '/tmp/dlevents' BUFFERSIZE 8
NONBLOCKED MANUALSTART
```

8. To activate or deactivate an event monitor, use the SET EVENT MONITOR STATE statement.

Results

Once a file event monitor is created and activated, it will record monitoring data as its specified events occur.

Event monitor file management:

With some event monitors, you can have event data written to text files. You can configure some upper bounds on the number of files created, as well as their size with options on the CREATE or ALTER EVENT MONITOR statements.

A file event monitor enables the event monitor to store its event records in files. All the output of the event monitor goes in the directory supplied in the FILE parameter for the CREATE EVENT MONITOR statement. Before the monitor is activated, the directory must exist, or the SET EVENT MONITOR command will return an error; the directory will not be created by the database manager if it does not already exist.

Important: When a file event monitor is first activated, a control file named db2event.ct1 is created in this directory. Do not remove or modify this file.

By default, an event monitor writes its trace to a single file, called 00000000.evt. This file keeps growing as long as there is space on the file system. If you specified a file size limit with the **MAXFILESIZE** parameter of the CREATE EVENT MONITOR statement, then when a file is full, output is directed to a new file. The number that makes up the file name is increased by 1 each time a new file is created. Hence, the active file is the file with the highest number.

You can limit the maximum size of the entire event monitor trace by also using the **MAXFILES** parameter of the CREATE EVENT MONITOR statement. When the number of files reaches the maximum defined by MAXFILES, the event monitor deactivates itself and the following message is written to the administration notification log.

```
DIA1601I Event Monitor monitor-name was deactivated when it reached
its preset MAXFILES and MAXFILESIZE limit.
```

If you receive this message, do not delete any of the event monitor files. If you do, you will not be able to view any of the event monitor information (even that contained in any remaining files) using the **db2evmon** command. Instead take one of the following actions:

- Recreate the event monitor without the **MAXFILES** and **MAXFILESIZE** limits.
- Leave the limits imposed by the **MAXFILES** and **MAXFILESIZE** parameters in place, but move all but the most recent *.evt files in the directory to another directory or file system. You can then view the event monitor information from the files in the new directory. You can create a script to do this automatically if you want.

Either way, you must reactivate the event monitor using the statement **SET EVENT MONITOR event-monitor-name STATE 1** to start collecting information again after you receive the DIA1601I message.

When a file event monitor is restarted, it can either erase any existing data or append new data to it. This option is specified in the CREATE EVENT MONITOR statement, where either an APPEND monitor or a REPLACE monitor can be created. APPEND is the default option. An APPEND event monitor starts writing at the end of the file it was last using. If you have removed that file, the next file number in sequence is used. When an append event monitor is restarted, only a start_event is generated. The event log header and database header are generated only for the first activation. A REPLACE event monitor always deletes existing event files and starts writing at 00000000.evt.

Note: If you did not use the REPLACE option for the event monitor, you can perform the following steps to force the event monitor to start collecting a new set of data:

1. Deactivate the event monitor using the **SET EVENT MONITOR *event-monitor-name* STATE 0** command.
2. Delete all files in the directory that was specified by the FILE option of the CREATE EVENT MONITOR statement.
3. Reactivate the event monitor using the **SET EVENT MONITOR *event-monitor-name* STATE 1** command.

If a file event monitor runs out of disk space, it shuts itself down after logging a system-error-level message in the administration notification log.

You might want to process monitor data while the event monitor is active. This is possible, and furthermore, when you are finished processing a file, you can delete it, freeing up space for further monitoring data. An event monitor cannot be forced to switch to the next file unless you stop and restart it. It must also be in APPEND mode. To track which events have been processed in the active file, you can create an application that simply tracks the file number and location of the last record processed. When processing the trace the next time around, the application can seek to that file location.

Creating a pipe event monitor

When creating an event monitor you must determine where the information it collects is to be stored. A pipe event monitor streams event records directly from the event monitor, to a named pipe.

Before you begin

- You need SQLADM or DBADM authority to create a pipe event monitor.
- This task assumes the named pipe is already created. To create a named pipe on UNIX or Linux systems, use the **mkfifo** command provided on those systems.

About this task

It is the responsibility of the monitoring application to promptly read the data from the pipe as the event monitor writes the event data. If the event monitor is unable to write data to the pipe (for example, if it is full), monitor data will be lost.

Pipe event monitors are defined with the CREATE EVENT MONITOR statement.

Procedure

1. Indicate that event monitor data is to be directed to a named pipe.

```
CREATE EVENT MONITOR myevmon FOR eventtype
WRITE TO PIPE '/home/dbadmin/dlevents'
```

myevmon is the name of the event monitor.

/home/dbadmin/dlevents is the name of the named pipe (on UNIX) to where the event monitor will direct the event records. The CREATE EVENT MONITOR statement supports UNIX and Windows pipe naming syntax.

The named pipe specified in the CREATE EVENT MONITOR statement must be present and open when you activate the event monitor. If you specify that the event monitor is to start automatically, the named pipe must exist before the event monitor's creation.

2. Specify the types of events to be monitored. You can monitor one or more event types with a single event monitor.

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
        WRITE TO PIPE '/home/dbadmin/myevents'
```

This event monitor will monitor for the BUFFERPOOLS and TABLESPACES event types.

3. Specify if the event monitor is to be activated automatically each time the database starts. By default, event monitors are not activated automatically when the database starts.

- To create an event monitor that starts automatically when the database starts, issue the following statement:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
        WRITE TO PIPE '/home/dbadmin/myevents'
        AUTOSTART
```

- To create an event monitor that does not start automatically when the database starts, issue the following statement:

```
CREATE EVENT MONITOR myevmon FOR BUFFERPOOLS, TABLESPACES
        WRITE TO PIPE '/home/dbadmin/myevents'
        MANUALSTART
```

4. Start the client application that reads from the named pipe. For example, you can start the db2evmon tool to process the data as it is delivered to the pipe.
5. To activate or deactivate an event monitor, use the SET EVENT MONITOR STATE statement.

Results

After a pipe event monitor is created and activated, it will record monitoring data as its specified events occur.

Event monitor named pipe management:

With some event monitors, you can have event data written to named pipes. What follows are some guidelines on how to use named pipe event monitors more effectively.

A pipe event monitor enables the processing of the event monitor data stream through a named pipe. Using a pipe event monitor is desirable if you need to process event records in real time. Another important advantage is that your application can ignore unwanted data as it is read off the pipe, giving the opportunity to considerably reduce storage requirements.

On AIX®, you can create named pipes by using the mkfifo command. On Linux and other UNIX types (such as the Solaris operating system) use the pipe() routine. On Windows, you can create named pipes by using the CreateNamedPipe() routine.

When you direct data to a pipe, I/O is always blocked and the only buffering is that performed by the pipe. It is the responsibility of the monitoring application to promptly read the data from the pipe as the event monitor writes the event data. If the event monitor is unable to write the data to the pipe (for example, because the pipe is full), monitor data will be lost.

In addition, there must be enough space in the named pipe to handle incoming event records. If the application does not read the data from the named pipe fast enough, the pipe will fill up and overflow. The smaller the pipe buffer, the greater the chance of an overflow.

When a pipe overflow occurs, the monitor creates overflow event records indicating that an overflow has occurred. The event monitor is not turned off, but monitor data is lost. If there are outstanding overflow event records when the monitor is deactivated, a diagnostic message will be logged. Otherwise, the overflow event records will be written to the pipe when possible.

The amount of data that can be written to a pipe at any one time is determined by the underlying operating system. If your operating system allows you to define the size of the pipe buffer, use a pipe buffer of at least 32K. For high-volume event monitors, you should set the monitoring application's process priority equal to or higher than the agent process priority.

It is possible for the data stream coming from a single write operation of an activities or statistics event monitor to contain more data than can be written to the named pipe. In these situations, the data stream is split into blocks that can fit into the buffer, and each block is identified with a header: The first block is identified by a logical header with the element ID `SQLM_ELM_EVENT_STARTPIPEBLOCK`. The last block is identified by a logical header with element ID `SQLM_ELM_EVENT_ENDPIPEBLOCK`. All blocks in between are identified by logical headers with element ID `SQLM_ELM_EVENT_MIDPIPEBLOCK`. The monitoring application that is reading the pipe must be aware of these headers, and reassemble the blocks back into the complete data stream, stripping off the block headers as needed and reassembling the blocks to form a complete, valid data stream. The `db2evmon` tool provides this capability; it provides formatted output for all events generated by an event monitor that writes to a named pipe, reassembling the blocks as needed. If you want to process only selected events or monitor elements, you can write your own application to do so.

Write-to-table and file event monitor buffering

For some write-to-table and file event monitors, the event monitor stores output in a buffer before writing it to a file or table.

Table 11 shows which event monitors use such output buffers.

Table 11. Event monitors and output buffers

Event monitor type	Writes output to buffers before writing to disk?
Activities	No
Bufferpools	Yes
Change history	No
Connections	Yes
Database	Yes
Deadlocks (all versions)	Yes

Table 11. Event monitors and output buffers (continued)

Event monitor type	Writes output to buffers before writing to disk?
Locking	No
Package cache	No
Statements	Yes
Statistics	Yes
Tablespaces	Yes
Tables	Yes
Transactions	Yes
Unit of work	No

Event monitors that do not use buffers use a newer, faster mechanism for writing output to disk, eliminating the need for buffers.

For those event monitors that use buffers, records are written to disk automatically when a buffer is full. Therefore, you can improve monitoring performance for event monitors with high amounts of throughput by specifying larger buffers to reduce the number of disk accesses. To force an event monitor to flush its buffers, you must either deactivate it or empty the buffers by using the FLUSH EVENT MONITOR statement.

Event monitors that use buffers let you specify whether the event monitor output is to be *blocked* or *non-blocked*. A blocked event monitor suspends the database process that is sending monitor data when both of its buffers are full. This is to ensure that no event records are discarded while the blocked event monitor is active. The suspended database process and consequently, any dependent database processes cannot run until a buffer has been written. This can introduce a significant performance consumption, depending on the type of workload and the speed of the I/O device. Event monitors are blocked by default.

A non-blocked event monitor discards monitor data coming from agents when data is coming faster than the event monitor can write the data. This prevents event monitoring from becoming a performance burden on other database activities.

An event monitor that has discarded event records generates an overflow event. It specifies the start and stop time during which the monitor was discarding events and the number of events that were discarded during that period. It is possible for an event monitor to terminate or be deactivated with a pending overflow to report. If this occurs, the following message is written to the admin log:

```
DIA2503I Event Monitor monitor-name had a pending overflow record
when it was deactivated.
```

Loss of event monitoring data can also occur for individual event records. If the length of an event record exceeds the event buffer size, the data that does not fit in the buffer is truncated. For example, this situation might occur if you are capturing the stmt_text monitor element and applications attached to the database being monitored issue lengthy SQL statements. If you must capture all of the event record information, specify larger buffers. Keep in mind that larger buffers result in less frequent writes to file or table.

Event monitor self-describing data stream

An event monitor that writes to a pipe or file outputs a binary stream of logical data groupings that are exactly the same for both pipe and file event monitors. You can format the data stream either by using the **db2evmon** command or by developing a client application.

This data stream is presented in a self-describing format.

Figure 4 shows the structure of the data stream and Table 12 on page 131 provides some examples of the logical data groups and monitor elements that could be returned.

Note: In the examples and tables descriptive names are used for the identifiers. These names are prefixed by **SQLM_ELM_** in the actual data stream. For example, **db_event** would appear as **SQLM_ELM_DB_EVENT** in the event monitor output. Types are prefixed with **SQLM_TYPE_** in the actual data stream. For example, headers appear as **SQLM_TYPE_HEADER** in the data stream.

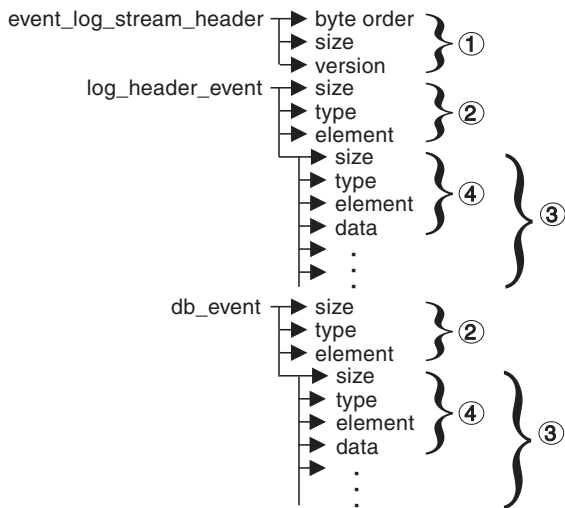


Figure 4. Pipe or File Event Monitor Data Stream

1. The structure of the `sqlm_event_log_data_stream_header` is different than the other headers in the data stream. The version field determines if the output can be processed as a self-describing data stream.

This header has the same size and type as pre-Version 6 event monitor streams. This allows applications to determine if the event monitor output is self-describing or is in the pre-Version 6 static format.

Note: This monitor element is extracted by reading `sizeof(sqlm_event_log_data_stream)` bytes from the data stream.

2. Each logical data group begins with a header that indicates its size and element name. This does not apply `event_log_stream_header`, as its size element contains a dummy value to maintain backwards compatibility.
3. The size element in the header indicates the size of all the data in that logical data group.
4. Monitor element information follows its logical data group header and is also self-describing.

Table 12. Sample event data stream

Logical Data Group	Data Stream	Description
event_log_stream_header	<pre> └─sqlm_little_endian └─200 └─sqlm_dbmon_version9 </pre>	<p>Not used (for compatibility with previous releases). Not used (for compatibility with previous releases). The version of the database manager that returned the data. Event monitors write data in the self-describing format.</p>
log_header_event	<pre> └─100 └─header └─log_header └─4 └─u32bit └─byte_order └─little_endian └─2 └─u16bit └─codepage_id └─850 </pre>	<p>Size of the logical data group. Indicates the start of a logical data group. Name of the logical data group. Size of the data stored in this monitor element. Monitor element type - 32 bit numeric. The name of the monitor element collected. The collected value for this element. Size of the data stored in this monitor element. Monitor element type - unsigned 16 bit numeric. The name of the monitor element collected. The collected value for this element.</p>
db_event	<pre> └─100 └─header └─db_event └─4 └─u32bit └─lock_waits └─2 </pre>	<p>Size of the logical data group. Indicates the start of a logical data group. Name of the logical data group. Size of the data stored in this monitor element Monitor element type - unsigned 32 bit numeric. The name of the monitor element collected. The collected value for this element.</p>

The event_log_stream_header identifies the version of the database manager that returned the data. Event monitors write their data in the self-describing format. An event monitor, unlike a snapshot monitor, does not have a **size** element that returns the total size of the trace. The number present in event_log_stream_header is a dummy value present for backwards compatibility. The total size of an event trace is not known when the event_log_stream_header is written. You typically read an event monitor trace until you reach an end of file or pipe.

The log header describes the characteristics of the trace, containing information such as the memory model (for example little endian) of the server where the trace was collected, and the code page of the database. You might have to do byte swapping on numeric values, if the system where you read the trace has a different memory model than the server (for example, if you are reading a trace from a UNIX server on a Windows 2000 system). Code page translation might also need to be done if the database is configured in a different language than the machine from which you read the trace. When reading the trace, you can use the **size** element to skip a logical data group in the trace.

Event type mappings to logical data groups

For file and pipe event monitors, event monitor output consists of an ordered series of logical data groupings. Regardless of the event monitor type, the output records always contain the same starting logical data groups.

These frame the logical data groups whose presence varies depending on the event types recorded by the event monitor.

For file and pipe event monitors, event records may be generated for any connection and may therefore appear in mixed order in the stream. This means

that you may get a transaction event for Connection 1, immediately followed by a connection event for Connection 2. However, records belonging to a single connection or a single event will appear in their logical order. For example, a statement record (end of statement) always precedes a transaction record (end of UOW), if any. Similarly, a deadlock event record always precedes the deadlocked connection event records for each connection involved in the deadlock. The **application id** or **application handle (agent_id)** can be used to match records with a connection.

Connection header events are normally written for each connection to the database. For deadlocks with details event monitors, they are only written when the deadlock occurs. In this case, connection header events are only written for participants in the deadlock and not for all connections to the database.

The logical data groupings are ordered according to four different levels: Monitor, Prolog, Contents, and Epilog. Following are detailed descriptions for each level, including the corresponding event types and logical data groups.

Monitor

Information at the Monitor level is generated for all event monitors. It consists of event monitor metadata.

Table 13. Event Monitor Data Stream: Monitor Section

Event type	Logical data group	Available information
Monitor Level	event_log_stream_header	Identifies the version level and byte order of the event monitor. Applications can use this header to determine whether they can handle the evmon output stream.

Prolog

The Prolog information is generated when the event monitor is activated.

Table 14. Event Monitor Data Stream: Prolog Section

Event type	Logical data group	Available information
Log Header	event_log_header	Characteristics of the trace, for example server type and memory layout.
Database Header	event_db_header	Database name, path and activation time.
Event Monitor Start	event_start	Time when the monitor was started or restarted.
Connection Header	event_connheader	One for each current connection, includes connection time and application name. Event connection headers are only generated for connection, statement, transaction, and deadlock event monitors. Deadlocks with details event monitors produce connection headers only when a deadlock occurs.

Contents

Information specific to the event monitor's specified event types is presented in the Contents section.

Table 15. Event Monitor Data Stream: Contents Section

Event type	Logical data group	Available information
Statement Event	event_stmt	Statement level data, including text for dynamic statements. Statement event monitors do not log fetches.
Subsection Event	event_subsection	Subsection level data.
Transaction Event ¹	event_xact	Transaction level data.
Connection Event	event_conn	Connection level data.
Deadlock Event	event_deadlock	Deadlock level data.
Deadlocked Connection Event	event_dlconn	One for each connection involved in the deadlock, includes applications involved and locks in contention.
Deadlocked Connection Event with Details	event_detailed_dlconn, lock	One for each connection involved in the deadlock, includes applications involved, locks in contention, current statement information, and other locks held by the application contention.
Overflow	event_overflow	Number of records lost - generated when writer cannot keep up with a (non-blocked) event monitor.
Deadlocks with details history ²	event_stmt_history	List of statements executed in any unit of work that was involved in a deadlock.
Deadlocks with details history values ²	event_data_value	Parameter markers for a statement in the event_stmt_history list.
Activities	event_activity	List of activities that completed executing on the system or were captured before completion.
	event_activystmt	Information about the statement the activity was executing if the activity type was a statement.
	event_activityvals	The data values used as input variables for each activity that is an SQL statement. These data values do not include LOB data, long data, or structured type data.
Statistics	event_scstats	Statistics computed from the activities that executed within each service class, work class, or workload in the system, as well as statistics computed from the threshold queues.
	event_wcstats	
	event_wlstats	
	event_qstats	
	event_histogrambin	

Table 15. Event Monitor Data Stream: Contents Section (continued)

Event type	Logical data group	Available information
Threshold violations	event_thresholdviolations	Information identifying the threshold violated and the time of violation.

- ¹ This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR UNIT OF WORK statement to monitor transaction events.
- ² This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Epilog

The Epilog information is generated during database deactivation (last application finished disconnecting):

Table 16. Event Monitor Data Stream: Epilog Section

Event type	Logical data group	Available information
Database Event	event_db	Database manager level data.
Buffer Pool Event	event_bufferpool	Buffer pool level data.
Table Space Event	event_tablespace	Table space level data.
Table Event	event_table	Table level data.

Displaying a list of event monitors created in your database

You can see what event monitors are already defined in your database by using the catalog view SYSCAT.EVENTMONITORS.

Procedure

To view a list of the event monitors that you defined on your system, query the catalog view SYSCAT.EVENTMONITORS. For example, to see a list of event monitors that includes the event monitor name, the target output type (that is, a regular table, file, named pipe, or unformatted event table), and the owner, you can use a query such as the following one:

```
SELECT SUBSTR(EVMONNAME,1,20) AS EVMON_NAME, TARGET_TYPE, OWNER
FROM SYSCAT.EVENTMONITORS
```

The preceding query returns results similar to those that follow:

EVMON_NAME	TARGET_TYPE	OWNER
DB2DETAILDEADLOCK	F	DBADMIN1
CACHEEVMON	T	DBADMIN1
INVTLOCK	T	DBADMIN1
INVTUOW	T	DBADMIN1
INVTACT	T	DBADMIN1
INVTSTATS	T	DBADMIN1
INVTTHRESHOLD	T	DBADMIN1
TABLE_INVTTABLE	T	DBADMIN1
BUFFER_INVTT	T	DBADMIN1
TABLESPACES_INVTT	T	DBADMIN1

CONNECTIONS_INVT	T	DBADMIN1
TRANSAC_INVT	T	DBADMIN1
DEADLOCK_INVT	T	DBADMIN1
QUINNJN_LOC_UNF	U	DBADMIN1
UNFORM	U	DBADMIN1
RM	U	DBADMIN1
UOWINVT	U	DBADMIN1
LOCK_UP_STAFF	U	DBADMIN1
INVTLOCK2	T	DBADMIN1
STAFF_UOW	T	DBADMIN1
STAFFSTATS	T	DBADMIN1

21 record(s) selected.

Examples

You can also use a catalog view to see which event monitors exist for monitoring a specific type of event. The SYSCAT.EVENTS view returns a list of event monitors and the type of events for which they record data.

```
SELECT SUBSTR(TYPE,1,20) AS EVENT_TYPE,
       SUBSTR(EVMONNAME,1,20) AS EVENT_MONITOR_NAME
FROM SYSCAT.EVENTS
ORDER BY TYPE
```

EVENT_TYPE	EVENT_MONITOR_NAME
-----	-----
ACTIVITIES	INVTACT
BUFFERPOOLS	BUFFER_INVT
CONNECTIONS	CONNECTIONS_INVT
DEADLOCKS	DEADLOCK_INVT
DETAILDEADLOCKS	DB2DETAILDEADLOCK
LOCKING	INVTLOCK
LOCKING	QUINNJN_LOC_UNF
LOCKING	UNFORM
LOCKING	RM
LOCKING	LOCK_UP_STAFF
LOCKING	INVTLOCK2
PKGCACHEBASE	CACHEEVMON
STATISTICS	INVTSTATS
STATISTICS	STAFFSTATS
TABLES	TABLE_INVTTABLE
TABLESPACES	TABLESPACES_INVT
THRESHOLDVIOLATIONS	INVTTHRESHOLD
TRANSACTIONS	TRANSAC_INVT
UOW	INVTUOW
UOW	UOWINVT
UOW	STAFF_UOW

21 record(s) selected.

Event monitors for partitioned databases and databases in a DB2 pureScale environment

Generally, event monitors on partitioned database systems or in a DB2 pureScale® environment work similarly to event monitors that run on nonpartitioned, single-member databases. However, there are some differences to be aware of.

Partitioned database environments

Event monitors that write to regular tables and unformatted event (UE) tables

You cannot create event monitors that write to regular tables and UE tables on a specific partition. Instead, for a partitioned database environment, an event monitor process runs on each of the partitions. More specifically, the

event monitor process runs on the members for each partition that belong to the database partition groups in which the target tables exist.

Each partition where the event monitor process runs has the same set of target tables for a specific event monitor. The data in these tables is different from partition to partition because the data for a specific partition reflects only events that take place on that partition. For table event monitors, you can retrieve aggregate values from all the partitions by issuing SQL statements to collect data from event monitor tables from each partition. For UE table event monitors, you can aggregate data across partitions by using the SQL statement that you specify for the `EVMON_FORMAT_UE_TO_TABLE` stored procedure or by using the `EVMON_FORMAT_UE_TO_XML` table function.

The first column of each event monitor table is named `PARTITION_KEY` and is used as the partitioning key for the table. The value of this column is chosen so that each event monitor process inserts data into the database partition on which the process is running. That is, insert operations are performed locally on the database partition where the event monitor process is running. On any database partition, the `PARTITION_KEY` field contains the same value. As a result, if you drop a data partition and data redistribution is performed, all data on the dropped database partition goes to one other database partition instead of being evenly distributed. Therefore, before dropping a database partition, consider deleting all table rows on that database partition.

In addition, in partitioned database environments, a column named `PARTITION_NUMBER`, or `MEMBER` is defined for each table. This column contains the number of the partition or member on which the data was inserted.

Events are written to the event monitor target tables on those partitions where the table space for the target tables exists. If the table space for the event monitor target tables does not exist on any partition where the event monitor runs, no data is collected on those partitions, and no error is returned. Moreover, no log records for these events are written where the table space does not exist. This behavior means that you can choose a subset of partitions for monitoring by creating a table space that exists only on certain partitions.

During write-to-table event monitor activation, the `CONTROL` table rows for `FIRST_CONNECT` and `EVMON_START` are inserted on all database partitions where the table space for target tables exists.

If a partition is not yet active when an event monitor is activated, the event monitor is activated when that partition is next activated.

Event monitors that write to files and named pipes

File and pipe event monitors, with one exception, capture only events that take place on the database partition on which they are running (the *monitor partition*). Such an event monitor is known as a *local event monitor*. The exception is the `DEADLOCK` event monitor; you can create it as a local or a *global* event monitor. When you create it as a global event monitor, deadlock information is collected on all database partitions and is reported to the specific database partition where the event monitor process runs.³

3. This event monitor is deprecated. The `LOCKING` event monitor is the preferred event monitor for capturing lock and deadlock event information.

When you create a file or pipe event monitor in a partitioned database environment, you can specify the partition that you want it to run on as part of the CREATE EVENT MONITOR statement. If you omit the partition number, the event monitor runs on the database partition that was connected when you created the event monitor.

An event monitor can be activated only if the monitor partition is active. If you use the SET EVENT MONITOR statement to activate an event monitor but the monitor partition is not yet active, event monitor activation occurs when the monitor partition is next started. Furthermore, the event monitor is activated automatically until you explicitly deactivate the event monitor or the instance. For example, consider the following sequence of statements:

```
DB2 CONNECT TO PAYROLL
DB2 CREATE EVENT MONITOR ABC ... ON DBPARTITIONNUM 2
DB2 SET EVENT MONITOR ABC STATE 1
```

After these statements are run, event monitor ABC activates automatically whenever the database PAYROLL is activated on database partition 2. This automatic activation occurs until the statement DB2 SET EVENT MONITOR ABC STATE 0 is issued or partition 2 is stopped.

If you add database partitions, the existing global, table, or UE table event monitors do not automatically start collecting data for the newly created partitions. To collect and record data about the new partitions, you must take one of the following steps:

- For global event monitors (that is, a DEADLOCKS event monitor), restart the event monitors.
- For table or UE table event monitors, drop, re-create, and restart the event monitors.

DB2 pureScale environments

In DB2 pureScale environments, there is effectively one data partition, with two or more members that process data. Thus, when you create an event monitor, event monitor processes run on all members, regardless of whether they write to a file, pipe, tables, or a UE table.

Event data is reported on a per-member basis. As a result, monitor elements or metrics that are associated with a member, such as the **total_cpu_time** monitor element, report data that is specific to that member. However, other monitor elements related to the data itself, such as the **tablespace_total_pages** monitor element, reflect the same values regardless of what member reports them.

Examples

Example 1: Creating a write-to-file event monitor in a partitioned database environment

The example that follows shows how to create an event monitor that runs and collects data for buffer pool-related events on partition 3, writing its output to a file:

```
CREATE EVENT MONITOR bpmon FOR BUFFERPOOLS
WRITE TO FILE '/tmp/dlevents'
ON DBPARTITION 3
```

Example 2: Creating a table event monitor in a partitioned database environment

The example that follows shows how to create a table monitor that runs and collects data for activities-related events and writes its output to a table:

```
CREATE EVENT MONITOR myacts FOR ACTIVITIES
WRITE TO TABLE
```

In this example, because no logical data groups are specified for the event monitor, tables are created for all logical data groups associated with this type of event monitor. Each of these tables is created on each partition in the default table space if the default table space exists on each partition. The data that is collected in the tables on each database partition pertains to events that take place on that partition.

To view event monitor data from selected partitions, issue a SELECT statement that queries those partitions:

```
SELECT TOTAL_CPU_TIME FROM myacts WHERE PARTITION_NUMBER = 3
```

Enabling event monitor data collection

Depending on the type of event monitor you are using, you might need to configure collection after you create the event monitor.

By default, some event monitors collect certain data immediately when activated. Other event monitors require that you explicitly configure data collection independently of creating the event monitor. These types of event monitors are sometimes referred to as *passive* event monitors.

Before you begin

All event monitors must be activated before any data is written its target output table or tables (regular or UE), file or pipe. Some event monitors are configured by default as AUTOSTART event monitors. This means they are activated automatically when the database is activated. Others are configured by default to require that you activate them manually. Either way, you can override the default startup options. However, to start an automatic event monitor after you create it, but before the next database activation, you must use the SET EVENT MONITOR STATE statement to activate it manually.

About this task

Some event monitors support the use of a WHERE clause on the CREATE or ALTER EVENT MONITOR statement to capture event information selectively. The following event monitors, however, provide the ability to control what event data is collected independently of the event monitor definition:

- Activities
- Change history
- Locking
- Statistics
- Unit of work

Some of the event monitors listed collect certain types of data by default after the event monitor is activated; others require that you explicitly enable data collection. Either way, you can enable data collection in one of two ways, depending on the scope of activities for which you want data collected:

All activities in the database

To have monitor data collected across all activities in the database, you modify the appropriate configuration parameter for the type of data you are interested in. For example, to have unit of work data collected for all units of work that run in the database, set `mon_uow_data` to `BASE`. In some cases, the default settings for configuration parameters are such that some type of data is always collected if there is an appropriate event monitor active to receive the data. For example, the default setting for `mon_req_metrics` is `BASE`; unless you override this setting, any active statistics or unit of work event monitor will record the values for the `BASE` set of request monitor elements.

Remember: Event monitors that support the use of the `WHERE` predicate collect only the data that satisfies the conditions specified in that predicate, regardless of the settings for any relevant configuration parameters.

Selected activities

Some event monitors - in particular, the workload management event monitors (threshold violations, statistics and activities) - provide the ability to control data collection for specific workload management objects. For example, you might choose to collect activity information for activities running in a specific service superclass. Configuring collection at this level generally involves adding a `COLLECT` clause to the `CREATE` or `ALTER WORKLOAD` (or `SERVICE CLASS` or `WORK ACTION`) statements to specify what type of information to collect for activities running under the auspices of that WLM object. For example, to enable the collection of extended statistics information for the service class `urgent`, you might use the following statement:

```
ALTER SERVICE CLASS urgent
    COLLECT AGGREGATE ACTIVITY DATA EXTENDED
```

Note: If a `COLLECT` clause is specified in a WLM `CREATE` or `ALTER` statement, the settings specified in the clause take precedence for that WLM object over any database-wide setting configured using a configuration parameter. For example, if `mon_req_metrics` is set to `EXTENDED`, and if workload `payroll` was configured to collect `BASE` request metrics (for example, `CREATE WORKLOAD payroll COLLECT REQUEST METRICS BASE`), then extended request metrics are collected for all activities in the database *except* for the `payroll` workload.

Procedure

To enable collection of data for one of the types of event monitors shown at the beginning of this section, perform the following steps:

1. Determine what, if any data is already collected by default. The data you are interested in might be collected without you having to change any settings.
2. Decide on the scope of activities for which you want to collect data. Do you want to collect data for the entire database, or only for specific workloads, service class or work actions?
3. Decide what types of monitor elements you want to collect. Some event monitors support the collection of different types of monitor data, such as request monitor elements, activity data, and so on.
4. For the different sets of monitor data collected, decide the scope of data to be collected within each set. You generally have the choice of collecting no data (`NONE`), basic data (`BASE`), or extended data (`EXTENDED`). See to determine what data is collected for each setting.

5. Based on the decisions made in the preceding steps, configure data collection using either a configuration parameter or a COLLECT clause.
 - a. To configure collection across the entire database, set the appropriate configuration parameter. For example, to enable the collection of lock wait information with history by the locking event monitor on the database SALES, run the following command.

```
UPDATE DATABASE CONFIGURATION for SALES USING mon_lockwait HISTORY
```

- b. To configure collection for a specific workload, create or modify the workload, including the appropriate COLLECT clause. For example, to configure the collection of lock wait data with statement history for locks waiting longer than 5 seconds in the MANAGERS workload, run a statement like the one that follows:

```
ALTER WORKLOAD MANAGERS  
  COLLECT LOCK WAIT DATA FOR LOCKS WAITING MORE THAN 5 SECONDS  
  WITH HISTORY
```

What to do next

Now that the event monitor is created and active, and data collection is enabled, run your applications or workload.

Methods for accessing event monitor information

Depending on the type of event monitor that you are using and the type of output it generates, there are different options for accessing and viewing event monitor data.

For example:

- Data produced by table event monitors can be queried directly using SQL.
- Data from event monitors that write to pipes can be viewed as it is produced.
- Data from file event monitors can be viewed by opening the output file after the event monitor is deactivated.
- Data from both file and pipe event monitors can also be formatted into a report using the **db2evmon** command.
- Data written to UE tables must be post-processed before it can be examined. UE event monitor data can be converted to tables or to XML, which makes it possible to query the data using SQL or XML query techniques. Alternatively, you can format the data in a UE table into a formatted report without going through a conversion process.

The sections that follow describe the different ways you can access information produced by event monitors.

Accessing event monitor data in regular tables

You can use SQL to directly access event monitor data that is written to regular relational tables.

Before you begin

Before accessing data, you must perform the following tasks:

- Create and activate the event monitor
- Enable data collection if required for the type of event monitor that you are using and the type of data that you want to collect
- Run the workload or applications for which you want to collect monitoring data

Optionally, depending on how you are using the event monitor data, deactivate data collection before you start examining the event data. If the event monitor remains active, it continues to write data to the output tables. Therefore, the results from one query might differ from the results that you obtain by running the same query later on.

About this task

Accessing event monitor data from relational tables involves using SQL to formulate queries to retrieve data from the tables produced by the event monitor.

Procedure

To retrieve information from the tables that are produced by an event monitor that writes to tables:

1. Formulate a SELECT statement to display the monitor element data you want to see. For example, to request lock data for the payroll workload from a locking event monitor named mylocks, you might use a query such as the following one:

```
SELECT DISTINCT CAST(STMT_TEXT AS VARCHAR(25)) STMT, LP.PARTICIPANT_NO,
    VARCHAR(LP.APPL_NAME,10) APPL_NAME, LP.LOCK_MODE_REQUESTED,
    LP.PARTICIPANT_TYPE
FROM LOCK_PARTICIPANT_ACTIVITIES_LOCK_MYLOCKS AS LPA
JOIN LOCK_PARTICIPANTS_LOCK_MYLOCKS AS LP
ON LPA.EVENT_ID = LP.EVENT_ID
WHERE LP.WORKLOAD_NAME = 'PAYROLL'
```

In this example, data from the LOCK_PARTICIPANTS table from the event monitor mylocks is joined with information from the LOCK_PARTICIPANTS_ACTIVITIES table to return the following results.

2. Run the SQL statement.

Results

STMT	PARTICIPANT_NO	APPL_NAME	LOCK_WAIT_VAL
select * from staff	2	db2bp	0
select * from staff	1	db2bp	1000

LOCK_MODE_REQUESTED	PARTICIPANT_TYPE
0	OWNER
1	REQUESTER

2 record(s) selected.

Methods for accessing information in unformatted event tables

There are different ways to access the information in unformatted event (UE) tables. You can generate a text report intended to be read. Alternatively, you can extract the data into relational tables or XML; this approach lets you query the data using SQL or pureXML®.

Event monitors that write to UE tables write event data in a binary format. You can access this data using the db2evmonfmt command or routines provided for this purpose.

With the db2evmonfmt command you can:

- select events of interest based on the following attributes: event ID, event type, time period, application, workload, or service class.
- choose whether to receive the output in the form of a text report or a formatted XML document.
- completely control the output format by creating your own XSLT style sheets instead of using the ones provided with db2evmonfmt.

You can also extract data from an unformatted event table using the following routines:

- EVMON_FORMAT_UE_TO_XML - extracts data from an unformatted event table into an XML document.
- EVMON_FORMAT_UE_TO_TABLES - extracts data from an unformatted event table into a set of relational tables.

With these two routines, you can use a SELECT statement to specify the exact rows from the unformatted event table that you want to extract.

db2evmonfmt tool for reading event monitor data:

The Java™-based, generic XML parser tool, **db2evmonfmt**, produces a readable flat-text output (text version) or a formatted XML output from the data generated by an event monitor that uses the unformatted event table.

Based on the parameters that you specify, the **db2evmonfmt** tool determines how to parse the event monitor data and the type of output to create.

The **db2evmonfmt** tool is provided as Java source code. You must setup and compile this tool, before you can use it, by performing the following steps:

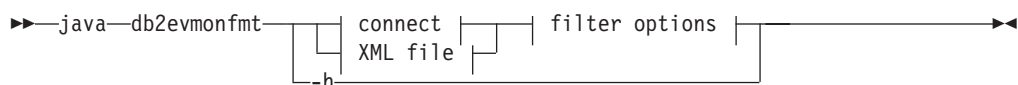
1. Locate the source code in the sql/lib/samples/java/jdbc directory
2. Follow the instructions embedded in the Java source file to setup and compile the tool

You can modify the source code to change the output to your liking.

The tool uses XSLT style sheets to transform the event data into formatted text. You do not need to understand these style sheets. The tool will automatically load the correct style sheet, based on the event monitor type, and transform the event data. Each event monitor will provide default style sheets within the sql/lib/samples/xml/data directory. The tool will also provide the following filtering options:

- Event ID
- Event timestamp
- Event type
- Workload name
- Service class name
- Application name

Tool syntax



connect:

```
|--d db_name--ue table_name |
|                               |--u user_id--p password |
```

XML file:

```
|--f xml_filename |
```

filter options:

```
|
|--fxml |
|--ftext |
|         |--ss stylesheet_name |
|         |--id event_id |
|
|--type event_type |
|--hours num_hours |
|--w workload_name |
|
|--a appl_name |
|--s srvc_subclass_name |
```

Tool parameters**java**

To run the **db2evmonfmt** Java-based tool successfully, the **java** keyword must precede the tool name. The proper Java version to successfully run this tool is installed from the `sqlib/java/jdk64` directory during the DB2 product installation.

-d db_name

Specifies the database name to which a connection is made

-ue table_name

Specifies the name of the unformatted event table

-u user_id

Specifies the user ID

-p password

Specifies the password

-f xml_filename

Specifies the name of the input XML file to format

-fxml

Produces a formatted XML document (pipe to stdout)

-ftext

Formats an XML document to a text document (pipe to stdout)

-ss stylesheet_name

Specifies the XSLT style sheet to use to transform the XML document

-id event_id

Displays all events matching the specified event ID

-type event_type

Displays all events matching the specified event type

- hours** *num_hours*
Displays all events that have occurred within the specified last number of hours
- w** *workload_name*
Displays all events that are part of the specified workload
- a** *appl_name*
Displays all events that are part of the specified application
- s** *svrc_subclass_name*
Displays all events that are part of the specified service subclass

XSLT style sheets

The DB2 database manager provides default XSLT style sheets (see Table 1) which can be found in the `sqllib/samples/java/jdbc` directory. You can change these style sheets to produce the required output.

Table 17. Default XSLT style sheets for event monitors

Event monitor	Default XSLT style sheet
Locking	DB2EvmonLocking.xsl
Unit of work	DB2EvmonUOW.xsl
Package cache	DB2EvmonPkgCache.xsl

You can create your own XSLT style sheet to transform XML documents. You can pass these style sheets into the Java-based tool using the `-ss stylesheet_name` option.

Examples

Example 1

To obtain a formatted text output for all events that have occurred in the last 32 hours from the package cache unformatted event table `PKG` in database `SAMPLE`, issue the following command:

```
java db2evmonfmt -d sample -ue pkg -ftext -hours 32
```

Example 2

To obtain a formatted text output for all events of type `LOCKTIMEOUT` that have occurred in the last 24 hours from unformatted event table `LOCK` in database `SAMPLE`, issue the following command:

```
java db2evmonfmt -d sample -ue LOCK -ftext -hours 24 -type locktimeout
```

Example 3

To obtain a formatted text output from the XML source file `LOCK.XML`, extracting all events that match the event type `LOCKWAIT` in the last 5 hours, issue the following command:

```
java db2evmonfmt -f lock.xml -ftext -type lockwait -hours 5
```

Example 4

To obtain a formatted text output using the created XSLT style sheet `SUMMARY.XSL` for all events in the unformatted event table `UOW` in database `SAMPLE`, issue the following command:

```
java db2evmonfmt -d sample -ue uow -ftext -ss summary.xsl
```

Sample formatted flat-text output

The following sample of formatted flat-text output was generated from the locking event monitor XSLT style sheet:

```
-----  
Event Entry      : 0  
Event ID        : 1  
Event Type      : Locktimeout  
Event Timestamp : 2008-05-23-12.00.14.132329000  
-----
```

Lock Details

```
-----  
Lock Name       : 020004010000000000000000054  
Lock Type      : Table  
Lock Attributes : 00000000  
Lock Count     : 1  
Lock Hold Count : 0  
Lock rrIID     : 0  
Lock Status    : Waiting  
Cursor Bitmap  : 00000000  
Tablespace Name : USERSPACE1  
Table Name     : NEWTON .SARAH
```

Attributes	Requestor	Holder
-----	-----	-----
Application Handle	[0-35]	[0-16]
Application ID	*LOCAL.horton.080523160016	*LOCAL.horton.080523155938
Application Name	xaplus0001	db2bp
Authentication ID	NEWTON	HORTON
Requesting Agent	65	21
Coordinating Agent	65	21
Application Status	SQLM_CONNECTPEND	SQLM_CONNECTPEND
Lock Timeout	5000	0
Workload Name	XAPLUS0010_WL02	SYSDEFAULTUSERWORKLOAD
Service Subclass	XAPLUS0010_SC02	SYSDEFAULTSUBCLASS
Current Request	Execute	Execute Immediate
Lock Mode	Intent Exclusive	Exclusive
tpmon Userid		
tpmon Wkstn		
tpmon App		
tpmon Accstring		

Lock Requestor Current Activities

```
-----  
Activity ID      : 2  
Uow ID          : 1  
Package ID      : 65426E4D4B584659  
Package SectNo  : 3  
Package Name    : NEWTON  
Package Schema  : AKINTERF  
Package Version :  
Reopt          : always  
Eff Isolation   : Cursor Stability  
Eff Locktimeout : 5  
Eff Degree      : 0  
Nesting Level   : 0  
Stmt Unicode    : No  
Stmt Flag       : Dynamic  
Stmt Type       : DML, Insert/Update/Delete  
Stmt Text       : INSERT INTO SARAH VALUES(:H00008, :H00013, :H00014)
```

Lock Requestor Past Activities

```
-----  
Activity ID      : 1
```

Uow ID : 1
Package ID : 65426E4D4B584659
Package SectNo : 2
Package Name : NEWTON
Package Schema : AKINTERF
Package Version :
Reopt : always
Eff Isolation : Cursor Stability
Eff Locktimeout : 5
Eff Degree : 0
Nesting Level : 0
Stmt Unicode : No
Stmt Flag : Dynamic
Stmt Type : DML, Insert/Update/Delete
Stmt Text : INSERT INTO NADIA VALUES(:H00007)

Lock Holder Current Activities

Lock Holder Past Activities

Activity ID : 1
Uow ID : 2
Package ID : 41414141414E4758
Package SectNo : 201
Package Name : NULLID
Package Schema : SQLC2G13
Package Version :
Reopt : none
Eff Isolation : Cursor Stability
Eff Locktimeout : 5
Eff Degree : 0
Nesting Level : 0
Stmt Unicode : No
Stmt Flag : Dynamic
Stmt Type : DML, Select (blockable)
Stmt Text : select * from newton.sarah

Activity ID : 2
Uow ID : 2
Package ID : 41414141414E4758
Package SectNo : 203
Package Name : NULLID
Package Schema : SQLC2G13
Package Version :
Reopt : none
Eff Isolation : Cursor Stability
Eff Locktimeout : 5
Eff Degree : 0
Nesting Level : 0
Stmt Unicode : No
Stmt Flag : Dynamic
Stmt Type : DML, Lock Table
Stmt Text : lock table newton.sarah in exclusive mode

Event Entry : 1
Event ID : 2
Event Type : Locktimeout
Event Timestamp : 2008-05-23-12.04.42.144896000

...
...
...

Usage notes

The **db2evmonfmt** utility is a Java-based tool which must be preceded by the **java** keyword in order to run successfully. The Java version required is that which is installed with the DB2 product from the `sql1lib/java/jdk64` directory.

Note: You can also use the `EVMON_FORMAT_UE_TO_XML` table function to format the binary events, contained in the unformatted event table BLOB column, into an XML document.

Routines for extracting data from unformatted event tables:

If you want to perform queries on the data collected by an event monitor that writes to a unformatted event (UE) table, you must first extract the data from UE table using one of the two routines provided for this purpose.

The `EVMON_FORMAT_UE_TO_TABLES` procedure extracts data from the UE table to create relational tables. The `EVMON_FORMAT_UE_TO_XML` table function creates an XML document.

EVMON_FORMAT_UE_TO_TABLES

The `EVMON_FORMAT_UE_TO_TABLES` procedure examines the UE table produced by an event monitor, and extracts the data it contains into relational tables that you can query. The number of tables produced depends on the type of event monitor; and the logical data groups for which that event monitor collects data. Generally speaking, the data from each logical data group is written to a separate table. For example, the package cache event monitor collects event data from three logical data groups: `pkgcache` and `pkgcache_metrics`, and `pkgcache_stmt_args`. Thus, three tables are produced by `EVMON_FORMAT_UE_TO_TABLES`.

Note: `EVMON_FORMAT_UE_TO_TABLES` does not create a table for the control logical data group.

In addition to creating relational tables from UE tables, as of Version 10.1 the `EVMON_FORMAT_UE_TO_TABLES` procedure provides the capability to prune data from UE tables. When you use the `PRUNE_UE_TABLES` option for `EVMON_FORMAT_UE_TO_TABLES`, data that is successfully inserted into relational tables is deleted from the unformatted event (UE) table.

EVMON_FORMAT_UE_TO_XML

The `EVMON_FORMAT_UE_TO_XML` table function examines the UE table produced by an event monitor, and extracts the data it contains into an XML document. This document can then be queried as often as needed using `pureXML`.

Notes:

- This table function works similarly to the **db2evmonfmt** utility when that utility is used with the `-fxml` option. The differences between using `EVMON_FORMAT_UE_TO_XML` instead of **db2evmonfmt** are as follows:
 - `EVMON_FORMAT_UE_TO_XML` is a table function. As such, it is invoked as part of an SQL statement. **db2evmonfmt** runs as a separate utility.
 - `EVMON_FORMAT_UE_TO_XML` lets you specify a `SELECT` statement with a `WHERE` clause to filter events from the UE table. **db2evmonfmt** has only limited capabilities for filtering event data.

- The output XML document from `EVMON_FORMAT_UE_TO_XML` can be formatted by `db2evmonfmt` to create a flat text file.

With both routines, you must include a `SELECT` statement in the call to the routine to specify conditions for which data to extract.

Pruning data from UE tables:

If you use the `EVMON_FORMAT_UE_TO_TABLES` procedure to extract data from UE tables, you can use the `PRUNE_UE_TABLE` option to remove data that you no longer need.

Before you begin

Before you can extract data from a UE table, you must have created, activated, and enabled data collection for an event monitor that writes to a UE table.

About this task

In addition to the performance advantages that UE tables offer, using UE tables as output for an event monitor lets you take advantage of the automatic pruning feature of the `EVMON_FORMAT_UE_TO_TABLES` procedure. When you use this procedure, any data that is extracted from the UE table and written to a regular table can be automatically removed from the UE table. This procedure makes it easier to manage a UE table. For example, assume that you want to use a unit of work event monitor to capture information to generate daily reports for accounting purposes, such as charging departments for CPU time that is used by an application or query. In that case, you might want to prune that data after producing the reports.

Procedure

To extract and then prune data from a UE table:

Issue an SQL statement that calls the `EVMON_FORMAT_UE_TO_TABLES` procedure with the `PRUNE_UE_TABLE` option to extract data into a regular table. For example, if you have a unit of work event monitor called `TRACKWORK`, you might create a statement such as the one that follows:

```
CALL EVMON_FORMAT_UE_TO_TABLES
    ('UOW', NULL, NULL, NULL, NULL, NULL, 'PRUNE_UE_TABLE', -1,
     'SELECT * FROM TRACKWORK')
```

All event data is copied from the UE table to the `UOW_EVENT_TRACKWORK` and `UOW_METRICS_TRACKWORK` tables. In addition, all records that were copied are removed from the UE table.

Formatting file or pipe event monitor output from a command line

The output of a file or pipe event monitor is a binary stream of logical data groupings. You can format this data stream from a command line by using the `db2evmon` command.

This productivity tool reads in event records from an event monitor's files or pipe, then writes them to the screen (standard output).

Before you begin

No authorization is required unless you are connecting to the database, in which case one of the following authorities is required:

- SYSADM
- SYSCTRL
- SYSMANT
- DBADM

About this task

You can indicate which event monitor output to format by either providing the path of the event files, or providing the name of the database and the event monitor name.

Procedure

To format event monitor output:

- Specify the directory containing the event monitor files:

```
db2evmon -path '/tmp/dlevents'
```

`/tmp/dlevents` represents a (UNIX) path.

- Specify the database and event monitor name:

```
db2evmon -db 'sample' -evm 'dlmon'
```

`sample` represents the database the event monitor belongs to.

`dlmon` represents an event monitor.

Altering an event monitor

You cannot change an event monitor, with one exception: you can add one or more logical data groups to the set of logical data groups that the event monitor collects. You use the ALTER EVENT MONITOR statement to add logical groups.

About this task

When you create an event monitor that writes to tables, by default, all logical data groups of monitor elements that are associated with that event monitor are captured. However, if you include the names of logical data groups in the CREATE EVENT MONITOR statement, only those groups are captured. For example, you might create an activities event monitor that captures data only from the event_activity and event_activity_metrics logical data groups, as shown in the following example:

```
CREATE EVENT MONITOR myacts FOR ACTIVITIES
  WRITE TO TABLE
  event_activity, event_activity_metrics
```

The preceding DDL statement creates an event monitor that writes to two tables: ACTIVITY_myacts and ACTIVITY_METRICS_myacts.

Restrictions

You can use the ALTER EVENT MONITOR statement only to add logical data groups to an event monitor. You cannot remove a logical data group. You also cannot change the name, the target table space, or the value for PCTDEACTIVATE

that is associated with the table that is used to capture the data in monitor elements that belong to a data group.

Procedure

To add additional logical data groups to an event monitor:

1. Decide which logical data group you want to add. Using the preceding example of a locking event monitor where only two logical data groups are being captured, assume that you want to add the `event_activitystmt` and `event_activityvals` logical data groups.
2. Formulate an `ALTER EVENT MONITOR` statement to add these new logical data groups.

```
ALTER EVENT MONITOR mylocks
  ADD LOGICAL GROUP event_activitystmt
  ADD LOGICAL GROUP event_activityvals
```

3. Execute the statement.

Results

When the `ALTER EVENT MONITOR` statement completes execution, two additional tables are created for the event monitor `mylocks`:

```
ACTIVITYSTMT_mylocks
ACTIVITYVALS_mylocks
```

The next time the event monitor is activated, these tables are populated with data from their corresponding logical data groups.

Remember: If you add new logical data groups to an event monitor, any data that existed for the logical data groups that were originally part of the table will not have any corresponding rows in the tables for the newly added logical group. Adjust your queries as needed, or consider pruning old data from the table after adding the logical groups.

Example

A database administrator creates a locking event monitor called `mylocks` by using the following SQL statement:

```
CREATE EVENT MONITOR mylocks FOR LOCKING WRITE TO TABLE LOCK, LOCK_PARTICIPANTS
```

This statement collects information for monitor elements in the `lock` and `lock_participants` logical data groups. The tables to which the monitor element data is written are created with the default table names `LOCK_MYLOCKS` and `LOCK_PARTICIPANTS_MYLOCKS`.

Later on, the database administrator decides that she wants to collect information in the `LOCK_PARTICIPANT_ACTIVITIES` logical data group. She uses the following statement to modify the event monitor:

```
ALTER EVENT MONITOR mylocks ADD LOGICAL GROUP LOCK_PARTICIPANT_ACTIVITIES
```

This statement causes the monitor elements in the `lock_participant_activities` to be collected in addition to the other elements that already were collected. This new set of monitor elements are written to the table `LOCK_PARTICIPANT_ACTIVITIES_MYLOCKS`.

Later, the database administrator decides that she also needs the data from the control logical data group. However, she wants this data to be written to a table with a name other than the default name, and to a table space other than the default table space. She uses the following statement:

```
ALTER EVENT MONITOR mylocks ADD LOGICAL GROUP CONTROL TABLE ctl_mylocks IN mytbsp3
```

This statement adds the control logical data group to the output of the event monitor. This statement adds the control logical data group to the output of the event monitor. The data is written to the CTL_MYLOCKS table, and the table is written to the table space mytbsp3, instead of the default table space.

Monitoring different types of events

Lock and deadlock event monitoring

Diagnosing and correcting lock contention situations in large DB2 environments can be complex and time-consuming. The locking event monitor designed to simplify this task by collecting locking data.

Note: The deadlocks event monitor has been deprecated, and the function it provided is included in the locking event monitor. In addition, the DB2DETAILDEADLOCK event monitor is also deprecated. See “Deprecated lock monitoring functionality” on page 153 for important usage information about this event monitor.

The locking event monitor is used to capture descriptive information about lock events at the time that they occur. The information captured identifies the key applications involved in the lock contention that resulted in the lock event. Information is captured for both the lock requester (the application that received the deadlock or lock timeout error, or waited for a lock for more than the specified amount of time) and the current lock owner.

The information collected by the lock event monitor can be written in binary format to an unformatted event table in the database, in which case the captured data must be processed in a post-capture step. Alternatively, the lock event information can be written to a set of regular tables. See “Output options for event monitors” on page 40 for more information about how to choose the most appropriate output format.

You can also directly access DB2 relational monitoring interfaces (table functions) to collect lock event information by using either dynamic or static SQL.

Determining if a deadlock or lock timeout has occurred is also simplified. Messages are written to the administration notification log when either of these events occurs; this supplements the SQL0911N (sqlcode -911) error returned to the application. In addition, a notification of lock escalations is also written to the administration notification log; this information can be useful in adjusting the size of the lock table and the amount of the table an application can use. There are also counters for lock timeouts (**lock_timeouts**), lock waits (**lock_waits**), and deadlocks (**deadlocks**) that can be checked.

The types of activities for which locking data can be captured are as follows:

- SQL statements, such as:
 - DML
 - DDL

- CALL
- **LOAD** command
- **REORG** command
- **BACKUP DATABASE** command
- Utility requests

The lock event monitor replaces the deprecated deadlock event monitors (CREATE EVENT MONITOR FOR DEADLOCKS statement and DB2DETAILDEADLOCK) and the deprecated lock timeout reporting feature (DB2_CAPTURE_LOCKTIMEOUT registry variable) with a simplified and consistent interface for gathering locking event data, and adds the ability to capture data on lock waits.

Functional overview

Two steps are required to enable the capturing of lock event data using the locking event monitor:

1. You must create a LOCK EVENT monitor using the CREATE EVENT MONITOR FOR LOCKING statement. You provide a name for the monitor and, if you are using UE tables as the output format, the name of an unformatted event table into which the lock event data is written.

Note: If you choose to use regular tables for event monitor output, default table names are assigned. You can override the defaults from the CREATE EVENT MONITOR statement, if you prefer.

2. You must specify the level for which you want lock event data captured by using one of the following methods:
 - You can specify particular workloads by either altering an existing workload, or by creating a new workload using the CREATE or ALTER WORKLOAD statements. At the workload level you must specify the type of lock event data you want captured (deadlock, lock timeout or lock wait), and whether you want the SQL statement history and input values for the applications involved in the locking. For lock waits you must also specify the amount of time that an application will wait for a lock, after which data is captured for the lock wait.
 - You can collect data at the database level and affect all DB2 workloads by setting the appropriate database configuration parameter:

mon_lockwait

This parameter controls the generation of lock wait events

Best practice is to enable lock wait data collection at the workload level.

mon_locktimeout

This parameter controls the generation of lock timeout events

Best practice is to enable lock timeout data collection at the database level if they are unexpected by the application. Otherwise enable at workload level.

mon_deadlock

This parameter controls the generation of deadlock events

Best practice is to enable deadlock data collection at the database level.

mon_lw_thresh

This parameter controls the amount of time spent in lock wait before an event for **mon_lockwait** is generated

Capturing of SQL statement history and input values uses additional processor time, memory and storage, but this level of detail is often needed to successfully debug a locking problem.

After a locking event has occurred, you can view the event data in the output produced by the event monitor. If you used UE tables, the binary data in the unformatted event table can be transformed into an XML or a text document using a supplied Java-based application called **db2evmonfmt**. In addition, you can format the binary event data in the unformatted event table BLOB column into either an XML report document, using the `EVMON_FORMAT_UE_TO_XML` table function, or into a relational table, using the `EVMON_FORMAT_UE_TO_TABLES` procedure.

If you used regular tables as the output format, you can query the data directly using SQL.

To aid in the determination of what workloads should be monitored for locking events, the administration notification log can be reviewed. Each time a deadlock or lock timeout is encountered, a message is written to the log. These messages identify the workload in which the lock requester and lock owner or owners are running, and the type of locking event. There are also counters at the workload level for lock timeouts (**lock_timeouts**), lock waits (**lock_waits**), and deadlocks (**deadlocks**) that can be checked.

Information collected for a locking event

Some of the information for lock events collected by the lock event monitor include the following:

- The lock that resulted in an event
- The application holding the lock that resulted in the lock event
- The applications that were waiting for or requesting the lock that result in the lock event
- What the applications were doing during the lock event

Deprecated lock monitoring functionality

The deprecated detailed deadlock event monitor, `DB2DETAILDEADLOCK`, is created by default for each database and starts when the database is activated. If you use the locking event monitor to detect deadlocks, consider disabling the `DB2DETAILDEADLOCK` event monitor. If the `DB2DETAILDEADLOCK` event monitor remains active while the locking event monitor also collects deadlock information, both event monitors will be collecting data, which can significantly affect performance.

To remove the `DB2DETAILDEADLOCK` event monitor, issue the following SQL statements:

```
SET EVENT MONITOR DB2DETAILDEADLOCK state 0
DROP EVENT MONITOR DB2DETAILDEADLOCK
```

Data generated by locking event monitors

Locking event monitors produce data about locks and deadlocks in the system. You can choose to have the output from a locking event monitor to regular tables, or to an unformatted event (UE) table.

If data is written to a UE table, you must perform post-processing on it to view the data.

Regardless of the output format you choose, locking event data comes from one of four logical groups:

- lock
- lock_participants
- lock_participant_activities
- lock_activity_values

If you choose to have the locking event data written to regular tables, data from an additional group (CONTROL) is used to generate meta-data about the event monitor itself.

Note: By default, only deadlock information is generated for locking event monitors. To have other types of locking data generated, you must enable collection of that data explicitly.

Information written to tables for a locking event monitor:

Information written by the locking event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for the locking event monitor, by default, five tables are produced, each containing monitor elements from one or more logical data groups:

Table 18. Tables produced by locking write-to-table event monitors

Default table name	Logical data groups reported
LOCK_ <i>evmon-name</i>	lock
LOCK_PARTICIPANTS_ <i>evmon-name</i>	lock_participants
LOCK_PARTICIPANT_ACTIVITIES_ <i>evmon-name</i>	lock_participant_activities
LOCK_ACTIVITY_VALUES_ <i>evmon-name</i>	lock_activity_values
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

Important: Even though all five tables are produced by default, you must still ensure that data collection is enabled for the kind of lock information that you want to gather. Otherwise, some of the columns contain null values.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced for the CREATE EVENT MONITOR or ALTER EVENT MONITOR statement. Refer to the reference topics for those statements for details.

Tables produced

Table 19. Information returned for a locking event monitor: Default table name: LOCK_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
DEADLOCK_TYPE	VARCHAR(10)	"deadlock_type - Deadlock type monitor element" on page 849
DL_CONNS	INTEGER	dl_conns - Connections involved in deadlock
EVENT_ID	BIGINT NOT NULL	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP NOT NULL	event_timestamp - Event timestamp monitor element
EVENT_TYPE	VARCHAR(128) NOT NULL	event_type - Event Type monitor element monitor element
MEMBER	SMALLINT NOT NULL	member - Database member
ROLLED_BACK_PARTICIPANT_NO	INTEGER	rolled_back_participant_no - Rolled back application participant

Table 20. Information returned for a locking event monitor: Default table name: LOCK_PARTICIPANTS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
AGENT_STATUS	INTEGER	agent_status - DCS application agents
AGENT_TID	BIGINT	"agent_tid - Agent thread ID monitor element" on page 714
APPL_ACTION	VARCHAR(64)	"appl_action - Application action monitor element" on page 725
APPL_ID	VARCHAR(128)	appl_id - Application ID
APPL_NAME	VARCHAR(128)	appl_name - Application name
APPLICATION_HANDLE	BIGINT	application_handle - Application handle
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID
CLIENT_ACCTNG	VARCHAR(255)	client_acctng - Client accounting string
CLIENT_APPLNAME	VARCHAR(255)	client_applname - Client application name
CLIENT_USERID	VARCHAR(255)	client_userid - Client user ID
CLIENT_WRKSTNNAME	VARCHAR(255)	client_wrkstnname - Client workstation name
COORD_AGENT_TID	BIGINT	"coord_agent_tid - Coordinator agent engine dispatchable unit ID monitor element" on page 812
CURRENT_REQUEST	VARCHAR(32)	"current_request - Current operation request monitor element" on page 831
DEADLOCK_MEMBER	SMALLINT	"deadlock_member - Deadlock member monitor element" on page 848
EVENT_ID	BIGINT	event_id - Event ID monitor element

Table 20. Information returned for a locking event monitor: Default table name: LOCK_PARTICIPANTS_evmon-name (continued)

Column name	Data type	Description
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
EVENT_TYPE	VARCHAR(128)	event_type - Event Type monitor element monitor element
INTERNAL_DATA	VARCHAR(255)	
LOCK_ATTRIBUTES	CHAR(8)	lock_attributes - Lock attributes
LOCK_COUNT	BIGINT	lock_count - Lock count
LOCK_CURRENT_MODE	BIGINT	lock_current_mode - Original lock mode before conversion
LOCK_ESCALATION	CHAR(3)	lock_escalation - Lock escalation
LOCK_HOLD_COUNT	BIGINT	lock_hold_count - Lock hold count
LOCK_MODE	BIGINT	lock_mode - Lock mode
LOCK_MODE_REQUESTED	BIGINT	lock_mode_requested - Lock mode requested
LOCK_NAME	CHAR(32)	lock_name - Lock name
LOCK_OBJECT_TYPE	BIGINT	lock_object_type - Lock object type waited on
LOCK_OBJECT_TYPE_ID	CHAR(1)	Reserved for future use
LOCK_RELEASE_FLAGS	CHAR(8)	lock_release_flags - Lock release flags
LOCK_RRIID	BIGINT	
LOCK_STATUS	BIGINT	lock_status - Lock status
LOCK_TIMEOUT_VAL	BIGINT	lock_timeout_val - Lock timeout value
LOCK_WAIT_END_TIME	TIMESTAMP	"lock_wait_end_time - Lock wait end timestamp monitor element" on page 1008
LOCK_WAIT_START_TIME	TIMESTAMP	lock_wait_start_time - Lock wait start timestamp
LOCK_WAIT_VAL	BIGINT	"lock_wait_val - Lock wait value monitor element" on page 1013
MEMBER	SMALLINT	member - Database member
OBJECT_REQUESTED	VARCHAR(10)	"object_requested - Requested object monitor element" on page 1081
PARTICIPANT_NO	INTEGER	participant_no - Participant within deadlock
PARTICIPANT_NO_HOLDING_LK	INTEGER	participant_no_holding_lk - Participant holding a lock on the object required by application
PARTICIPANT_TYPE	VARCHAR(10)	"participant_type - Participant type monitor element" on page 1105
PAST_ACTIVITIES_WRAPPED	CHAR(3)	"past_activities_wrapped - Past activities list wrapped monitor element" on page 1107
QUEUE_START_TIME	TIMESTAMP	"queue_start_time - Queue start timestamp monitor element" on page 1264

Table 20. Information returned for a locking event monitor: Default table name: LOCK_PARTICIPANTS_evmon-name (continued)

Column name	Data type	Description
QUEUED_AGENTS	BIGINT	“queued_agents - Queued threshold agents monitor element” on page 1265
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
TABLE_FILE_ID	BIGINT	table_file_id - Table file identification
TABLE_NAME	VARCHAR(128)	table_name - Table name
TABLE_SCHEMA	VARCHAR(128)	table_schema - Table schema name
TABLESPACE_NAME	VARCHAR(128)	tablespace_name - Table space name
THRESHOLD_ID	INTEGER	“thresholdid - Threshold ID monitor element” on page 1412
THRESHOLD_NAME	VARCHAR(128)	threshold_name - Threshold name
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_NAME	VARCHAR(128)	workload_name - Workload name
XID	VARCHAR(140)	xid - Transaction ID

Table 21. Information returned for a locking event monitor: Default table name: LOCK_PARTICIPANT_ACTIVITIES_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
ACTIVITY_ID	BIGINT	activity_id - Activity ID
ACTIVITY_TYPE	VARCHAR(10)	activity_type - Activity type
CONSISTENCY_TOKEN	CHARACTER(8)	consistency_token - Package consistency token
EFFECTIVE_ISOLATION	CHARACTER(2)	effective_isolation - Effective isolation
EFFECTIVE_QUERY_DEGREE	BIGINT	effective_query_degree - Effective query degree
EVENT_ID	BIGINT	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
EVENT_TYPE	VARCHAR(128)	event_type - Event Type monitor element monitor element
INCREMENTAL_BIND	CHARACTER(3)	“incremental_bind - Incremental bind monitor element” on page 956
MEMBER	SMALLINT	member - Database member
PACKAGE_NAME	VARCHAR(128)	package_name - Package name
PACKAGE_SCHEMA	VARCHAR(128)	package_schema - Package schema
PACKAGE_VERSION_ID	VARCHAR(64)	package_version_id - Package version
PARTICIPANT_NO	SMALLINT	participant_no - Participant within deadlock

Table 21. Information returned for a locking event monitor: Default table name: LOCK_PARTICIPANT_ACTIVITIES_evmon-name (continued)

Column name	Data type	Description
QUERY_ACTUAL_DEGREE	INTEGER	query_actual_degree - Actual runtime degree of intrapartition parallelism
REOPT	VARCHAR(10)	"reopt - Reopt bind option monitor element" on page 1275
SECTION_NUMBER	BIGINT	section_number - Section number
STMT_FIRST_USE_TIME	TIMESTAMP	stmt_first_use_time - Statement first use timestamp
STMT_INVOCATION_ID	BIGINT	stmt_invocation_id - Statement invocation identifier
STMT_LAST_USE_TIME	TIMESTAMP	stmt_last_use_time - Statement last use timestamp
STMT_LOCK_TIMEOUT	INTEGER	stmt_lock_timeout - Statement lock timeout
STMT_NEST_LEVEL	BIGINT	stmt_nest_level - Statement nesting level
STMT_OPERATION	VARCHAR(128)	"stmt_operation/operation - Statement operation monitor element" on page 1353
STMT_PKG_CACHE_ID	BIGINT	stmt_pkgcache_id - Statement package cache identifier
STMT_QUERY_ID	BIGINT	stmt_query_id - Statement query identifier
STMT_SOURCE_ID	BIGINT	stmt_source_id - Statement source identifier
STMT_TEXT	CLOB	stmt_text - SQL statement text
STMT_TYPE	BIGINT	stmt_type - Statement type
STMT_UNICODE	CHARACTER(3)	"stmt_unicode - Statement unicode flag monitor element" on page 1361
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 22. Information returned for a locking event monitor: Default table name: LOCK_ACTIVITY_VALUES_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACTIVITY_ID	BIGINT	activity_id - Activity ID
EVENT_ID	BIGINT	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
EVENT_TYPE	VARCHAR(128)	event_type - Event Type monitor element monitor element
MEMBER	SMALLINT	member - Database member
PARTICIPANT_NO	SMALLINT	participant_no - Participant within deadlock
STMT_VALUE_DATA	CLOB	stmt_value_data - Value data
STMT_VALUE_INDEX	INTEGER	stmt_value_index - Value index
STMT_VALUE_ISNULL	INTEGER	stmt_value_isnull - Value has null value
STMT_VALUE_ISREOPT	INTEGER	stmt_value_isreopt - Variable used for statement reoptimization
STMT_VALUE_TYPE	CHARACTER(16)	stmt_value_type - Value type
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 23. Information returned for a locking event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a locking event monitor:

Information written for a locking event monitor from the EVMON_FORMAT_UE_TO_TABLES table function. This is also documented in the sql1lib/misc/DB2EvmonLocking.xsd file.

Table 24. Information returned for a locking event monitor: Table name: LOCK_EVENT

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	"xmlid - XML ID monitor element" on page 1547
DEADLOCK_TYPE	VARCHAR(10)	"deadlock_type - Deadlock type monitor element" on page 849
EVENT_ID	BIGINT NOT NULL	event_id - Event ID monitor element
EVENT_TYPE	VARCHAR(128) NOT NULL	event_type - Event Type monitor element monitor element
EVENT_TIMESTAMP	TIMESTAMP NOT NULL	event_timestamp - Event timestamp monitor element
MEMBER	SMALLINT NOT NULL	member - Database member
DL_CONNS	INTEGER	dl_conns - Connections involved in deadlock
ROLLED_BACK_PARTICIPANT_NO	INTEGER	rolled_back_participant_no - Rolled back application participant

Table 25. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANTS

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	"xmlid - XML ID monitor element" on page 1547
PARTICIPANT_NO	INTEGER	participant_no - Participant within deadlock
PARTICIPANT_TYPE	VARCHAR(10)	"participant_type - Participant type monitor element" on page 1105

Table 25. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANTS (continued)

Column Name	Data Type	Description
PARTICIPANT_NO_HOLDING_LK	INTEGER	participant_no_holding_lk - Participant holding a lock on the object required by application
APPLICATION_HANDLE	BIGINT	application_handle - Application handle
APPL_ACTION	VARCHAR(64)	"appl_action - Application action monitor element" on page 725
APPL_ID	VARCHAR(128)	appl_id - Application ID
APPL_NAME	VARCHAR(128)	appl_name - Application name
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID
AGENT_TID	BIGINT	"agent_tid - Agent thread ID monitor element" on page 714
COORD_AGENT_TID	BIGINT	"coord_agent_tid - Coordinator agent engine dispatchable unit ID monitor element" on page 812
AGENT_STATUS	INTEGER	agent_status - DCS application agents
DEADLOCK_MEMBER	SMALLINT	"deadlock_member - Deadlock member monitor element" on page 848
LOCK_TIMEOUT_VAL	BIGINT	lock_timeout_val - Lock timeout value
LOCK_WAIT_VAL	BIGINT	"lock_wait_val - Lock wait value monitor element" on page 1013
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_NAME	VARCHAR(128)	workload_name - Workload name
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
CURRENT_REQUEST	VARCHAR(32)	"current_request - Current operation request monitor element" on page 831
LOCK_ESCALATION	CHAR(3)	lock_escalation - Lock escalation
PAST_ACTIVITIES_WRAPPED	CHAR(3)	"past_activities_wrapped - Past activities list wrapped monitor element" on page 1107
CLIENT_USERID	VARCHAR(255)	client_userid - Client user ID
CLIENT_WRKSTNNAME	VARCHAR(255)	client_wrkstnname - Client workstation name

Table 25. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANTS (continued)

Column Name	Data Type	Description
CLIENT_APPLNAME	VARCHAR(255)	client_applname - Client application name
CLIENT_ACCTNG	VARCHAR(255)	client_acctng - Client accounting string
OBJECT_REQUESTED	VARCHAR(10)	"object_requested - Requested object monitor element" on page 1081
LOCK_NAME	CHAR(32)	lock_name - Lock name
LOCK_OBJECT_TYPE	VARCHAR(32)	lock_object_type - Lock object type waited on
LOCK_OBJECT_TYPE_ID	CHAR(1) FOR BIT DATA	Reserved for future use
LOCK_ATTRIBUTES	CHAR(8)	lock_attributes - Lock attributes
LOCK_CURRENT_MODE	BIGINT	lock_current_mode - Original lock mode before conversion
LOCK_MODE_REQUESTED	BIGINT	lock_mode_requested - Lock mode requested
LOCK_MODE	BIGINT	lock_mode - Lock mode
LOCK_COUNT	BIGINT	lock_count - Lock count
LOCK_HOLD_COUNT	BIGINT	lock_hold_count - Lock hold count
LOCK_RRIID	BIGINT	
LOCK_STATUS	BIGINT	lock_status - Lock status
LOCK_RELEASE_FLAGS	CHAR(8)	lock_release_flags - Lock release flags
LOCK_WAIT_START_TIME	TIMESTAMP	lock_wait_start_time - Lock wait start timestamp
LOCK_WAIT_END_TIME	TIMESTAMP	"lock_wait_end_time - Lock wait end timestamp monitor element" on page 1008
QUEUED_AGENTS	BIGINT	"queued_agents - Queued threshold agents monitor element" on page 1265
QUEUE_START_TIME	TIMESTAMP	"queue_start_time - Queue start timestamp monitor element" on page 1264
TABLE_FILE_ID	BIGINT	table_file_id - Table file identification
TABLE_NAME	VARCHAR(128)	table_name - Table name
TABLE_SCHEMA	VARCHAR(128)	table_schema - Table schema name
TABLESPACE_NAME	VARCHAR(128)	tablespace_name - Table space name
THRESHOLD_ID	INTEGER	"thresholdid - Threshold ID monitor element" on page 1412
THRESHOLD_NAME	VARCHAR(128)	threshold_name - Threshold name

Table 25. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANTS (continued)

Column Name	Data Type	Description
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	
XID	VARCHAR(140) FOR BIT DATA)	xid - Transaction ID

Table 26. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANT_ACTIVITIES

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	“xmlid - XML ID monitor element” on page 1547
PARTICIPANT_NO	INTEGER	participant_no - Participant within deadlock
ACTIVITY_ID	INTEGER	activity_id - Activity ID
ACTIVITY_TYPE	VARCHAR(10)	activity_type - Activity type
UOW_ID	INTEGER	uow_id - Unit of work ID
PACKAGE_NAME	VARCHAR(128)	package_name - Package name
PACKAGE_SCHEMA	VARCHAR(128)	package_schema - Package schema
PACKAGE_VERSION_ID	VARCHAR(64)	package_version_id - Package version
CONSISTENCY_TOKEN	VARCHAR(8)	consistency_token - Package consistency token
SECTION_NUMBER	BIGINT	section_number - Section number
REOPT	VARCHAR(10)	“reopt - Reopt bind option monitor element” on page 1275
INCREMENTAL_BIND	CHAR(3)	“incremental_bind - Incremental bind monitor element” on page 956
EFFECTIVE_ISOLATION	CHAR(2)	effective_isolation - Effective isolation
EFFECTIVE_QUERY_DEGREE	BIGINT	effective_query_degree - Effective query degree
STMT_LOCK_TIMEOUT	INTEGER	stmt_lock_timeout - Statement lock timeout
STMT_TYPE	BIGINT	stmt_type - Statement type
STMT_QUERY_ID	BIGINT	stmt_query_id - Statement query identifier
STMT_NEST_LEVEL	BIGINT	stmt_nest_level - Statement nesting level
STMT_INVOCATION_ID	BIGINT	stmt_invocation_id - Statement invocation identifier
STMT_OPERATION	VARCHAR(128)	“stmt_operation/operation - Statement operation monitor element” on page 1353
STMT_SOURCE_ID	BIGINT	stmt_source_id - Statement source identifier

Table 26. Information returned for a locking event monitor: Table name: LOCK_PARTICIPANT_ACTIVITIES (continued)

Column Name	Data Type	Description
STMT_PKG_CACHE_ID	BIGINT	stmt_pkgcache_id - Statement package cache identifier
STMT_FIRST_USE_TIME	TIMESTAMP	stmt_first_use_time - Statement first use timestamp
STMT_LAST_USE_TIME	TIMESTAMP	stmt_last_use_time - Statement last use timestamp
STMT_TEXT	CLOB(2097152)	stmt_text - SQL statement text
STMT_UNICODE	CHAR(3)	"stmt_unicode - Statement unicode flag monitor element" on page 1361
QUERY_ACTUAL_DEGREE	INTEGER	query_actual_degree - Actual runtime degree of intrapartition parallelism

Table 27. Information returned for a locking event monitor: Table name: LOCK_ACTIVITY_VALUES

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	"xmlid - XML ID monitor element" on page 1547
PARTICIPANT_NO	INTEGER	participant_no - Participant within deadlock
ACTIVITY_ID	INTEGER	activity_id - Activity ID
UOW_ID	INTEGER	uow_id - Unit of work ID
STMT_VALUE_INDEX	INTEGER	stmt_value_index - Value index
STMT_VALUE_ISREOPT	INTEGER	stmt_value_isreopt - Variable used for statement reoptimization
STMT_VALUE_ISNULL	INTEGER	stmt_value_isnull - Value has null value
STMT_VALUE_TYPE	CHAR(16)	stmt_value_type - Value type
STMT_VALUE_DATA	CLOB(32K)	stmt_value_data - Value data

Information written to XML by EVMON_FORMAT_UE_TO_XML for a locking event monitor:

Information written for a locking event monitor from the EVMON_FORMAT_UE_TO_XML table function. This is also documented in the sql1lib/misc/DB2EvmonLocking.xsd file.

db2_lock_event

The main schema that describes a lock timeout, lock wait or deadlock event in details.

Element content: (("db2_deadlock_graph" on page 164 {zero or one times (?)} , "db2_participant" on page 164 {one or more (+)}) | ("db2_message" on page 165, "db2_event_file" on page 165))

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			required	
type				required	
timestamp	xs:dateTime			required	
member				required	
release	xs:long			required	
ANY attribute from ANY namespace					

db2_deadlock_graph

Schema element represents the DB2 Deadlock Graph. The graph outlines all the participants involved in the deadlock.

Contained by: “db2_lock_event” on page 163

Element content: (“db2_participant” on page 175 {one or more (+)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
dl_conns	xs:int			required	
rolled_back_participant_no	xs:int			required	
type			required		
ANY attribute from ANY namespace					

db2_participant

Schema element represents the application information of the all the participants involved in a lock event.

Contained by: “db2_lock_event” on page 163 “db2_deadlock_graph”

Element content: (“db2_object_requested” on page 169 {zero or one times (?)}, “db2_app_details” on page 169, “db2_activity” on page 170 {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
no	xs:int			required	
type			required		
participant_no_holding_lk	xs:int			optional	
deadlock_member	xs:int			optional	
ANY attribute from ANY namespace					

db2_message

Error message

Contained by: “db2_lock_event” on page 163

db2_event_file

Fully qualified path to file where event has been written.

Contained by: “db2_lock_event” on page 163

application_handle

A system-wide unique ID for the application. See monitor element “agent_id - Application handle (agent ID) monitor element” on page 710 for more details.

Contained by: “db2_app_details” on page 169

appl_id

This identifier is generated when the application connects to the database at the database manager. See monitor element “appl_id - Application ID monitor element” on page 727 for more details.

Contained by: “db2_app_details” on page 169

appl_name

The name of the application running at the client, as known to the database. See monitor element “appl_name - Application name monitor element” on page 731 for more details.

Contained by: “db2_app_details” on page 169

auth_id

The authorization ID of the user who invoked the application that is being monitored. See monitor element “auth_id - Authorization ID” on page 748 for more details.

Contained by: “db2_app_details” on page 169

agent_tid

Contained by: “db2_app_details” on page 169

Element content:

Type	Facet
xs:long	

coord_agent_tid

Contained by: "db2_app_details" on page 169

Element content:

Type	Facet
xs:long	

agent_status

The status of the application that was in effect before entering lock wait status rather than the current lock wait status. See monitor element "appl_status - Application status monitor element" on page 734 for more details.

Contained by: "db2_app_details" on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			optional	

appl_action

The action/request that the client application is performing

Contained by: "db2_app_details" on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			optional	

lock_timeout_val

The database configuration parameter lock timeout. Value in seconds. See monitor element "lock_timeout_val - Lock timeout value monitor element" on page 1004 for more details.

Contained by: "db2_app_details" on page 169

Element content:

Type	Facet
xs:long	

lock_wait_val

The lock wait parameter in effect during the lock event. This is either the database configuration parameter MON_LKWAIT_THRSH or the COLLECT LOCK WAIT DATA setting specified at the workload level. Value in milliseconds.

Contained by: "db2_app_details" on page 169

Element content:

Type	Facet
xs:long	

tentry_state

TEntry state. Internal use only.

Contained by: "db2_app_details" on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			optional	

tentry_flag1

TEntry flags1. Internal use only.

Contained by: "db2_app_details" on page 169

tentry_flag2

TEntry flags2. Internal use only.

Contained by: "db2_app_details" on page 169

xid

XID - Global transaction identifier

Contained by: "db2_app_details" on page 169

workload_id

ID of the workload to which this application belongs. See monitor element "workload_id - Workload ID monitor element" on page 1542for more details.

Contained by: "db2_app_details" on page 169

workload_name

Name of the workload to which this application belongs. See monitor element "workload_name - Workload name monitor element" on page 1543for more details.

Contained by: "db2_app_details" on page 169

service_class_id

ID of the service subclass to which this application belongs. See monitor element "service_class_id - Service class ID monitor element" on page 1309for more details.

Contained by: "db2_app_details" on page 169

service_subclass_name

Name of the service subclass to which this application belongs. See monitor element "service_subclass_name - Service subclass name monitor element" on page 1310 for more details.

Contained by: "db2_app_details" on page 169

current_request

The operation currently being processed or most recently processed.

Contained by: "db2_app_details" on page 169

lock_escalation

Indicates whether a lock request was made as part of a lock escalation. See monitor element "lock_escalation - Lock escalation monitor element" on page 988 for more details. Possible values: Yes or No.

Contained by: "db2_app_details" on page 169

past_activities_wrapped

Indicates whether the activities list has wrapped. The default limit on the number of past activities to be kept by any one application is 250. This default can be overridden using the registry variable DB2_MAX_INACT_STMTS. Users may want to choose a different value for the limit to increase or reduce the amount of system monitor heap used for inactive statement information.

Contained by: "db2_app_details" on page 169

client_userid

The client user ID generated by a transaction manager and provided to the server. See monitor element "client_userid - Client user ID monitor element" on page 781 for more details.

Contained by: "db2_app_details" on page 169

client_wrkstname

Identifies the client system or workstation, if the sqleseti API was issued in this connection. See monitor element "client_wrkstname - Client workstation name monitor element" on page 782 for more details.

Contained by: "db2_app_details" on page 169

client_applname

Identifies the server transaction program performing the transaction, if the sqleseti API was issued in this connection. See monitor element "client_applname - Client application name monitor element" on page 774 for more details.

Contained by: "db2_app_details"

client_acctng

The data passed to the target database for logging and diagnostic purposes, if the sqleseti API was issued in this connection. See monitor element "client_acctng - Client accounting string monitor element" on page 773 for more details.

Contained by: "db2_app_details"

utility_invocation_id

Contained by: "db2_app_details"

service_superclass_name

Name of the service superclass to which this application belongs. See monitor element "service_superclass_name - Service superclass name monitor element" on page 1311 for more details.

Contained by: "db2_app_details"

db2_object_requested

Schema element represents the DB2 lock that the Requestor is attempting to acquire, which is being held by the Owner.

Contained by: "db2_participant" on page 164

Element content: (("lock_name" on page 170, "lock_object_type" on page 170, "lock_specifics" on page 170, "lock_attributes" on page 171, "lock_current_mode" on page 171, "lock_mode_requested" on page 171, "lock_mode" on page 171, "lock_count" on page 171, "lock_hold_count" on page 172, "lock_rriid" on page 172, "lock_status" on page 172, "lock_release_flags" on page 172, "tablespace_name" on page 173, "table_name" on page 173, "table_schema" on page 173, "lock_object_type_id" on page 173, "lock_wait_start_time" on page 173, "lock_wait_end_time" on page 174, ANY content (skip) {zero or more (*)}) | ("threshold_name" on page 174, "threshold_id" on page 174, "queued_agents" on page 174, "queue_start_time" on page 174, ANY content (skip) {zero or more (*)}))

Attributes:

QName	Type	Fixed	Default	Use	Annotation
type			required		

db2_app_details

Schema element represents the details regarding this participant.

Contained by: "db2_participant" on page 164

Element content: ("application_handle" on page 165, "appl_id" on page 165, "appl_name" on page 165, "auth_id" on page 165, "agent_tid" on page 165, "coord_agent_tid" on page 166, "agent_status" on page 166, "appl_action" on page 166, "lock_timeout_val" on page 166, "lock_wait_val" on page 166, "tentry_state" on page 167

on page 167, "tentry_flag1" on page 167, "tentry_flag2" on page 167, "xid" on page 167, "workload_id" on page 167, "workload_name" on page 167, "service_class_id" on page 167, "service_subclass_name" on page 168, "current_request" on page 168, "lock_escalation" on page 168, "past_activities_wrapped" on page 168, "client_userid" on page 168, "client_wrkstnname" on page 168, "client_applname" on page 168, "client_acctng" on page 169, "utility_invocation_id" on page 169, "service_superclass_name" on page 169, ANY content (skip) {zero or more (*)})

db2_activity

List of all DB2 activities the application is currently executing or has executed.

Contained by: "db2_participant" on page 164

Element content: ("db2_activity_details" on page 180, "db2_input_variable" on page 180 {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
type			required		
ANY attribute from ANY namespace					

lock_name

Internal binary lock name. This element serves as a unique identifier for locks. See monitor element "lock_name - Lock name monitor element" on page 999 for more details.

Contained by: "db2_object_requested" on page 169

lock_object_type

The type of object the application is waiting to obtain a lock. See monitor element "lock_object_type - Lock object type waited on monitor element" on page 1000 for more details.

Contained by: "db2_object_requested" on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	

lock_specifics

Internal specifics about the lock. For information use only.

Contained by: "db2_object_requested" on page 169

lock_attributes

Lock attributes. See monitor element “lock_attributes - Lock attributes monitor element” on page 985 for more details.

Contained by: “db2_object_requested” on page 169

lock_current_mode

Original lock before conversion. See monitor element “lock_current_mode - Original lock mode before conversion monitor element” on page 987 for more details.

Contained by: “db2_object_requested” on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	
mode				optional	

lock_mode_requested

The lock mode being requested by this participant. See monitor element “lock_mode_requested - Lock mode requested monitor element” on page 998 for more details.

Contained by: “db2_object_requested” on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	
mode				optional	

lock_mode

The type of lock being held. See monitor element “lock_mode - Lock mode monitor element” on page 996 for more details.

Contained by: “db2_object_requested” on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	
mode				optional	

lock_count

The number of locks on the lock being held. See monitor element “lock_count - Lock count monitor element” on page 986 for more details.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:long	

lock_hold_count

The number of holds placed on the lock. See monitor element "lock_hold_count - Lock hold count monitor element" on page 995for more details.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:long	

lock_rriid

IID for Row locking. Internal use only.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:long	

lock_status

Indicates the internal status of the lock. See monitor element "lock_status - Lock status monitor element" on page 1003for more details.

Contained by: "db2_object_requested" on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			optional	

lock_release_flags

Lock release flags. See monitor element "lock_release_flags - Lock release flags monitor element" on page 1002for more details.

Contained by: "db2_object_requested" on page 169

tablespace_name

The name of the table space where the lock is held. See monitor element “tablespace_name - Table space name monitor element” on page 1383 for more details.

Contained by: “db2_object_requested” on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	

table_name

The name of the table where the lock is held. See monitor element “table_name - Table name monitor element” on page 1373 for more details.

Contained by: “db2_object_requested” on page 169

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	
data_member_id				optional	The identifier of the data member for which information is returned.

table_schema

The schema of the table. See monitor element “table_schema - Table schema name monitor element” on page 1375 for more details.

Contained by: “db2_object_requested” on page 169

lock_object_type_id

The type of object the application is waiting to obtain a lock. See monitor element “lock_object_type - Lock object type waited on monitor element” on page 1000 for more details.

Contained by: “db2_object_requested” on page 169

lock_wait_start_time

The data and time the application started waiting to obtain a lock on the object that is currently locked by the lock owner. See monitor element “lock_wait_start_time - Lock wait start timestamp monitor element” on page 1008 for more details.

Contained by: “db2_object_requested” on page 169

Element content:

Type	Facet
xs:dateTime	

lock_wait_end_time

The data and time the application stopped waiting to obtain a lock on the object that is currently locked by the lock owner.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:dateTime	

threshold_name

The name of the threshold queue.

Contained by: "db2_object_requested" on page 169

threshold_id

The ID of the threshold queue.

Contained by: "db2_object_requested" on page 169

queued_agents

The total number of agents currently queued in the threshold.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:long	

queue_start_time

The data and time the application started waiting in the queue to to obtain a threshold ticket.

Contained by: "db2_object_requested" on page 169

Element content:

Type	Facet
xs:dateTime	

db2_participant

Schema element represents a single stack entry in a deadlock graph.

Contained by: “db2_lock_event” on page 163 “db2_deadlock_graph” on page 164

Attributes:

QName	Type	Fixed	Default	Use	Annotation
no	xs:int			required	
deadlock_member				required	
participant_no _holding_lk	xs:int			required	
application_handle				required	
ANY attribute from ANY namespace					

activity_id

Counter which uniquely identifies an activity for an application within a given unit of work. See monitor element “activity_id - Activity ID monitor element” on page 706 for more details.

Contained by: “db2_activity_details” on page 180

uow_id

The unit of work ID to which this activity record applies. See monitor element “uow_id - Unit of work ID monitor element” on page 1517 for more details.

Contained by: “db2_activity_details” on page 180

package_name

The name of the package that contains the SQL statement currently executing. See monitor element “package_name - Package name monitor element” on page 1095 for more details.

Contained by: “db2_activity_details” on page 180

package_schema

The schema name of the package associated with an SQL statement. See monitor element “package_schema - Package schema monitor element” on page 1096 for more details.

Contained by: “db2_activity_details” on page 180

package_version_id

The package version identifies the version identifier of the package that contains the SQL statement currently executing. See monitor element “package_version_id - Package version monitor element” on page 1096 for more details.

Contained by: “db2_activity_details” on page 180

consistency_token

The package consistency token helps to identify the version of the package that contains the SQL statement currently executing. See monitor element “consistency_token - Package consistency token monitor element” on page 803for more details.

Contained by: “db2_activity_details” on page 180

section_number

The internal section number in the package for the SQL statement currently processing or most recently processed. See monitor element “section_number - Section number monitor element” on page 1303for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

reopt

The REOPT bind option used to precompile this package. Possible values are: NONE, ONCE, and ALWAYS. See the REOPT bind options for more details.

Contained by: “db2_activity_details” on page 180

incremental_bind

The package was incrementally bound at execution time. Possible values: Yes or No.

Contained by: “db2_activity_details” on page 180

effective_isolation

The isolation value in effect for the SQL statement while it was being run. See monitor element “effective_isolation - Effective isolation monitor element” on page 875for more details.

Contained by: “db2_activity_details” on page 180

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	

effective_query_degree

The degree value in effect for the SQL statement while it was being run. See monitor element “effective_query_degree - Effective query degree monitor element” on page 876 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_unicode

The SQL statement unicode flag. Possible values: Yes or No.

Contained by: “db2_activity_details” on page 180

stmt_lock_timeout

The locktimeout value in effect for the SQL statement while it was being run. See monitor element “stmt_lock_timeout - Statement lock timeout monitor element” on page 1352 for more details

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:int	

stmt_type

The type of SQL statement processed. Possible values: Dynamic or Static. See monitor element “stmt_type - Statement type monitor element” on page 1359 for more details.

Contained by: “db2_activity_details” on page 180

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			required	

stmt_operation

Contained by: “db2_activity_details” on page 180

stmt_query_id

Internal query identifier given to any SQL statement. See monitor element “stmt_query_id - Statement query identifier monitor element” on page 1355 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_nest_level

This element shows the level of nesting or recursion in effect when the statement was run. See monitor element “stmt_nest_level - Statement nesting level monitor element” on page 1352 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_invocation_id

This element shows the identifier of the routine invocation in which the SQL statement was run. See monitor element “stmt_invocation_id - Statement invocation identifier monitor element” on page 1350 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_source_id

This element shows the internal identifier given to the source of the the SQL statement that was run. See monitor element “stmt_source_id - Statement source identifier” on page 1356 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_pkgcache_id

This element shows the internal package cache identifier of a dynamic SQL statement. See monitor element “stmt_pkgcache_id - Statement package cache identifier monitor element” on page 1354 for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:long	

stmt_text

The text of the SQL statement. See monitor element “stmt_text - SQL statement text monitor element” on page 1358 for more details.

Contained by: “db2_activity_details” on page 180

stmt_first_use_time

This element shows the first time the statement entry was processed. For cursor operations, “stmt_first_use_time - Statement first use timestamp monitor element” on page 1349 shows when the cursor was opened. At application coordination nodes, this value reflects the application requests; at non-coordinator nodes, this value reflects when requests were received from the originating node. See monitor element stmt_first_use_time for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:dateTime	

stmt_last_use_time

This element shows the last time the statement entry was processed. For cursor operations, “stmt_last_use_time - Statement last use timestamp monitor element” on page 1351 shows the time of the last action on the cursor where that action could be an open, fetch, or close. At application coordination nodes, this value reflects the application requests; at non-coordinator nodes, this value reflects when requests were received from the originating node. See monitor element stmt_last_use_time for more details.

Contained by: “db2_activity_details” on page 180

Element content:

Type	Facet
xs:dateTime	

query_actual_degree

The actual runtime degree value for the SQL statement while it was being run. See monitor element “query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element” on page 1261 for more details.

Contained by: “db2_activity_details”

Element content:

Type	Facet
xs:int	

db2_activity_details

Schema represents the details regarding this activity

Contained by: “db2_activity” on page 170

Element content: (“activity_id” on page 175, “uow_id” on page 175, “package_name” on page 175, “package_schema” on page 175, “package_version_id” on page 175, “consistency_token” on page 176, “section_number” on page 176, “reopt” on page 176, “incremental_bind” on page 176, “effective_isolation” on page 176, “effective_query_degree” on page 177, “stmt_unicode” on page 177, “stmt_lock_timeout” on page 177, “stmt_type” on page 177, “stmt_operation” on page 177, “stmt_query_id” on page 178, “stmt_nest_level” on page 178, “stmt_invocation_id” on page 178, “stmt_source_id” on page 178, “stmt_pkgcache_id” on page 179, “stmt_text” on page 179, “stmt_first_use_time” on page 179, “stmt_last_use_time” on page 179, “query_actual_degree”, ANY content (skip) {zero or more (*)})

db2_input_variable

Schema element represents the list of input variables associated with the SQL statement.

Contained by: “db2_activity” on page 170

Element content: (“stmt_value_index”, “stmt_value_isreopt”, “stmt_value_isnull” on page 181, “stmt_value_type” on page 181, “stmt_value_data” on page 181, ANY content (skip) {zero or more (*)})

stmt_value_index

The element represents the position of the input parameter marker or host variable used in the SQL statement. See monitor element “stmt_value_index - Value index” on page 1362 for more details.

Contained by: “db2_input_variable”

stmt_value_isreopt

The element shows whether the variable was used during statement reoptimization. See monitor element “stmt_value_isreopt - Variable used for statement reoptimization monitor element” on page 1363 for more details.

Contained by: "db2_input_variable" on page 180

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_isnull

The element shows whether a data value associated with the SQL statement is the NULL value. See monitor element "stmt_value_isnull - Value has null value monitor element" on page 1363 for more details.

Contained by: "db2_input_variable" on page 180

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_type

"stmt_value_type - Value type monitor element" on page 1364

Contained by: "db2_input_variable" on page 180

stmt_value_data

The element contains a string representation of a data value associated with an SQL statement. See monitor element "stmt_value_data - Value data" on page 1362 for more details.

Contained by: "db2_input_variable" on page 180

Collecting lock event data and generating reports

You can use the lock event monitor to collect lock timeout, lock wait, and deadlock information to help identify and resolve locking problems. After the lock event data has been collected in an unreadable form in an unformatted event table, this task describes how to obtain a readable text report.

Before you begin

To create the locking event monitor and collect lock event monitor data, you must have DBADM, or SQLADM authority.

About this task

The lock event monitor collects relevant information that helps with the identification and resolution of locking problems. For example, some of the information the lock event monitor collects for a lock event is as follows:

- The lock that resulted in a lock event
- The applications requesting or holding the lock that resulted in a lock event
- What the applications were doing during the lock event

This task provides instructions for collecting lock event data for a given workload. You might want to collect lock event data under the following conditions:

- You notice that lock wait values are longer than usual when using the `MON_GET_WORKLOAD` table function.
- An application returns a -911 SQL return code with reason code 68 in the administration notification log, stating that "The transaction was rolled back due to a lock timeout." See also message `SQL0911N` for further details.
- You notice a deadlock event message in the administration notification log (-911 SQL return code with reason code 2, stating that "The transaction was rolled back due to a deadlock."). The log message indicates that the lock event occurred between two applications, for example, Application A and B, where A is part of workload `FINANCE` and B is part of workload `PAYROLL`. See also message `SQL0911N` for further details.

Restrictions

To view data values, you need the `EXECUTE` privilege on the `EVMON_FORMAT_UE_*` routines, which the `SQLADM` and `DBADM` authorities hold implicitly. You also need `SELECT` privilege on the unformatted event table, which by default is held by users with the `DATAACCESS` authority and by the creator of the event monitor and the associated unformatted event table.

Procedure

To collect detailed information regarding potential future lock events, perform the following steps:

1. Create a lock event monitor called `lockevmon` by using the `CREATE EVENT MONITOR FOR LOCKING` statement, as shown in the following example:

```
CREATE EVENT MONITOR lockevmon FOR LOCKING
WRITE TO UNFORMATTED EVENT TABLE
```

Note: The following lists important points to remember when creating an event monitor:

- You can create event monitors ahead of time and not worry about using up disk space since nothing is written until you activate the data collection at the database or workload level
 - In a partitioned database environment, ensure that the event monitors are placed in a partitioned table space across all nodes. Otherwise, lock events will be missed at partitions where the partitioned table space is not present.
 - Ensure that you set up a table space and bufferpool to minimize the interference on high performance work caused by ongoing work during accesses to the tables to obtain data.
2. Activate the lock event monitor called `lockevmon` by running the following statement:

```
SET EVENT MONITOR lockevmon STATE 1
```
 3. To enable the lock event data collection at the workload level, issue the `ALTER WORKLOAD` statement with one of the following `COLLECT` clauses: `COLLECT LOCK TIMEOUT DATA`, `COLLECT DEADLOCK DATA`, or `COLLECT LOCK WAIT DATA`. Specify the `WITH HISTORY` option on the `COLLECT` clause. Setting the database configuration parameter affects the lock event data collection at the database level and all workloads are affected.

For lock wait events

To collect lock wait data for any lock acquired after 5 seconds for the

FINANCE application and to collect lock wait data for any lock acquired after 10 seconds for the PAYROLL application, issue the following statements:

```
ALTER WORKLOAD finance COLLECT LOCK WAIT DATA WITH HISTORY AND VALUES
    FOR LOCKS WAITING MORE THAN 5 SECONDS
ALTER WORKLOAD payroll COLLECT LOCK WAIT DATA
    FOR LOCKS WAITING MORE THAN 10 SECONDS WITH HISTORY
```

To set the **mon_lockwait** database configuration parameter with HIST_AND_VALUES input data value for the SAMPLE database, and to set the **mon_lw_thresh** database configuration parameter for 10 seconds, issue the following commands:

```
db2 update db cfg for sample using mon_lockwait hist_and_values
db2 update db cfg for sample using mon_lw_thresh 10000000
```

For lock timeout events

To collect lock timeout data for the FINANCE and PAYROLL applications, issue the following statements:

```
ALTER WORKLOAD finance COLLECT LOCK TIMEOUT DATA WITH HISTORY
ALTER WORKLOAD payroll COLLECT LOCK TIMEOUT DATA WITH HISTORY
```

To set the **mon_locktimeout** database configuration parameter with HIST_AND_VALUES input data value for the SAMPLE database, issue the following command:

```
db2 update db cfg for sample using mon_locktimeout hist_and_values
```

For deadlock events

To collect data for the FINANCE and PAYROLL applications, issue the following statements:

```
ALTER WORKLOAD finance COLLECT DEADLOCK DATA WITH HISTORY
ALTER WORKLOAD payroll COLLECT DEADLOCK DATA WITH HISTORY
```

To set the **mon_deadlock** database configuration parameter with HIST_AND_VALUES input data value for the SAMPLE database, issue the following command:

```
db2 update db cfg for sample using mon_deadlock hist_and_values
```

4. Rerun the workload in order to receive another lock event notification.
5. Connect to the database.
6. Obtain the locking event report using one of the following approaches:
 - a. Use the XML parser tool, **db2evmonfmt**, to produce a flat-text report based on the event data collected in the unformatted event table and using the default stylesheet, for example:

```
java db2evmonfmt -d db_name -ue table_name -ftext -u user_id -p password
```
 - b. Use the EVMON_FORMAT_UE_TO_XML table function to obtain an XML document.
 - c. Use the EVMON_FORMAT_UE_TO_TABLES procedure to output the data into a relational table.
7. Analyze the report to determine the reason for the lock event problem and resolve it.
8. Turn OFF lock data collection for both FINANCE and PAYROLL applications by running the following statements or resetting the database configuration parameters:

For lock wait events

```
ALTER WORKLOAD finance COLLECT LOCK WAIT DATA NONE
ALTER WORKLOAD payroll COLLECT LOCK WAIT DATA NONE
```

To reset the **mon_lockwait** database configuration parameter with the default NONE input data value for the SAMPLE database, and to reset the **mon_lw_thresh** database configuration parameter back to its default value of 5 seconds, issue the following command:

```
db2 update db cfg for sample using mon_lockwait none
db2 update db cfg for sample using mon_lw_thresh 5000000
```

For lock timeout events

```
ALTER WORKLOAD finance COLLECT LOCK TIMEOUT DATA NONE
ALTER WORKLOAD payroll COLLECT LOCK TIMEOUT DATA NONE
```

To reset the **mon_locktimeout** database configuration parameter with the default NONE input data value for the SAMPLE database, issue the following command:

```
db2 update db cfg for sample using mon_locktimeout none
```

For deadlock events

```
ALTER WORKLOAD finance COLLECT DEADLOCK DATA NONE
ALTER WORKLOAD payroll COLLECT DEADLOCK DATA NONE
```

To reset the **mon_deadlock** database configuration parameter with the default WITHOUT_HIST input data value for the SAMPLE database, issue the following command:

```
db2 update db cfg for sample using mon_deadlock without_hist
```

What to do next

Rerun the application or applications to ensure that the locking problem has been eliminated.

Unit of work event monitoring

The unit of work event monitor records an event whenever a unit of work is completed, that is, whenever there is a commit or a rollback.

This historical information about individual units of work is useful for chargeback purposes (charging by CPU usage) and for monitoring compliance with response-time service-level objectives.

The unit of work event monitor is one way to perform system-perspective monitoring with request metrics. The most closely related alternatives or complements to the unit of work event monitor are the statistics event monitor and the MON_GET_UNIT_OF_WORK and MON_GET_UNIT_OF_WORK_DETAILS table functions.

You can use the unit of work event monitor to collect a listing of packages used within a unit of work and the nesting level at which it was used. This information helps facilitate stored procedure troubleshooting. Starting in DB2 Version 10.1, you can also generate a listing of the executable IDs and associated statement-level metrics for statements that ran within a unit of work.

To create the unit of work event monitor and collect unit of work event monitor data, you must have DBADM or SQLADM authority.

Creating a unit of work event monitor

Starting in DB2 Version 10.1, you have the choice of having the output for a unit of work event monitor output written to an unformatted event (UE) table, or a

regular table. See “Output options for event monitors” on page 40 for more information on how to choose the most appropriate output format.

Whichever type of table you use, when you create a unit of work event monitor, identify the table space where you plan to store the table or tables containing the output for your event monitor. The recommended practice is to have a table space that is dedicated and configured to store the table. However, when you create an event monitor, you can specify an existing table space. If you do not specify a table space, one is chosen for you.

To create a unit of work event monitor using defaults and best practices, use the CREATE EVENT MONITOR statement. The following sample statement uses defaults where possible and specifies that output will be stored in a UE table in the MY_EVMON_TABLESPACE table space:

```
CREATE EVENT MONITOR MY_UOW_EVMON
  FOR UNIT OF WORK
  WRITE TO UNFORMATTED EVENT TABLE (IN MY_EVMON_TABLESPACE)
```

Configuring data collection

You can specify four different collection levels for unit of work data:

1. None
2. Basic unit of work data
 - a. Information about the packages that ran within the unit of work
 - b. A list of executable IDs for statements that ran within the unit of work.

You can use database configuration parameters to control the collection of unit of work data for all unit of work event monitors that are active in the database. Alternatively, to control the collection of information for specific workloads, service classes, or work actions, you can use the CREATE and ALTER statements for the appropriate workload objects.

To configure data collection at the database level, set the **mon_uow_data** database configuration parameter and, optionally, the **mon_uow_pkglist** and **mon_uow_execlist** database configuration parameters by using the **UPDATE DATABASE CONFIGURATION** command. Possible combinations of values for these parameters are shown in Table 28:

Table 28. Possible values for unit of work event monitor configuration parameters

Data to collect	mon_uow_data	mon_uow_pkglist	mon_uow_execlist
Collect no unit of work data	NONE (default)	OFF(default)	OFF (default)
Collect only basic unit of work data	BASE	OFF (default)	OFF (default)
Collect package list information but not information about executable IDs	BASE	ON	OFF (default)
Collect information about executable IDs but not a list of packages	BASE	OFF (default)	ON

Table 28. Possible values for unit of work event monitor configuration parameters (continued)

Data to collect	mon_uow_data	mon_uow_pkglist	mon_uow_execlist
Collect basic unit of work data, package list information, and information about executable IDs	BASE	ON	ON

Tips:

- If you do not set any of the configuration parameters, no unit of work data is collected unless you enable collection for specific workload objects. You can enable collection for specific workload objects by using either the CREATE or ALTER statement for the appropriate workload object type, for example, the CREATE SERVICE CLASS or ALTER WORKLOAD statement.
- To collect basic unit of work data but no package list or executable ID information, you can set the **mon_uow_data** configuration parameter to BASE and omit the **mon_uow_pkglist** and **mon_uow_execlist** configuration parameters. If you do not explicitly set them, the default value of OFF is used.
- To collect one or both of package list and executable ID information, you must also set the **mon_uow_data** configuration parameter to BASE. If you set the **mon_uow_data** configuration parameter to NONE, no information is collected, regardless of the settings of the **mon_uow_pkglist** and **mon_uow_execlist** configuration parameters.

To control the collection of data for specific workload objects, use the COLLECT UNIT OF WORK DATA clause of the CREATE or ALTER statement for the specific type of workload object that you are interested in. For example, to collect basic unit of work event data and package list information for the workload REPORTS, you might issue a statement such as this:

```
ALTER WORKLOAD REPORTS COLLECT UNIT OF WORK DATA BASE INCLUDE PACKAGE LIST
```

To collect both package list information and a list of the executable IDs for statements that are run in the unit of work, you might use this statement:

```
ALTER WORKLOAD REPORTS COLLECT UNIT OF WORK DATA BASE INCLUDE PACKAGE LIST, EXECUTABLE LIST
```

The settings that are shown in Table 28 on page 185 apply to all workloads running in the system unless you override these settings for specific workloads by using the CREATE WORKLOAD or ALTER WORKLOAD statement. If you want to collect base-level information for all workloads but also want to collect package list information for selected workloads, set the **mon_uow_data** database configuration parameter to BASE. Then, use the CREATE WORKLOAD or ALTER WORKLOAD statement to set the level to BASE PACKAGE LIST for the workloads that you are interested in.

By default, applicable table functions and event monitors, including the unit of work event monitor, collect and report request metrics. You can change the default setting as follows:

- By using the **mon_req_metrics** database configuration parameter
- By using the COLLECT REQUEST METRICS clause of the CREATE SERVICE CLASS or ALTER SERVICE CLASS statement for a service superclass.

Changing the default setting affects any table function or event monitor that can report request metrics.

Accessing event data that is captured by a unit of work event monitor

A unit of work event monitor can write data to a regular table or it can write data in binary format to an unformatted event (UE) table. You can access the data in regular tables by using SQL.

To access data in a UE table, use one of the following table functions:

EVMON_FORMAT_UE_TO_XML

Extracts data from an unformatted event table into an XML document.

EVMON_FORMAT_UE_TO_TABLES

Extracts data from an unformatted event table into a set of relational tables.

When you use one of these table functions, you can specify which data to extract by including a **SELECT** statement as one of the parameters to the function. You have full control over selection, ordering, and other aspects provided by the **SELECT** statement.

If you are generating package listing information, you can use the **EVMON_FORMAT_UE_TO_XML** table function to generate a single XML document that contains both the base unit of work event monitor data and the package listing. The **EVMON_FORMAT_UE_TO_TABLES** procedure produces two tables: one for the basic unit of work event monitor information and another for the package listing information. You can join the two tables by using the values in the **MEMBER**, **APPLICATION_ID**, and **UOW_ID** columns.

You can also use the **db2evmonfmt** command to help perform the following tasks:

- Select events of interest based on the following attributes: event ID, event type, time period, application, workload, or service class
- Choose whether to receive the output in the form of a text report or a formatted XML document
- Control the output format by creating your own XSLT style sheets instead of using the ones provided by the **db2evmonfmt** command

For example, the following command provides a unit of work report that selects unit of work events that occurred in the past 24 hours in the database **SAMPLE**. These event records are obtained from the unformatted event table called **SAMPLE_UOW_EVENTS**. The command creates formatted text output by using the **MyUOW.xsl** style sheet.

```
java db2evmonfmt -d SAMPLE -ue SAMPLE_UOW_EVENTS -ftext -ss MyUOW.xsl -hours 24
```

Data generated by unit of work event monitors

Unit of work event monitors produce data about units of work (transactions) that run in the system. You can choose to have the output from a unit of work event monitor to regular tables, or to an unformatted event (UE) table.

If data is written to a UE table, you must perform post-processing on it to view the data.

Regardless of the output format you choose, unit of work event data comes from one of four logical groups:

- uow
- uow_metrics
- uow_package_list
- uow_exec_list

If you choose to have the unit of work event data written to regular tables, data from an additional group (CONTROL) is used to generate meta-data about the event monitor itself.

Note: Unless you specify otherwise, the only monitor elements collected by a unit of work event monitor are request metrics. To enable the generation of basic unit of work event data, or for package or execution list data, you must enable data collection explicitly. See “Enabling event monitor data collection” on page 138 for more information.

Information written to tables for a unit of work event monitor:

Information written by the unit of work event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for the unit of work event monitor, by default, five tables are produced, each containing monitor elements from one or more logical data groups:

Table 29. Tables produced by UNIT OF WORK write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
UOW_ <i>evmon-name</i>	uow
UOW_METRICS_ <i>evmon-name</i>	uow_metrics
UOW_PACKAGE_LIST_ <i>evmon-name</i>	uow_package_list
UOW_EXECUTABLE_LIST_ <i>evmon-name</i>	uow_executable_list
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

Note: Even though all five tables are produced by default, you must still ensure data collection is enabled for the kind of lock information you want to gather, otherwise some of the columns will report null values.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

Table 30. Information returned for a locking event monitor: Default table name: UOW_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
APPLICATION_HANDLE	BIGINT	application_handle - Application handle
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
APPLICATION_NAME	VARCHAR(128)	"appl_name - Application name monitor element" on page 731
CLIENT_ACCTNG	VARCHAR(255)	client_acctng - Client accounting string
CLIENT_APPLNAME	VARCHAR(255)	client_applname - Client application name
CLIENT_HOSTNAME	VARCHAR(255)	client_hostname - Client hostname
CLIENT_PID	BIGINT	client_pid - Client process ID
CLIENT_PLATFORM	VARCHAR(12)	client_platform - Client operating platform
CLIENT_PORT_NUMBER	INTEGER	client_port_number - Client port number
CLIENT_PRODUCT_ID	VARCHAR(128)	"client_prdid - Client product and version ID monitor element" on page 780
CLIENT_PROTOCOL	VARCHAR(10)	client_protocol - Client communication protocol
CLIENT_USERID	VARCHAR(255)	client_userid - Client user ID
CLIENT_WRKSTNNAME	VARCHAR(255)	client_wrkstnname - Client workstation name
COMPLETION_STATUS	VARCHAR(128)	completion_status - Completion status
CONNECTION_TIME	TIMESTAMP	"connection_start_time - Connection start time monitor element" on page 801
COORD_MEMBER	SMALLINT	coord_member - Coordinator member
EVENT_ID	INTEGER NOT NULL	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP NOT NULL	event_timestamp - Event timestamp monitor element
EXECUTABLE_LIST_SIZE	BIGINT	"executable_list_size - Size of executable list monitor element" on page 889
EXECUTABLE_LIST_TRUNCATED	CHAR(3)	"executable_list_truncated - Executable list truncated monitor element" on page 889

Table 30. Information returned for a locking event monitor: Default table name: UOW_evmon-name (continued)

Column name	Data type	Description
GLOBAL_TRANSACTION_ID	VARCHAR(40)	"global_transaction_id - Global transaction identifier monitor element" on page 925
INTRA_PARALLEL_STATE	VARCHAR(128)	intra_parallel_state - Current state of intrapartition parallelism
LOCAL_TRANSACTION_ID	VARCHAR(16)	"local_transaction_id - Local transaction identifier monitor element" on page 984
MEMBER	SMALLINT	member - Database member
MEMBER_ACTIVATION_TIME	TIMESTAMP	"db_conn_time - Database activation timestamp monitor element" on page 838
METRICS	BLOB	
MON_INTERVAL_ID	VARCHAR(128)	mon_interval_id - Monitor interval identifier
PACKAGE_LIST_EXCEEDED	CHAR(3)	package_list_exceeded - Package list exceeded
PACKAGE_LIST_SIZE	INTEGER	"package_list_size - Size of package list monitor element" on page 1095
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
SESSION_AUTHID	VARCHAR(128)	"session_auth_id - Session authorization ID monitor element" on page 1312
START_TIME	TIMESTAMP	start_time - Event start time
STOP_TIME	TIMESTAMP	stop_time - Event stop time
SYSTEM_AUTHID	VARCHAR(128)	"system_auth_id - System authorization identifier monitor element" on page 1371
UOW_ID	INTEGER	uow_id - Unit of work ID
UOW_LOG_SPACE_USED	BIGINT	uow_log_space_used - Unit of work log space used
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_NAME	VARCHAR(128)	workload_name - Workload name
WORKLOAD_OCCURRENCE_ID	INTEGER	workload_occurrence_id - Workload occurrence identifier

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
APPLICATION_ID	VARCHAR (128)	"appl_id - Application ID monitor element" on page 727
MEMBER	SMALLINT	member - Database member
UOW_ID	INTEGER	uow_id - Unit of work ID
WLM_QUEUE_TIME_TOTAL	BIGINT	wlm_queue_time_total - Workload manager total queue time
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	wlm_queue_assignments_total - Workload manager total queue assignments
FCM_TQ_RECV_WAIT_TIME	BIGINT	fcm_tq_recv_wait_time - FCM table queue received wait time
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	fcm_message_recv_wait_time - FCM message received wait time
FCM_TQ_SEND_WAIT_TIME	BIGINT	fcm_tq_send_wait_time - FCM table queue send wait time
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	fcm_message_send_wait_time - FCM message send wait time
AGENT_WAIT_TIME	BIGINT	agent_wait_time - Agent wait time
AGENT_WAITS_TOTAL	BIGINT	agent_waits_total - Total agent waits
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
LOG_BUFFER_WAIT_TIME	BIGINT	log_buffer_wait_time - Log buffer wait time
NUM_LOG_BUFFER_FULL	BIGINT	num_log_buffer_full - Number of full log buffers
LOG_DISK_WAIT_TIME	BIGINT	log_disk_wait_time - Log disk wait time
LOG_DISK_WAITS_TOTAL	BIGINT	log_disk_waits_total - Total log disk waits
TCPIP_RECV_WAIT_TIME	BIGINT	tcPIP_recv_wait_time - TCP/IP received wait time
TCPIP_RECVS_TOTAL	BIGINT	tcPIP_recvs_total - TCP/IP receives total
CLIENT_IDLE_WAIT_TIME	BIGINT	client_idle_wait_time - Client idle wait time
IPC_RECV_WAIT_TIME	BIGINT	ipc_recv_wait_time - Interprocess communication received wait time
IPC_RECVS_TOTAL	BIGINT	ipc_recvs_total - Interprocess communication receives total
IPC_SEND_WAIT_TIME	BIGINT	ipc_send_wait_time - Interprocess communication send wait time
IPC_SENDS_TOTAL	BIGINT	ipc_sends_total - Interprocess communication send total
TCPIP_SEND_WAIT_TIME	BIGINT	tcPIP_send_wait_time - TCP/IP send wait time
TCPIP_SENDS_TOTAL	BIGINT	tcPIP_sends_total - TCP/IP sends total
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	audit_file_write_wait_time - Audit file write wait time
AUDIT_FILE_WRITES_TOTAL	BIGINT	audit_file_writes_total - Total audit files written
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	audit_subsystem_wait_time - Audit subsystem wait time
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	audit_subsystem_waits_total - Total audit subsystem waits
DIAGLOG_WRITE_WAIT_TIME	BIGINT	diaglog_write_wait_time - Diagnostic log file write wait time
DIAGLOG_WRITES_TOTAL	BIGINT	diaglog_writes_total - Total diagnostic log file writes
FCM_SEND_WAIT_TIME	BIGINT	fcm_send_wait_time - FCM send wait time
FCM_RECV_WAIT_TIME	BIGINT	fcm_rcv_wait_time - FCM received wait time
TOTAL_WAIT_TIME	BIGINT	total_wait_time - Total wait time
RQSTS_COMPLETED_TOTAL	BIGINT	rqsts_completed_total - Total requests completed
TOTAL_RQST_TIME	BIGINT	total_rqst_time - Total request time
APP_RQSTS_COMPLETED_TOTAL	BIGINT	app_rqsts_completed_total - Total application requests completed
TOTAL_APP_RQST_TIME	BIGINT	total_app_rqst_time - Total application request time
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	total_section_sort_proc_time - Total section sort processing time
TOTAL_SECTION_SORTS	BIGINT	total_section_sorts - Total section sorts
TOTAL_SECTION_SORT_TIME	BIGINT	total_section_sort_time - Total section sort time
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
ACT_COMPLETED_TOTAL	BIGINT	act_completed_total - Total completed activities
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_ESCALS	BIGINT	lock_escalations - Number of lock escalations
FCM_SENDS_TOTAL	BIGINT	fcm_sends_total - FCM sends total
FCM_RECVS_TOTAL	BIGINT	fcm_recvs_total - FCM receives total
FCM_SEND_VOLUME	BIGINT	fcm_send_volume - FCM send volume
FCM_RECV_VOLUME	BIGINT	fcm_recv_volume - FCM received volume
FCM_MESSAGE_SENDS_TOTAL	BIGINT	fcm_message_sends_total - Total FCM message sends
FCM_MESSAGE_RECVS_TOTAL	BIGINT	fcm_message_recvs_total - Total FCM message receives
FCM_MESSAGE_SEND_VOLUME	BIGINT	fcm_message_send_volume - FCM message send volume
FCM_MESSAGE_RECV_VOLUME	BIGINT	fcm_message_recv_volume - FCM message received volume
FCM_TQ_SENDS_TOTAL	BIGINT	fcm_tq_sends_total - FCM table queue send total
FCM_TQ_RECVS_TOTAL	BIGINT	fcm_tq_recvs_total - FCM table queue receives total
FCM_TQ_SEND_VOLUME	BIGINT	fcm_tq_send_volume - FCM table queue send volume
FCM_TQ_RECV_VOLUME	BIGINT	fcm_tq_recv_volume - FCM table queue received volume
TQ_TOT_SEND_SPILLS	BIGINT	tq_tot_send_spills - Total number of table queue buffers overflowed
TCPIP_SEND_VOLUME	BIGINT	tcPIP_send_volume - TCP/IP send volume
TCPIP_RECV_VOLUME	BIGINT	tcPIP_recv_volume - TCP/IP received volume
IPC_SEND_VOLUME	BIGINT	ipc_send_volume - Interprocess communication send volume
IPC_RECV_VOLUME	BIGINT	ipc_recv_volume - Interprocess communication received volume
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
AUDIT_EVENTS_TOTAL	BIGINT	audit_events_total - Total audit events
ACT_REJECTED_TOTAL	BIGINT	act_rejected_total - Total rejected activities
ACT_ABORTED_TOTAL	BIGINT	act_aborted_total - Total aborted activities
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
TOTAL_ROUTINE_TIME	BIGINT	total_routine_time - Total routine time
TOTAL_COMPILE_PROC_TIME	BIGINT	total_compile_proc_time - Total compile processing time
TOTAL_COMPILATIONS	BIGINT	total_compilations - Total compilations
TOTAL_COMPILE_TIME	BIGINT	total_compile_time - Total compile time
TOTAL_IMPLICIT_COMPILATIONS	BIGINT	total_implicit_compilations - Total implicit complications
TOTAL_IMPLICIT_COMPILE_TIME	BIGINT	total_implicit_compile_time - Total implicit compile time
TOTAL_RUNSTATS_PROC_TIME	BIGINT	total_runstats_proc_time - Total runtime statistics processing time
TOTAL_RUNSTATS	BIGINT	total_runstats - Total runtime statistics
TOTAL_RUNSTATS_TIME	BIGINT	total_runstats_time - Total runtime statistics time
TOTAL_REORG_PROC_TIME	BIGINT	total_reorg_proc_time - Total reorganization processing time
TOTAL_REORGS	BIGINT	total_reorgs - Total reorganizations
TOTAL_REORG_TIME	BIGINT	total_reorg_time - Total reorganization time
TOTAL_LOAD_PROC_TIME	BIGINT	total_load_proc_time - Total load processing time
TOTAL_LOADS	BIGINT	total_loads - Total loads
TOTAL_LOAD_TIME	BIGINT	total_load_time - Total load time
TOTAL_SECTION_PROC_TIME	BIGINT	total_section_proc_time - Total section processing time
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	total_app_section_executions - Total application section executions
TOTAL_SECTION_TIME	BIGINT	total_section_time - Total section time
TOTAL_COMMIT_PROC_TIME	BIGINT	total_commit_proc_time - Total commits processing time
TOTAL_APP_COMMITS	BIGINT	total_app_commits - Total application commits
TOTAL_COMMIT_TIME	BIGINT	total_commit_time - Total commit time
TOTAL_ROLLBACK_PROC_TIME	BIGINT	total_rollback_proc_time - Total rollback processing time
TOTAL_APP_ROLLBACKS	BIGINT	total_app_rollbacks - Total application rollbacks
TOTAL_ROLLBACK_TIME	BIGINT	total_rollback_time - Total rollback time
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	total_routine_user_code_time - Total routine user code time
THRESH_VIOLATIONS	BIGINT	thresh_violations - Number of threshold violations
NUM_LW_THRESH_EXCEEDED	BIGINT	num_lw_thresh_exceeded - Number of lock wait thresholds exceeded

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
TOTAL_ROUTINE_INVOCATIONS	BIGINT	total_routine_invocations - Total routine invocations
INT_COMMITS	BIGINT	int_commits - Internal commits
INT_ROLLBACKS	BIGINT	int_rollbacks - Internal rollbacks
CAT_CACHE_INSERTS	BIGINT	cat_cache_inserts - Catalog cache inserts
CAT_CACHE_LOOKUPS	BIGINT	cat_cache_lookups - Catalog cache lookups
PKG_CACHE_INSERTS	BIGINT	pkg_cache_inserts - Package cache inserts
PKG_CACHE_LOOKUPS	BIGINT	pkg_cache_lookups - Package cache lookups
ACT_RQSTS_TOTAL	BIGINT	act_rqsts_total - Total activity requests
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
LOCK_WAIT_TIME_GLOBAL	BIGINT	lock_wait_time_global - Lock wait time global
LOCK_WAITS_GLOBAL	BIGINT	lock_waits_global - Lock waits global
RECLAIM_WAIT_TIME	BIGINT	reclaim_wait_time - Reclaim wait time
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	spacemappage_reclaim_wait_time - Space map page reclaim wait time
LOCK_TIMEOUTS_GLOBAL	BIGINT	lock_timeouts_global - Lock timeouts global
LOCK_ESCALS_MAXLOCKS	BIGINT	lock_escals_maxlocks - Number of maxlocks lock escalations
LOCK_ESCALS_LOCKLIST	BIGINT	lock_escals_locklist - Number of locklist lock escalations
LOCK_ESCALS_GLOBAL	BIGINT	lock_escals_global - Number of global lock escalations
CF_WAIT_TIME	BIGINT	cf_wait_time - cluster caching facility wait time
CF_WAITS	BIGINT	cf_waits - Number of cluster caching facility DB2 pureScale server waits
POOL_DATA_GBP_L_READS	BIGINT	pool_data_gbp_l_reads - Group buffer pool data logical reads
POOL_DATA_GBP_P_READS	BIGINT	pool_data_gbp_p_reads - Group buffer pool data physical reads
POOL_DATA_LBP_PAGES_FOUND	BIGINT	pool_data_lbp_pages_found - Local buffer pool found data pages
POOL_DATA_GBP_INVALID_PAGES	BIGINT	pool_data_gbp_invalid_pages - Group buffer pool invalid data pages
POOL_INDEX_GBP_L_READS	BIGINT	pool_index_gbp_l_reads - Group buffer pool index logical reads
POOL_INDEX_GBP_P_READS	BIGINT	pool_index_gbp_p_reads - Group buffer pool index physical reads
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	pool_index_lbp_pages_found - Local buffer pool index pages found
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	pool_index_gbp_invalid_pages - Group buffer pool invalid index pages
POOL_XDA_GBP_L_READS	BIGINT	pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests
POOL_XDA_GBP_P_READS	BIGINT	pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests
POOL_XDA_LBP_PAGES_FOUND	BIGINT	pool_xda_lbp_pages_found - Local buffer pool XDA data pages found

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_XDA_GBP_INVALID_PAGES	BIGINT	pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages
EVMON_WAIT_TIME	BIGINT	evmon_wait_time - Event monitor wait time
EVMON_WAITS_TOTAL	BIGINT	evmon_waits_total - Event monitor total waits
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	total_extended_latch_wait_time - Total extended latch wait time
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	total_extended_latch_waits - Total extended latch waits
TOTAL_STATS_FABRICATIONS	BIGINT	total_stats_fabrications - Total statistics fabrications
TOTAL_STATS_FABRICATION_TIME	BIGINT	total_stats_fabrication_time - Total statistics fabrication time
TOTAL_SYNC_RUNSTATS_PROC_TIME	BIGINT	total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time
TOTAL_SYNC_RUNSTATS	BIGINT	total_sync_runstats - Total synchronous RUNSTATS activities
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	total_sync_runstats_time - Total synchronous RUNSTATS time
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	pool_queued_async_data_reqs - Data prefetch requests
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	pool_queued_async_index_reqs - Index prefetch requests
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	pool_queued_async_xda_reqs - XDA prefetch requests
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	pool_queued_async_other_reqs - Non-prefetch requests
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	pool_queued_async_data_pages - Data pages prefetch requests
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	pool_queued_async_index_pages - Index pages prefetch requests
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	pool_queued_async_xda_pages - XDA pages prefetch requests
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	pool_failed_async_data_reqs - Failed data prefetch requests
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	pool_failed_async_index_reqs - Failed index prefetch requests
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	pool_failed_async_xda_reqs - Failed XDA prefetch requests
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	pool_failed_async_other_reqs - Failed non-prefetch requests
APP_ACT_COMPLETED_TOTAL	BIGINT	app_act_completed_total - Total successful external coordinator activities
APP_ACT_ABORTED_TOTAL	BIGINT	app_act_aborted_total - Total failed external coordinator activities
APP_ACT_REJECTED_TOTAL	BIGINT	app_act_rejected_total - Total rejected external coordinator activities
TOTAL_PEDS	BIGINT	total_peds - Total partial early distincts
DISABLED_PEDS	BIGINT	"disabled_peds - Disabled partial early distincts monitor element" on page 870

Table 31. Information returned for a unit of work event monitor: Table name: UOW_METRICS_evmon-name (continued)

Column Name	Data Type	Description
POST_THRESHOLD_PEDS	BIGINT	post_threshold_peds - Partial early distincts threshold
TOTAL_PEAS	BIGINT	total_peas - Total partial early aggregations
POST_THRESHOLD_PEAS	BIGINT	post_threshold_peas - Partial early aggregation threshold
TQ_SORT_HEAP_REQUESTS	BIGINT	tq_sort_heap_requests - Table queue sort heap requests
TQ_SORT_HEAP_REJECTIONS	BIGINT	tq_sort_heap_rejections - Table queue sort heap rejections
TOTAL_CONNECT_REQUESTS	BIGINT	total_connect_requests - Connection or switch user requests
TOTAL_CONNECT_REQUEST_TIME	BIGINT	total_connect_request_time - Total connection or switch user request time
TOTAL_CONNECT_AUTHENTICATIONS	BIGINT	total_connect_authentications - Connections or switch user authentications performed
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
PREFETCH_WAITS	BIGINT	prefetch_waits - Prefetcher wait count
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225

Table 32. Information returned for a locking event monitor: Default table name: UOW_PACKAGE_LIST_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
INVOCATION_ID	INTEGER	invocation_id - Invocation ID
MEMBER	SMALLINT	member - Database member
NESTING_LEVEL	INTEGER	nesting_level - Nesting level
PACKAGE_ELAPSED_TIME	BIGINT	package_elapsed_time - Package elapsed time
PACKAGE_ID	BIGINT	package_id - Package identifier
ROUTINE_ID	INTEGER	routine_id - Routine ID
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 33. Information returned for a locking event monitor: Default table name: UOW_EXECUTABLE_LIST_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
EXECUTABLE_ID	VARCHAR(32)	executable_id - Executable ID
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
MEMBER	SMALLINT	member - Database member
NUM_EXECUTIONS	BIGINT	num_executions - Statement executions
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
ROWS_READ	BIGINT	rows_read - Rows read
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 34. Information returned for a unit of work event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a unit of work event monitor:

Information written for a unit of work event monitor from the EVMON_FORMAT_UE_TO_TABLES table function. This is also documented in the sql1lib/misc/DB2EvmonUOW.xsd file.

Table 35. Information returned for a unit of work event monitor: Table name: UOW_EVENT

Column Name	Data Type	Description
EVENT_ID	BIGINT NOT NULL	event_id - Event ID monitor element
TYPE	VARCHAR(128) NOT NULL	
EVENT_TIMESTAMP	TIMESTAMP NOT NULL	event_timestamp - Event timestamp monitor element
MEMBER	SMALLINT	member - Database member
COORD_MEMBER	SMALLINT	coord_member - Coordinator member
COMPLETION_STATUS	VARCHAR(128)	completion_status - Completion status
START_TIME	TIMESTAMP	start_time - Event start time
STOP_TIME	TIMESTAMP	stop_time - Event stop time
WORKLOAD_NAME	VARCHAR(128)	workload_name - Workload name
WORKLOAD_ID	INTEGER	workload_id - Workload ID
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
UOW_ID	INTEGER	uow_id - Unit of work ID
WORKLOAD_OCCURRENCE_ID	INTEGER	workload_occurrence_id - Workload occurrence identifier
CONNECTION_TIME	TIMESTAMP	"connection_start_time - Connection start time monitor element" on page 801
MEMBER_ACTIVATION_TIME	TIMESTAMP	"db_conn_time - Database activation timestamp monitor element" on page 838
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
APPLICATION_HANDLE	BIGINT	application_handle - Application handle
APPLICATION_NAME	VARCHAR(128)	"appl_name - Application name monitor element" on page 731
SYSTEM_AUTHID	VARCHAR(128)	"system_auth_id - System authorization identifier monitor element" on page 1371
SESSION_AUTHID	VARCHAR(128)	"session_auth_id - Session authorization ID monitor element" on page 1312
CLIENT_PLATFORM	VARCHAR(12)	client_platform - Client operating platform
CLIENT_PID	BIGINT	client_pid - Client process ID

Table 35. Information returned for a unit of work event monitor: Table name: UOW_EVENT (continued)

Column Name	Data Type	Description
CLIENT_PRODUCT_ID	VARCHAR(128)	"client_prdid - Client product and version ID monitor element" on page 780
CLIENT_PROTOCOL	VARCHAR(10)	client_protocol - Client communication protocol
CLIENT_HOSTNAME	VARCHAR(255)	client_hostname - Client hostname
CLIENT_PORT_NUMBER	INTEGER	client_port_number - Client port number
CLIENT_WRKSTNNAME	VARCHAR(255)	client_wrkstnname - Client workstation name
CLIENT_ACCTNG	VARCHAR(255)	client_acctng - Client accounting string
CLIENT_USERID	VARCHAR(255)	client_userid - Client user ID
CLIENT_APPLNAME	VARCHAR(255)	client_applname - Client application name
LOCAL_TRANSACTION_ID	VARCHAR(16)	"local_transaction_id - Local transaction identifier monitor element" on page 984
GLOBAL_TRANSACTION_ID	VARCHAR(40)	"global_transaction_id - Global transaction identifier monitor element" on page 925
UOW_LOG_SPACE_USED	BIGINT	uow_log_space_used - Unit of work log space used
PACKAGE_LIST_SIZE	INTEGER	"package_list_size - Size of package list monitor element" on page 1095
PACKAGE_LIST_EXCEEDED	CHAR(3)	package_list_exceeded - Package list exceeded
EXECUTABLE_LIST_SIZE	BIGINT	"executable_list_size - Size of executable list monitor element" on page 889
EXECUTABLE_LIST_TRUNCATED	CHAR(3)	"executable_list_truncated - Executable list truncated monitor element" on page 889
METRICS	BLOB(1M)	XML document containing metrics-related monitor elements. The metrics in this document are the same as those described in the UOW_METRICS table that appears later in this topic. See "Interfaces that return monitor data in XML documents" on page 18 for more information.
INTRA_PARALLEL_STATE	VARCHAR(3)	intra_parallel_state - Current state of intrapartition parallelism
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier

Table 36. Information returned for a unit of work event monitor: Table name: UOW_PACKAGE_LIST

Column Name	Data Type	Description
MEMBER	SMALLINT	member - Database member
UOW_ID	INTEGER	uow_id - Unit of work ID
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
PACKAGE_ID	BIGINT	package_id - Package identifier
NESTING_LEVEL	INTEGER	nesting_level - Nesting level
ROUTINE_ID	BIGINT	routine_id - Routine ID
INVOCATION_ID	INTEGER	invocation_id - Invocation ID
PACKAGE_ELAPSED_TIME	BIGINT	package_elapsed_time - Package elapsed time

Table 37. Information returned for a unit of work event monitor: Table name: UOW_EXECUTABLE_LIST

Column Name	Data Type	Description
MEMBER	SMALLINT	member - Database member
UOW_ID	INTEGER	uow_id - Unit of work ID
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727
EXECUTABLE_ID	VARCHAR(32) FOR BIT DATA	executable_id - Executable ID
NUM_EXECUTIONS	BIGINT	num_executions - Statement executions
ROWS_READ	BIGINT	rows_read - Rows read
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table

Column Name	Data Type	Description
MEMBER	SMALLINT	member - Database member
UOW_ID	INTEGER	uow_id - Unit of work ID
APPLICATION_ID	VARCHAR(128)	"appl_id - Application ID monitor element" on page 727

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
ACT_ABORTED_TOTAL	BIGINT	act_aborted_total - Total aborted activities
ACT_COMPLETED_TOTAL	BIGINT	act_completed_total - Total completed activities
ACT_REJECTED_TOTAL	BIGINT	act_rejected_total - Total rejected activities
AGENT_WAIT_TIME	BIGINT	agent_wait_time - Agent wait time
AGENT_WAITS_TOTAL	BIGINT	agent_waits_total - Total agent waits
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
CLIENT_IDLE_WAIT_TIME	BIGINT	client_idle_wait_time - Client idle wait time
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
FCM_RECV_VOLUME	BIGINT	fcm_rcv_volume - FCM received volume
FCM_RECVS_TOTAL	BIGINT	fcm_rcvs_total - FCM receives total
FCM_SEND_VOLUME	BIGINT	fcm_send_volume - FCM send volume
FCM_SENDS_TOTAL	BIGINT	fcm_sends_total - FCM sends total
FCM_RECV_WAIT_TIME	BIGINT	fcm_rcv_wait_time - FCM received wait time
FCM_SEND_WAIT_TIME	BIGINT	fcm_send_wait_time - FCM send wait time
IPC_RECV_VOLUME	BIGINT	ipc_rcv_volume - Interprocess communication received volume
IPC_RECV_WAIT_TIME	BIGINT	ipc_rcv_wait_time - Interprocess communication received wait time
IPC_RECVS_TOTAL	BIGINT	ipc_rcvs_total - Interprocess communication receives total
IPC_SEND_VOLUME	BIGINT	ipc_send_volume - Interprocess communication send volume
IPC_SEND_WAIT_TIME	BIGINT	ipc_send_wait_time - Interprocess communication send wait time
IPC_SENDS_TOTAL	BIGINT	ipc_sends_total - Interprocess communication send total
LOCK_ESCALS	BIGINT	lock_escals - Number of lock escalations
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
LOG_BUFFER_WAIT_TIME	BIGINT	log_buffer_wait_time - Log buffer wait time
NUM_LOG_BUFFER_FULL	BIGINT	num_log_buffer_full - Number of full log buffers
LOG_DISK_WAIT_TIME	BIGINT	log_disk_wait_time - Log disk wait time
LOG_DISK_WAITS_TOTAL	BIGINT	log_disk_waits_total - Total log disk waits
RQSTS_COMPLETED_TOTAL	BIGINT	rqsts_completed_total - Total requests completed
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
TCPIP_RECV_VOLUME	BIGINT	tcpip_rcv_volume - TCP/IP received volume
TCPIP_SEND_VOLUME	BIGINT	tcpip_send_volume - TCP/IP send volume
TCPIP_RECV_WAIT_TIME	BIGINT	tcpip_rcv_wait_time - TCP/IP received wait time
TCPIP_RECVS_TOTAL	BIGINT	tcpip_rcvs_total - TCP/IP receives total
TCPIP_SEND_WAIT_TIME	BIGINT	tcpip_send_wait_time - TCP/IP send wait time

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
TCPIP_SENDS_TOTAL	BIGINT	tcpip_sends_total - TCP/IP sends total
TOTAL_APP_RQST_TIME	BIGINT	total_app_rqst_time - Total application request time
TOTAL_RQST_TIME	BIGINT	total_rqst_time - Total request time
WLM_QUEUE_TIME_TOTAL	BIGINT	wlm_queue_time_total - Workload manager total queue time
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	wlm_queue_assignments_total - Workload manager total queue assignments
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
TOTAL_WAIT_TIME	BIGINT	total_wait_time - Total wait time
APP_RQSTS_COMPLETED_TOTAL	BIGINT	app_rqsts_completed_total - Total application requests completed
TOTAL_SECTION_SORT_TIME	BIGINT	total_section_sort_time - Total section sort time
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	total_section_sort_proc_time - Total section sort processing time
TOTAL_SECTION_SORTS	BIGINT	total_section_sorts - Total section sorts
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
TOTAL_COMPILE_TIME	BIGINT	total_compile_time - Total compile time
TOTAL_COMPILE_PROC_TIME	BIGINT	total_compile_proc_time - Total compile processing time
TOTAL_COMPILATIONS	BIGINT	total_compilations - Total compilations
TOTAL_IMPLICIT_COMPILE_TIME	BIGINT	total_implicit_compile_time - Total implicit compile time
TOTAL_IMPLICIT_COMPILE_PROC_TIME	BIGINT	total_implicit_compile_proc_time - Total implicit compile processing time
TOTAL_IMPLICIT_COMPILATIONS	BIGINT	total_implicit_compilations - Total implicit complications
TOTAL_SECTION_TIME	BIGINT	total_section_time - Total section time
TOTAL_SECTION_PROC_TIME	BIGINT	total_section_proc_time - Total section processing time
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	total_app_section_executions - Total application section executions
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
ACT_RQSTS_TOTAL	BIGINT	act_rqsts_total - Total activity requests
TOTAL_ROUTINE_TIME	BIGINT	total_routine_time - Total routine time
TOTAL_ROUTINE_INVOCATIONS	BIGINT	total_routine_invocations - Total routine invocations

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
TOTAL_COMMIT_TIME	BIGINT	total_commit_time - Total commit time
TOTAL_COMMIT_PROC_TIME	BIGINT	total_commit_proc_time - Total commits processing time
TOTAL_APP_COMMITS	BIGINT	total_app_commits - Total application commits
INT_COMMITS	BIGINT	int_commits - Internal commits
TOTAL_ROLLBACK_TIME	BIGINT	total_rollback_time - Total rollback time
TOTAL_ROLLBACK_PROC_TIME	BIGINT	total_rollback_proc_time - Total rollback processing time
TOTAL_APP_ROLLBACKS	BIGINT	total_app_rollback - Total application rollbacks
INT_ROLLBACKS	BIGINT	int_rollback - Internal rollbacks
TOTAL_RUNSTATS_TIME	BIGINT	total_runstats_time - Total runtime statistics time
TOTAL_RUNSTATS_PROC_TIME	BIGINT	total_runstats_proc_time - Total runtime statistics processing time
TOTAL_RUNSTATS	BIGINT	total_runstats - Total runtime statistics
TOTAL_REORG_TIME	BIGINT	total_reorg_time - Total reorganization time
TOTAL_REORG_PROC_TIME	BIGINT	total_reorg_proc_time - Total reorganization processing time
TOTAL_REORGS	BIGINT	total_reorgs - Total reorganizations
TOTAL_LOAD_TIME	BIGINT	total_load_time - Total load time
TOTAL_LOAD_PROC_TIME	BIGINT	total_load_proc_time - Total load processing time
TOTAL_LOADS	BIGINT	total_loads - Total loads
CAT_CACHE_INSERTS	BIGINT	cat_cache_inserts - Catalog cache inserts
CAT_CACHE_LOOKUPS	BIGINT	cat_cache_lookups - Catalog cache lookups
PKG_CACHE_INSERTS	BIGINT	pkg_cache_inserts - Package cache inserts
PKG_CACHE_LOOKUPS	BIGINT	pkg_cache_lookups - Package cache lookups
THRESH_VIOLATIONS	BIGINT	thresh_violations - Number of threshold violations
NUM_LW_THRESH_EXCEEDED	BIGINT	num_lw_thresh_exceeded - Number of lock wait thresholds exceeded
FCM_TQ_RECV_WAIT_TIME	BIGINT	fcm_tq_recv_wait_time - FCM table queue received wait time
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	fcm_message_recv_wait_time - FCM message received wait time
FCM_TQ_SEND_WAIT_TIME	BIGINT	fcm_tq_send_wait_time - FCM table queue send wait time
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	fcm_message_send_wait_time - FCM message send wait time
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	audit_file_write_wait_time - Audit file write wait time

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
AUDIT_FILE_WRITES_TOTAL	BIGINT	audit_file_writes_total - Total audit files written
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	audit_subsystem_wait_time - Audit subsystem wait time
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	audit_subsystem_waits_total - Total audit subsystem waits
DIAGLOG_WRITE_WAIT_TIME	BIGINT	diaglog_write_wait_time - Diagnostic log file write wait time
DIAGLOG_WRITES_TOTAL	BIGINT	diaglog_writes_total - Total diagnostic log file writes
FCM_MESSAGE_SENDS_TOTAL	BIGINT	fcm_message_sends_total - Total FCM message sends
FCM_MESSAGE_RECVS_TOTAL	BIGINT	fcm_message_recvs_total - Total FCM message receives
FCM_MESSAGE_SEND_VOLUME	BIGINT	fcm_message_send_volume - FCM message send volume
FCM_MESSAGE_RECV_VOLUME	BIGINT	fcm_message_recv_volume - FCM message received volume
FCM_TQ_SENDS_TOTAL	BIGINT	fcm_tq_sends_total - FCM table queue send total
FCM_TQ_RECVS_TOTAL	BIGINT	fcm_tq_recvs_total - FCM table queue receives total
FCM_TQ_SEND_VOLUME	BIGINT	fcm_tq_send_volume - FCM table queue send volume
FCM_TQ_RECV_VOLUME	BIGINT	fcm_tq_recv_volume - FCM table queue received volume
TQ_TOT_SEND_SPILLS	BIGINT	tq_tot_send_spills - Total number of table queue buffers overflowed
AUDIT_EVENTS_TOTAL	BIGINT	audit_events_total - Total audit events
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	total_routine_user_code_proc_time - Total routine user code processing time
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	total_routine_user_code_time - Total routine user code time
LOCK_WAITS_GLOBAL	BIGINT	lock_waits_global - Lock waits global
LOCK_WAIT_TIME_GLOBAL	BIGINT	lock_wait_time_global - Lock wait time global
LOCK_TIMEOUTS_GLOBAL	BIGINT	lock_timeouts_global - Lock timeouts global
LOCK_ESCALS_MAXLOCKS	BIGINT	lock_escals_maxlocks - Number of maxlocks lock escalations
LOCK_ESCALS_LOCKLIST	BIGINT	lock_escals_locklist - Number of locklist lock escalations
LOCK_ESCALS_GLOBAL	BIGINT	lock_escals_global - Number of global lock escalations
RECLAIM_WAIT_TIME	BIGINT	reclaim_wait_time - Reclaim wait time
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	spacemappage_reclaim_wait_time - Space map page reclaim wait time

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
CF_WAITS	BIGINT	cf_waits - Number of cluster caching facility DB2 pureScale server waits
CF_WAIT_TIME	BIGINT	cf_wait_time - cluster caching facility wait time
POOL_DATA_GBP_L_READS	BIGINT	pool_data_gbp_l_reads - Group buffer pool data logical reads
POOL_DATA_GBP_P_READS	BIGINT	pool_data_gbp_p_reads - Group buffer pool data physical reads
POOL_DATA_LBP_PAGES_FOUND	BIGINT	pool_data_lbp_pages_found - Local buffer pool found data pages
POOL_DATA_GBP_INVALID_PAGES	BIGINT	pool_data_gbp_invalid_pages - Group buffer pool invalid data pages
POOL_INDEX_GBP_L_READS	BIGINT	pool_index_gbp_l_reads - Group buffer pool index logical reads
POOL_INDEX_GBP_P_READS	BIGINT	pool_index_gbp_p_reads - Group buffer pool index physical reads
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	pool_index_lbp_pages_found - Local buffer pool index pages found
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	pool_index_gbp_invalid_pages - Group buffer pool invalid index pages
POOL_XDA_GBP_L_READS	BIGINT	pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests
POOL_XDA_GBP_P_READS	BIGINT	pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests
POOL_XDA_LBP_PAGES_FOUND	BIGINT	pool_xda_lbp_pages_found - Local buffer pool XDA data pages found
POOL_XDA_GBP_INVALID_PAGES	BIGINT	pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages
EVMON_WAIT_TIME	BIGINT	evmon_wait_time - Event monitor wait time
EVMON_WAITS_TOTAL	BIGINT	evmon_waits_total - Event monitor total waits
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	total_extended_latch_wait_time - Total extended latch wait time
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	total_extended_latch_waits - Total extended latch waits
TOTAL_STATS_FABRICATION_TIME	BIGINT	total_stats_fabrication_time - Total statistics fabrication time
TOTAL_STATS_FABRICATION_PROC_TIME	BIGINT	total_stats_fabrication_proc_time - Total statistics fabrication processing time
TOTAL_STATS_FABRICATIONS	BIGINT	total_stats_fabrications - Total statistics fabrications
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	total_sync_runstats_time - Total synchronous RUNSTATS time
TOTAL_SYNC_RUNSTATS_PROC_TIME	BIGINT	total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
TOTAL_SYNC_RUNSTATS	BIGINT	total_sync_runstats - Total synchronous RUNSTATS activities
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
TOTAL_PEDS	BIGINT	total_peds - Total partial early distincts
DISABLED_PEDS	BIGINT	“disabled_peds - Disabled partial early distincts monitor element” on page 870
POST_THRESHOLD_PEDS	BIGINT	post_threshold_peds - Partial early distincts threshold
TOTAL_PEAS	BIGINT	total_peas - Total partial early aggregations
POST_THRESHOLD_PEAS	BIGINT	post_threshold_peas - Partial early aggregation threshold
TQ_SORT_HEAP_REQUESTS	BIGINT	tq_sort_heap_requests - Table queue sort heap requests
TQ_SORT_HEAP_REJECTIONS	BIGINT	tq_sort_heap_rejections - Table queue sort heap rejections
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	pool_queued_async_data_reqs - Data prefetch requests
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	pool_queued_async_index_reqs - Index prefetch requests
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	pool_queued_async_xda_reqs - XDA prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	pool_queued_async_other_reqs - Non-prefetch requests
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	pool_queued_async_data_pages - Data pages prefetch requests
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	pool_queued_async_index_pages - Index pages prefetch requests
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	pool_queued_async_xda_pages - XDA pages prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	pool_failed_async_data_reqs - Failed data prefetch requests
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	pool_failed_async_index_reqs - Failed index prefetch requests
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	pool_failed_async_xda_reqs - Failed XDA prefetch requests
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	pool_failed_async_other_reqs - Failed non-prefetch requests
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
PREFETCH_WAITS	BIGINT	prefetch_waits - Prefetcher wait count
APP_ACT_COMPLETED_TOTAL	BIGINT	app_act_completed_total - Total successful external coordinator activities
APP_ACT_ABORTED_TOTAL	BIGINT	app_act_aborted_total - Total failed external coordinator activities
APP_ACT_REJECTED_TOTAL	BIGINT	app_act_rejected_total - Total rejected external coordinator activities
TOTAL_CONNECT_REQUEST_TIME	BIGINT	total_connect_request_time - Total connection or switch user request time
TOTAL_CONNECT_REQUEST_PROC_TIME	BIGINT	total_connect_request_proc_time - Total connection or switch user request processing time
TOTAL_CONNECT_REQUESTS	BIGINT	total_connect_requests - Connection or switch user requests
TOTAL_CONNECT_AUTHENTICATION_TIME	BIGINT	total_connect_authentication_time - Total connection or switch user authentication request time
TOTAL_CONNECT_AUTHENTICATION_PROC_TIME	BIGINT	total_connect_authentication_proc_time - Total connection authentication processing time
TOTAL_CONNECT_AUTHENTICATIONS	BIGINT	total_connect_authentications - Connections or switch user authentications performed
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165

Table 38. Information returned for a unit of work event monitor: Table name: UOW_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the UOW_EVENT table (continued)

Column Name	Data Type	Description
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225
COMM_EXIT_WAIT_TIME	BIGINT	comm_exit_wait_time - Communication buffer exit wait time monitor element
COMM_EXIT_WAITS	BIGINT	comm_exit_waits - Communication buffer exit number of waits monitor element

Information written to XML by EVMON_FORMAT_UE_TO_XML for a unit of work event monitor:

Information written for a unit of work event monitor from the EVMON_FORMAT_UE_TO_XML table function. This is also documented in the sql/lib/misc/DB2EvmonUOW.xsd file.

db2_uow_event

The main schema that describes a unit of work event.

Element content: ("completion_status" on page 216, "start_time" on page 216, "stop_time" on page 217, "connection_time" on page 217, "application_name" on page 217, "application_handle" on page 217, "application_id" on page 217, "uow_id" on page 218, "workload_occurrence_id" on page 218, "coord_member" on page 218, "member_activation_time" on page 218, "workload_name" on page 218, "workload_id" on page 218, "service_superclass_name" on page 218 {zero or one times (?)}, "service_subclass_name" on page 219 {zero or one times (?)}, "service_class_id" on page 219 {zero or one times (?)}, "session_authid" on page 219 {zero or one times (?)}, "system_authid" on page 219, "client_pid" on page 219, "client_product_id" on page 219, "client_platform" on page 219, "client_protocol" on page 220 {zero or one times (?)}, "client_userid" on page 220 {zero or one times (?)}, "client_wrkstnname" on page 220 {zero or one times (?)}, "client_applname" on page 220 {zero or one times (?)}, "client_acctng" on page 220 {zero or one times (?)}, "local_transaction_id" on page 220, "global_transaction_id" on page 221, "system_metrics" on page 221, "client_hostname" on page 221, "client_port_number" on page 221, "uow_log_space_used" on page 221, "package_list" on page 221, "executable_list" on page 222, "intra_parallel_state" on page 222, ANY content (skip) {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			required	
type				required	
timestamp	xs:dateTime			required	
member				required	
release	xs:long			required	
mon_interval_id	xs:long			required	

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

package_id

See monitor element “package_id - Package identifier monitor element” on page 1094 for more details.

Contained by: “package_entry” on page 212

Element content:

Type	Facet
xs:long	

package_elapsed_time

See monitor element “package_elapsed_time - Package elapsed time monitor element” on page 1094 for more details.

Contained by: “package_entry” on page 212

Element content:

Type	Facet
xs:long	

invocation_id

See monitor element “invocation_id - Invocation ID monitor element” on page 969 for more details.

Contained by: “package_entry” on page 212

Element content:

Type	Facet
xs:int	

routine_id

See monitor element “routine_id - Routine ID monitor element” on page 1286 for more details.

Contained by: “package_entry” on page 212

Element content:

Type	Facet
xs:int	

nesting_level

See monitor element “nesting_level - Nesting level monitor element” on page 1055 for more details.

Contained by: “package_entry”

Element content:

Type	Facet
xs:int	

package_entry

Contained by: “package_list_entries”

Element content: (“package_id” on page 211, “package_elapsed_time” on page 211, “invocation_id” on page 211, “routine_id” on page 211, “nesting_level”, ANY content (skip) {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

package_list_size

Contained by: “package_list” on page 221

Element content:

Type	Facet
xs:int	

package_list_exceeded

See monitor element “package_list_exceeded - Package list exceeded monitor element” on page 1095 for more details.

Contained by: “package_list” on page 221

package_list_entries

Contained by: “package_list” on page 221

Element content: (“package_entry” {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

executable_id

See monitor element “executable_id - Executable ID monitor element” on page 888 for more details.

Contained by: “executable_entry” on page 215

num_executions

See monitor element “num_executions - Statement executions monitor element” on page 1061 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

rows_read

See monitor element “rows_read - Rows read monitor element” on page 1292 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

total_cpu_time

See monitor element “total_cpu_time - Total CPU time monitor element” on page 1436 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

total_act_time

See monitor element “total_act_time - Total activity time monitor element” on page 1415 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

total_act_wait_time

See monitor element “total_act_wait_time - Total activity wait time monitor element” on page 1417 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

lock_wait_time

See monitor element “lock_wait_time - Time waited on locks monitor element” on page 1009 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

lock_waits

See monitor element “lock_waits - Lock waits monitor element” on page 1014 for more details.

Contained by: “executable_entry” on page 215

Element content:

Type	Facet
xs:long	

total_sorts

See monitor element “total_sorts - Total sorts monitor element” on page 1488 for more details.

Contained by: "executable_entry"

Element content:

Type	Facet
xs:long	

post_threshold_sorts

See monitor element "post_threshold_sorts - Post threshold sorts monitor element" on page 1248 for more details.

Contained by: "executable_entry"

Element content:

Type	Facet
xs:long	

post_shrthreshold_sorts

See monitor element "post_shrthreshold_sorts - Post shared threshold sorts monitor element" on page 1241 for more details.

Contained by: "executable_entry"

Element content:

Type	Facet
xs:long	

sort_overflows

See monitor element "sort_overflows - Sort overflows monitor element" on page 1326 for more details.

Contained by: "executable_entry"

Element content:

Type	Facet
xs:long	

executable_entry

Contained by: "executable_list_entries" on page 216

Element content: ("executable_id" on page 213, "num_executions" on page 213, "rows_read" on page 213, "total_cpu_time" on page 213, "total_act_time" on page 214, "total_act_wait_time" on page 214, "lock_wait_time" on page 214,

“lock_waits” on page 214, “total_sorts” on page 214, “post_threshold_sorts” on page 215, “post_shrthreshold_sorts” on page 215, “sort_overflows” on page 215, ANY content (skip) {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

executable_list_size

Contained by: “executable_list” on page 222

Element content:

Type	Facet
xs:int	

executable_list_truncated

Contained by: “executable_list” on page 222

executable_list_entries

Contained by: “executable_list” on page 222

Element content: (“executable_entry” on page 215 {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

completion_status

The completion status of the unit of work. Possible values are: UNKNOWN, COMMIT, ROLLBACK, GLOBAL_COMMIT, GLOBAL_ROLLBACK, XA_END, XA_PREPARE

Contained by: “db2_uow_event” on page 210

start_time

The start time of the unit of work. See monitor element “uow_start_time - Unit of work start timestamp monitor element” on page 1519 for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:dateTime	

stop_time

The stop time of the unit of work. See monitor element “uow_stop_time - Unit of work stop timestamp monitor element” on page 1521 for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:dateTime	

connection_time

The time the application connected to the database member. See monitor element “conn_time - Time of database connection monitor element” on page 801 for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:dateTime	

application_name

The name of the application running at the client, as known to the database. See monitor element “appl_name - Application name monitor element” on page 731 for more details.

Contained by: “db2_uow_event” on page 210

application_handle

A system-wide unique ID for the application. See monitor element “agent_id - Application handle (agent ID) monitor element” on page 710 for more details.

Contained by: “db2_uow_event” on page 210

application_id

This identifier is generated when the application connects to the database at the database manager. See monitor element “appl_id - Application ID monitor element” on page 727 for more details.

Contained by: “db2_uow_event” on page 210

uow_id

The unit of work ID to which this activity record applies. See monitor element “uow_id - Unit of work ID monitor element” on page 1517 for more details.

Contained by: “db2_uow_event” on page 210

workload_occurrence_id

The workload occurrence ID to which this activity record applies. See monitor element “workload_occurrence_id - Workload occurrence identifier monitor element” on page 1544 for more details.

Contained by: “db2_uow_event” on page 210

coord_member

Contained by: “db2_uow_event” on page 210

member_activation_time

The time this database member was activated. See monitor element “db_conn_time - Database activation timestamp monitor element” on page 838 for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:dateTime	

workload_name

The name of the workload under which the unit of work completed. See monitor element “workload_name - Workload name monitor element” on page 1543 for more details.

Contained by: “db2_uow_event” on page 210

workload_id

The workload ID of the workload under which the unit of work completed. See monitor element “workload_id - Workload ID monitor element” on page 1542 for more details.

Contained by: “db2_uow_event” on page 210

service_superclass_name

The name of the service super class under which the unit of work completed. See monitor element “service_superclass_name - Service superclass name monitor element” on page 1311 for more details.

Contained by: “db2_uow_event” on page 210

service_subclass_name

The name of the service sub class under which the unit of work completed. See monitor element “service_subclass_name - Service subclass name monitor element” on page 1310 for more details.

Contained by: “db2_uow_event” on page 210

service_class_id

The service class ID of the service class under which the unit of work completed. See monitor element “service_class_id - Service class ID monitor element” on page 1309 for more details.

Contained by: “db2_uow_event” on page 210

session_authid

The session authorization ID of the user who invoked the application that is being monitored. See monitor element “session_auth_id - Session authorization ID monitor element” on page 1312 for more details.

Contained by: “db2_uow_event” on page 210

system_authid

The system authorization ID of the user who invoked the application that is being monitored. See monitor element “system_auth_id - System authorization identifier monitor element” on page 1371 for more details.

Contained by: “db2_uow_event” on page 210

client_pid

The process ID reported by the client. See monitor element “client_pid - Client process ID monitor element” on page 778 for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:long	

client_product_id

The product ID of the client. See monitor element “client_prdid - Client product and version ID monitor element” on page 780 for more details.

Contained by: “db2_uow_event” on page 210

client_platform

The platform of the client. See monitor element “client_platform - Client operating platform monitor element” on page 778 for more details.

Contained by: "db2_uow_event" on page 210

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:short			optional	

client_protocol

The product ID of the client. See monitor element "client_protocol - Client communication protocol monitor element" on page 780 for more details.

Contained by: "db2_uow_event" on page 210

client_userid

The client user ID generated by a transaction manager and provided to the server. See monitor element "client_userid - Client user ID monitor element" on page 781 for more details.

Contained by: "db2_uow_event" on page 210

client_wrkstname

Identifies the client system or workstation, if the sqleseti API was issued in this connection. See monitor element "client_wrkstname - Client workstation name monitor element" on page 782 for more details.

Contained by: "db2_uow_event" on page 210

client_applname

Identifies the server transaction program performing the transaction, if the sqleseti API was issued in this connection. See monitor element "client_applname - Client application name monitor element" on page 774 for more details.

Contained by: "db2_uow_event" on page 210

client_acctng

The data passed to the target database for logging and diagnostic purposes, if the sqleseti API was issued in this connection. See monitor element "client_acctng - Client accounting string monitor element" on page 773 for more details.

Contained by: "db2_uow_event" on page 210

local_transaction_id

The local transaction id for the unit of work.

Contained by: "db2_uow_event" on page 210

global_transaction_id

The global transaction id for the unit of work.

Contained by: “db2_uow_event” on page 210

system_metrics

The metrics for the unit of work.

Contained by: “db2_uow_event” on page 210

client_hostname

The hostname of the client. See monitor element “client_hostname - Client hostname monitor element” on page 776for more details.

Contained by: “db2_uow_event” on page 210

client_port_number

The port number of the client. See monitor element “client_port_number - Client port number monitor element” on page 779for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:int	

uow_log_space_used

The amount of log space used during the unit of work. See monitor element “uow_log_space_used - Unit of work log space used monitor element” on page 1519for more details.

Contained by: “db2_uow_event” on page 210

Element content:

Type	Facet
xs:long	

package_list

The package list for the unit of work.

Contained by: “db2_uow_event” on page 210

Element content: (“package_list_size” on page 212, “package_list_exceeded” on page 212, “package_list_entries” on page 212, ANY content (skip) {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

executable_list

The executable list for the unit of work.

Contained by: “db2_uow_event” on page 210

Element content: (“executable_list_size” on page 216, “executable_list_truncated” on page 216, “executable_list_entries” on page 216, ANY content (skip) {zero or more (*)})

Attributes:

QName	Type	Fixed	Default	Use	Annotation
ANY attribute from ANY namespace					

intra_parallel_state

The current intrapartition parallelism state of the unit of work. Possible values are YES and NO.

Contained by: “db2_uow_event” on page 210

Unit of work event monitor package listing information:

The unit of work event monitor can collect a listing of packages used within a unit of work. This information can be used to determine which stored procedures within an application might be taking more time than expected to run.

Starting with DB2 Version 9.7 Fix Pack 1, you can have information about the packages used within units of work included in the data the event monitor collects. Depending on the output option you choose for the unit of work event monitor, this information is written to the unformatted event table or to the UOW_PACKAGE_LIST_ *evmon-name* table (where *evmon-name* is the name assigned to the event monitor) when the unit of work ends along with the rest of the information associated with the event.

There are two ways to control the capture of this information:

- The PACKAGE LIST option for the COLLECT UNIT OF WORK DATA clause of the CREATE or ALTER WORKLOAD statements controls the collection of this information for *specific* workloads. If this option is specified, information for the units of work that are executed under the workload identified in the CREATE or ALTER WORKLOAD statements, including package list information, is sent to any active unit of work event monitors.

- The `mon_uow_pkglist` configuration parameter can be set to ON so that package list information for *all* units of work executed on the data server is sent to any active unit of work event monitors.

Note: `mon_uow_data` must also be set to BASE for package list information to be collected.

The following data is collected for the package listing:

Package ID (“`package_id` - Package identifier monitor element” on page 1094)

A unique ID that identifies a package.

Nesting level (“`nesting_level` - Nesting level monitor element” on page 1055)

The level of nesting or recursion in effect when the statement was being run. Each level of nesting corresponds to nested or recursive invocation of a stored procedure or user-defined function (UDF).

Routine ID (“`routine_id` - Routine ID monitor element” on page 1286)

A unique routine identifier. It returns zero if the activity is not part of a routine.

Invocation ID (“`invocation_id` - Invocation ID monitor element” on page 969)

An identifier that distinguishes one invocation of a routine from others at the same nesting level within a unit of work. It is unique within a unit of work for a specific nesting level.

Package elapsed time (“`package_elapsed_time` - Package elapsed time monitor element” on page 1094)

The elapsed time spent executing sections within the package.

As the list of information collected for the package listing suggests, information is captured not only for each package but also for each invocation of a routine within a package.

Elapsed time is also tracked. The time calculated for a given invocation starts from the first execution of a section within a package until the database manager switches to another package. See “Examples” on page 226 to see more about how elapsed time is tracked.

How package lists are written to unformatted event tables

When you enable the collection of package list information, the unit of work event monitor writes two records to the unformatted event (UE) table for each unit of work. The first record contains the basic unit of work event monitor data. The next record contains the package listing information.

Package list information is stored in the UE table in a BLOB column. A list with 32 entries can be stored as an inline BLOB when the page size for the table space is 4k (the default). The number of entries that can be written to the package list is controlled by the `mon_pkglist_sz` configuration parameter. The default for this parameter is 32, which means that up to 32 entries can be included in the package listing. If you want to increase the number of entries that can be included in the package list, ensure that the UE table used to store the event monitor output is created in a table space with a larger page size. Assume that every increase of 32 in the size of the package list requires an increase of 4k in the page size of the table space. So, for example, if you want to have up to 64 entries in the package list, ensure that the page size for the table space is at least 8k. If you increase

mon_pkglist_sz without increasing the page size of the table space, the package list is still created, however the BLOB is not stored inline in the table, which might affect performance.

Note: You can use the `ADMIN_IS_INLINED` administrative function to determine whether the BLOB that contains the package list information is stored inline.

How package lists are written to regular tables

When you use regular tables for event monitor output, package list information is captured as part of the “uow_package_list logical data group” on page 109. As each unit of work completes, one or more rows are added to the `UOW_PACKAGE_LIST_evmon-name` table, with one column for each monitor element in the logical data group. The number of rows added to the table depends on how many packages ran as part of the unit of work. However, the upper limit to the number of rows that can be added to this table is controlled by the **mon_pkglist_sz** configuration parameter. The default for this parameter is 32, which means that up to 32 entries can be included in the package listing. If you want to increase the number of entries that can be included in the package list, increase **mon_pkglist_sz**.

Package listing output

As stated earlier, when the event monitor writes to a UE table, the unit of work event monitor writes two records to the UE table when collecting package information. Each of the interfaces for displaying the data in a UE table provides a mechanism for viewing the information contained in the two UE table records. For example, the **db2evmonfmt** tool combines the information in each record into a single report. If you use the `EVMON_FORMAT_UE_TO_TABLES` procedure, it produces relational tables that you can join; the table `UOW_PACKAGE_LIST` contains the package list information. `EVMON_FORMAT_UE_TO_XML` produces a single XML document that contains the information from both records. For more information, see “Accessing event data that is captured by a unit of work event monitor” on page 187.

When the event monitor writes to relational tables directly, the package list information is written to the table `UOW_PACKAGE_LIST_evmon-name`.

Note: In a partitioned database environment, the package list is only reported in the unit of work event generated by the *coordinator agent* and reflects the time spent in each package by that agent specifically; it does not reflect time spent in those packages by any other agent at any other partition.

Figure 5 on page 225 shows the information produced by the unit of work event monitor, as formatted by the **db2evmonfmt** tool.

```

-----
Event ID           : 12
Event Type        : UOW
Event Timestamp   : 2009-12-08-14.44.39.162707
Member           : 0
Release          : 9070200
-----

Database Level Details
-----
Database Member Activation Time : 2009-12-08-14.41.55.089416
Coordinator Member             : 0

Connection Level Details
-----
Application ID                : *LOCAL.gstager.091208194155
Application Handle            : 21
Application Name              : db2bp
Session Authorization ID     :
System Authorization ID      :
Connection Timestamp         : 2009-12-08-14.41.55.089416
Client Process ID            : 13043
Client Platform              : LINUXX8664
Client Product ID            : SQL09072
Client Protocol              : LOCAL
Client Hostname              : HOSTX
Client Port Number           : 0

UOW Level Details
-----
Start Time                  : 2009-12-08-14.44.39.160651
Stop Time                   : 2009-12-08-14.44.39.162707
Completion Status           : COMMIT
UOW ID                      : 12
Workoad Occurrence ID      : 1
Workload Name               : SYSDEFAULTUSERWORKLOAD
Workoad ID                  : 1
Service Superclass Name    : SYSDEFAULTUSERCLASS
Service Subclass Name      : SYSDEFAULTSUBCLASS
Service Class ID           : 13
Client Userid              :
Client Workstation Name    :
Client Application Name    :
Client Accounting String   :
Local Transaction ID       : 000000000000013B
Global Transaction ID      : 0000000000000000000000000000000000000000
Log Space Used              : 124

UOW Metrics
-----
TOTAL_CPU_TIME             : 1591
TOTAL_WAIT_TIME            : 8363
ACT_ABORTED_TOTAL         : 0
ACT_COMPLETED_TOTAL       : 1
ACT_REJECTED_TOTAL        : 0
AGENT_WAIT_TIME           : 87
AGENT_WAITS_TOTAL         : 1
APP_RQSTS_COMPLETED_TOTAL : 1
.
.

Package List
-----
Package List Size         : 2
Package List Exceeded    : no

PACKAGE_ID      NESTING_LEVEL ROUTINE_ID  INVOCATION_ID  PACKAGE_ELAPSED_TIME
-----
240             0             0             0             0
330             1             66539        1             1

```

Note: Some of the metrics in the "UOW Metrics" section have been excluded.

Figure 5. Sample output from the unit of work event monitor, with package listing information

The number of packages that appear in the package list for a given unit of work is reflected in the **package_list_count** monitor element ("Package List Size" in the preceding report), which is included with the base unit of work event monitor data. If the number of packages used with the unit of work exceeds the value

specified in the `mon_pkglist_sz` configuration parameter, the additional packages are not included in the package listing. However, the `package_list_exceeded` monitor element indicates whether there were more packages than would fit into the package list. This monitor element is returned along with the base information for the unit of work event monitor (“Package List Exceeded” in Figure 5 on page 225). If the value for this monitor element is YES, you can increase the value for `mon_pkglist_sz` to have a larger number of packages included in the package list.

Examples

Each of the examples that follow show the information returned for the package listing as it would be displayed by the `db2evmonfmt` tool.

Example 1: An application that executes one or more sections in a single package

In this example, one package with a package ID of 300 was run for this unit of work.

PACKAGE_ID	NESTING_LEVEL	ROUTINE_ID	INVOCATION_ID	ELAPSED_TIME
300	0	0	0	100

In this case, there is one entry on the package list, which reflects the execution of one or more sections in the package. All sections executed from the same package are considered to be part of the same package invocation.

Example 2: An application calls a stored procedure in a package

In this example, the package with a package ID of 300 calls a stored procedure with an ID of 806. Three sections are executed within the stored procedure.

PACKAGE_ID	NESTING_LEVEL	ROUTINE_ID	INVOCATION_ID	ELAPSED_TIME
300	0	0	0	21
300	1	806	1	100

This output shows two entries in the list. One entry is for the call to the stored procedure, and one for the execution of the three sections within the stored procedure. The `NESTING_LEVEL` for the second entry in the list reflects the fact that the stored procedure was called from another package.

Example 3: An application executes sections in two different packages

In this example, an application executes sections from one package, then another package, and then back to the first package. No stored procedures are called. The pseudocode that follows is a representation of this unit of work:

```
Application
EXEC PACKAGEA
EXEC PACKAGEB
EXEC PACKAGEA
```

Assume also that the invocation of `PACKAGEA` requires 100 ms, the invocation of `PACKAGEB` requires 25 ms, and that the invocation of `PACKAGEC` requires 460 ms. The following output shows what the package listing would look like:

PACKAGE_ID	NESTING_LEVEL	ROUTINE_ID	INVOCATION_ID	ELAPSED_TIME
300	0	0	0	560
301	0	0	0	25

In this case, there are two entries in the list. Package A, with PACKAGE_ID 300 had sections that ran for 560 ms in total. Package B ran for 25 ms. Package A is represented by a single line because each invocation has the same INVOCATION_ID and NESTING_LEVEL. INVOCATION_ID and NESTING_LEVEL remain at 0, because no stored procedures were called in either package.

Example 4: An application executes sections and stored procedures in multiple packages

In this example, there are 3 packages with IDs 100, 101, and 102. The application is in package 100. There are two stored procedures with IDs 201 and 202. The first stored procedure (SP1) is in package 101, and the second (SP2) is in package 102. The pseudocode that follows is a representation of this unit of work:

```
Application
CALL SP1 a
    INSERT INTO T1 VALUES(7) b
    CALL SP2 c
        INSERT INTO T2 VALUES(8)
    CALL SP2 d
        INSERT INTO T2 VALUES(8)
```

The package listing for this unit of work would be as follows:

PACKAGE_ID	NESTING_LEVEL	ROUTINE_ID	INVOCATION_ID	ELAPSED_TIME
100	0	0	0	21
101	1 1	201	1	40
102	2 2	202	1 3	35
102	2	202	2 3	35

In the preceding output, there are four entries:

- The first corresponds to the execution of the call to SP1 within the first package, line **a** in the pseudocode that represents the unit of work.
- The second corresponds to the execution of the sections within the stored procedure with ID 201 in package 101. These sections include lines **b**, **c**, and **d**. The nesting level increases to 1, as shown by **1**.
- The third entry represents the execution of the first of the INSERT INTO T2 statements in SP2, as called from SP1. The nesting level increases again (**2**).
- The fourth entry in the list represents the execution of the second of the INSERT INTO T2 statements in SP2. The nesting level remains the same, because like the previous call to SP2, this stored procedure is called from SP1. However, because these two statements occur within separate invocations of the stored procedure, they each have separate invocation IDs (**3**). Thus, there are two separate entries in the package listing.

Executable list information:

When collecting unit of work information, you have the option to also collect a list of the executable IDs of statements that run as part of each unit of work.

The information about the executable IDs is written to an unformatted event (UE) table or to a regular table. There are two ways to capture this information:

- Use the EXECUTABLE LIST option for the COLLECT UNIT OF WORK DATA clause of the CREATE WORKLOAD or ALTER WORKLOAD statement to collect information for specific workloads. Information for the units of work that are executed under the workload that you identify in the statement, including executable IDs, is sent to the active unit of work (UOW) event monitors.

- Use configuration parameters to have information about all units of work that are executed on the data server, including executable information, sent to active unit of work event monitors. To collect executable ID information, set the **mon_uow_data** configuration parameter to BASE, and set the **mon_uow_execlist** configuration parameter to ON.

The following data is collected for the executable listing:

Unit of Work Level

executable_list_size

The number of entries that are present within the executable ID listing for a particular unit of work.

executable_list_truncated

A YES or NO value indicating whether the list is truncated. The list can be truncated if there is insufficient memory available to store the entire executable list during processing.

Executable ID List

executable_id (“executable_id - Executable ID monitor element” on page 888) An opaque binary token generated on the data server that uniquely identifies the SQL statement section that was executed.

num_executions (“num_executions - Statement executions monitor element” on page 1061)

The number of times that an SQL statement has been executed.

rows_read (“rows_read - Rows read monitor element” on page 1292)

The number of rows read from the table.

total_cpu_time (“total_cpu_time - Total CPU time monitor element” on page 1436)

The total amount of CPU time used while in the DB2 product. Represents total of both user and system CPU time. This value is given in microseconds.

total_act_time (“total_act_time - Total activity time monitor element” on page 1415)

The total amount of time spent executing activities. This value is given in milliseconds.

total_act_wait_time (“total_act_wait_time - Total activity wait time monitor element” on page 1417)

Total time spent waiting within the DB2 database server, while processing an activity. The value is given in milliseconds.

lock_wait_time (“lock_wait_time - Time waited on locks monitor element” on page 1009)

The total elapsed time spent waiting for locks. The value is given in milliseconds.

lock_waits (“lock_waits - Lock waits monitor element” on page 1014)

The total number of times that applications or connections waited for locks.

total_sorts (“total_sorts - Total sorts monitor element” on page 1488)

The total number of sorts that have been executed.

post_threshold_sorts (“post_threshold_sorts - Post threshold sorts monitor element” on page 1248)

The number of sorts that have requested heaps after the sort heap threshold has been exceeded.

post_shrthreshold_sorts (“post_shrthreshold_sorts - Post shared threshold sorts monitor element” on page 1241)

The total number of sorts that were throttled back by the sort memory throttling algorithm. A throttled sort is a sort that was granted less memory than requested by the sort memory manager

sort_overflows (“sort_overflows - Sort overflows monitor element” on page 1326)

The total number of sorts that ran out of sort heap and may have required disk space for temporary storage.

How execution lists are written to UE tables

At least two separate records can be written to the UE table when base data and executable ID list data is collected for an UOW event monitor. The first record contains information about the UOW event that contains the base UOW data. The second record is the UOW_EXEC_LIST event that contains the executable ID listing data. This second record might consist of multiple records because of the potentially large number of unique executable IDs for a single UOW. These records are written as separate rows to the UE table to ensure that each event is contained within the inlined LOB space available. You can use the interfaces for formatting the UE table to merge information for these events. When the executable ID list is not collected, an associated record is not created; the table does not contain any rows.

How execution lists are written to regular tables

When you use regular tables for event monitor output, executable list information is captured as part of the “uow_executable_list logical data group” on page 102. As each unit of work is completed, one or more rows are added to the table UOW_EXECUTABLE_LIST_ *evmon_name*, with one column for each monitor element in the logical data group. The number of rows that are added to the table depends on how many unique executable IDs ran as part of the unit of work.

Executable listing output

When the event monitor writes to a UE table, the unit of work event monitor writes two records to the UE table when collecting execution information. Each of the interfaces for displaying the data in a UE table provides a mechanism for viewing the information contained in the two UE table records. The **db2evmonfmt** tool combines the information in each record into a single report. The EVMON_FORMAT_UE_TO_TABLES procedure produces relational tables that you can join; the table UOW_EXECUTABLE_LIST contains the executable list information. The EVMON_FORMAT_UE_TO_XML table function produces a single XML document that contains the information from both records. For more information, see “Accessing event data that is captured by a unit of work event monitor” on page 187.

When the event monitor writes directly to relational tables, the executable list information is written to the table UOW_EXECUTABLE_LIST_ *evmon_name*.

In a partitioned database environment, the executable ID list is generated per member, including per coordinator agent member and data member. In a DB2 pureScale environment, the list is generated from the coordinator member, which is similar to the situation in non-partitioned configurations.

Examples

The following sample information was collected for an application that executes five different SQL statement sections within a UOW. This output provides a logical view with sample columns; the actual output depends on the tool or query that you run.

EXECUTABLE_ID	NUM_EXECUTIONS	ROWS_READ	TOTAL_CPU_TIME
x'01007A00000020020081126171554951791'	1	23456	76888
x'01007900000020020081126171533551120'	55	345	768
x'01007C00000020020081126171720728997'	234	67	232
x'01007B00000020020081126171657272914'	3456	347	1223
x'01007D00000020020081126172409987719'	22242	2244	432444

In this example, there are five entries in the executable ID list to correspond to the five different sections that were executed. The five sections were executed a different number of times, as illustrated by the NUM_EXECUTIONS column, but only one entry is provided for each unique section. The first row might indicate a problematic activity statement because it consumed excessive CPU time in just one execution.

Collecting unit of work event data and generating reports

You can use the unit of work event monitor to collect data about transactions that you can use for chargeback purposes. The collected transaction event data is in an unreadable form in an unformatted event table. You can use this data to create a readable text report.

Before you begin

To collect unit of work event monitor data, you must have SYSADM or SYSCTRL authority.

About this task

This task provides instructions for collecting unit of work event data for a particular workload.

Package listing and execution list information is also collected if you set both the **mon_uow_pkglist** and **mon_uow_execlist** configuration parameters to ON. Alternatively, you can collect package listing and execution list information for a workload, regardless of the settings of the **mon_uow_pkglist** and **mon_uow_execlist** configuration parameters, by altering the ALTER WORKLOAD statement as follows:

- For package listing information, replace the BASE option with the BASE INCLUDE PACKAGE LIST option.
- For execution list information, replace the BASE option with the BASE INCLUDE EXECUTABLE LIST option.
- For package listing and execution list information, replace the BASE option with the BASE INCLUDE PACKAGE LIST, EXECUTABLE LIST option.

The unit of work event monitor collects information that identifies application transactions and the corresponding CPU usage. Examples of information that the unit of work event monitor collects for a transaction event are as follows:

- Total CPU usage time (TOTAL_CPU_TIME monitor element)
- Application handle (APPLICATION_HANDLE monitor element)

Restrictions

Input data values are not viewable if you do not have SYSADM or SYSCTRL authority.

Procedure

To collect detailed information regarding unit of work events:

1. Create a unit of work event monitor called UOWEVMON by issuing the CREATE EVENT MONITOR FOR UNIT OF WORK statement, as shown in the following example:

```
CREATE EVENT MONITOR UOWEVMON FOR UNIT OF WORK
WRITE TO UNFORMATTED EVENT TABLE
```

2. Activate the UOWEVMON unit of work event monitor by issuing the following statement:

```
SET EVENT MONITOR UOWEVMON STATE 1
```

3. Enable unit of work event data collection at the workload level by issuing the ALTER WORKLOAD statement with statement history. For example, to collect unit of work data for the FINANCE and PAYROLL applications, issue the following statements:

```
ALTER WORKLOAD finance COLLECT UNIT OF WORK DATA BASE
ALTER WORKLOAD payroll COLLECT UNIT OF WORK DATA BASE
```

4. To collect unit of work transaction events, rerun the workload.
5. Connect to the database.
6. Produce a flat-text report that is based on the event data that is collected in the unformatted event table by using the XML parser tool, **db2evmonfmt**, as shown in the following example:

```
java db2evmonfmt -d db_name -ue table_name -ftext -u user_id -p password
```

7. Analyze the report to determine how much CPU time applications are using so that appropriate charges can be billed.
8. If you want to turn off unit of work data collection for both the FINANCE and PAYROLL applications, issue the following statements:

```
ALTER WORKLOAD finance COLLECT UNIT OF WORK DATA NONE
ALTER WORKLOAD payroll COLLECT UNIT OF WORK DATA NONE
```

Example

The following example of a report was obtained by using the **db2evmonfmt** tool to convert the data that the unit of work event monitor collected in the unformatted event table:

```
-----
Event ID           : 1
Event Type        : UOW
Event Timestamp    : 2008-10-31-13.29.04.130849
Member of detection : 0
-----
```

Database Level Details

```

-----
Member Activation Time      : 2008-10-31T13:28:48.538973
Coordinator Member        : 0

Connection Level Details
-----
Application ID             : *LOCAL.gstager.081031172848
Application Handle        : 20
Application Name          : db2bp
Session Authorization ID  : GSTAGER
System Authorization ID   : GSTAGER
Connection Timestamp      : 2008-10-31T13:28:48.538973
Client Process ID        : 28167
Client Platform          : 30
Client Product ID        : SQL09070
Client Hostname          : gilera
Client Port Number       : 30143

UOW Level Details
-----
Start Time                : 2008-10-31T13:28:51.560138
Stop Time                 : 2008-10-31T13:29:04.130849
Completion Status         : COMMIT
UOW ID                    : 5
Workload Occurrence ID   : 1
Workload Name             : SYSDEFAULTUSERWORKLOAD
Workload ID               : 1
Client userid             :
Client Workstation Name   :
Client Application Name   :
Client Accounting String  :
Local Transaction ID     : 00000000000000EB
Global Transaction ID    : 0000000000000000000000000000000000000000
Log Space Used           : 0

UOW Metrics
-----
TOTAL_CPU_TIME           : 7459
TOTAL_WAIT_TIME          : 0
ACT_ABORTED_TOTAL       : 0
...

```

Calculating the CPU time used by different applications or workloads with the unit of work event monitor:

This topic shows one way that you can use the unit of work event monitor in day-to-day database operations.

In some business environments, departments are billed for the processing time their applications use. You can use the unit of work event to record the CPU time used by different application, workloads, or service classes. This information can, in turn, be used in accounting applications that perform billing for system resources.

Before you begin

The CREATE EVENT MONITOR statement requires a table space with a page size of at least 8 K to store the unformatted event (UE) table produced by the event monitor. Unless a table space is explicitly named in the CREATE EVENT MONITOR statement, the default table space for the database is used.

About this task

This task describes a basic scenario for “charge-back” accounting. In the example that follows, all work performed on the system is tracked. From the data gathered, reports are created that show the CPU time used by different applications.

Depending on how your organization is set up, tracking system time based on workload might be appropriate. Alternatively, you can also look at the CPU time used in different service super classes, by specific workloads, or even by different users. If the data is written to relational tables, as the example in this task shows, you can use SQL to query and present the data in almost limitless ways.

Note: Activities within a unit of work can run in different service subclasses. For this reason, it is not appropriate to aggregate unit of work information by service subclass. If you want to aggregate CPU time by service class, use the activity event monitor instead.

Procedure

1. Create a unit of work event monitor to capture information about units of work as they finish. For example, to create an event monitor called TRACKWORK, you might could use the following SQL:

```
CREATE EVENT MONITOR TRACKWORK FOR UNIT OF WORK WRITE TO UNFORMATTED EVENT TABLE
```

This statement creates a unit of work event monitor that writes to an unformatted event (UE) table. The UE table has the same name as the event monitor itself, TRACKWORK, and it is stored in the default table space.

2. Tell the database manager that you want to collect event information for all units of work completed on the database by running the following command:

```
UPDATE DATABASE CONFIGURATION FOR dbname USING MON_UOW_DATA BASE
```

This command causes information about all units of work executed on the data server to be sent to the active unit of work event monitors when the units of work complete. See “Configuring data collection” on page 185 for more information about controlling the scope of the unit of work data that is collected.

3. Next, activate the event monitor:

```
SET EVENT MONITOR TRACKWORK STATE 1
```

Note: By default, this event monitor starts automatically upon database activation, because the AUTOSTART option is applied by default. However, because this event monitor is being created in an already-active database, you must use the **SET EVENT MONITOR** command to start it manually.

From this point on, the unit of work event monitor captures information for each unit of work as it runs to completion. As each unit of work completes, the event monitor adds a record for the event to the UE table TRACKWORK.

4. When you are ready to collect data for reporting purposes, you must extract the records from the TRACKWORK UE table.

You can view this information in XML or relational format, using either the `EVMON_FORMAT_UE_TO_XML` or the `EVMON_FORMAT_UE_TO_TABLES` procedure to convert the data in the UE table. Alternatively, you can use the **db2evmonfmt** tool to create a text report of the information returned by the event monitor. This example shows the use of `EVMON_FORMAT_UE_TO_TABLES` to create relational tables that you can query in whatever way suits your needs.

```
CALL EVMON_FORMAT_UE_TO_TABLES
('UOW', NULL, NULL, NULL, NULL, NULL, NULL, -1, 'SELECT * FROM TRACKWORK')
```

The EVMON_FORMAT_UE_TO_TABLES procedure examines the UE table TRACKWORK produced by the event monitor; it selects each of the records from the UE table, and from them, creates rows containing the data collected by the unit of work event monitor in two relational tables:

- UOW_EVENT
- UOW_METRICS

The first table contains the most frequently used monitor elements and metrics associated with each event captured. The second contains detailed metrics for each event.

Notes:

- If you specify PKGLIST rather than BASE for the MON_UOW_DATA configuration parameter in step 2 on page 233, the EVMON_FORMAT_UE_TO_TABLES procedure creates a third table called UOW_PACKAGE_LIST. This table contains package list information related to the units of work. However, in this example, because only basic monitor elements are collected (see step 2 on page 233), this table will not contain any data. (See “Unit of work event monitor package listing information” on page 222 for more information about how the package list information can be used.)
 - The values in the columns of UOW_METRICS can also be found in the XML document contained in the METRICS column of the UOW_EVENT table. They are provided in the UOW_METRICS table for more convenient, column-oriented access.
5. Query the tables produced in the previous step to see how CPU time was used by applications. The statement that follows returns a breakdown of total CPU time used by different users on the system since the unit of work event monitor was initialized. (This example assumes that client applications have identified themselves to the database using the sqlseti API, or through whatever application development environment you might be using, such as IBM Rational® Application Developer for WebSphere® Software.

```
SELECT SUBSTR(E.CLIENT_USERID,1,10) AS CLIENT_ID,
       SUBSTR(E.CLIENT_APPLNAME,1,80) AS CLIENT_APP,
       SUBSTR(E.CLIENT_WRKSTNNAME,1,10) AS WKSTN,
       SUM(M.TOTAL_CPU_TIME) AS CPU_TIME
FROM UOW_EVENT E, UOW_METRICS M
WHERE M.APPLICATION_ID = E.APPLICATION_ID
      AND M.UOW_ID = E.UOW_ID
      AND M.MEMBER = E.MEMBER
GROUP BY E.CLIENT_USERID, E.CLIENT_APPLNAME, E.CLIENT_WRKSTNNAME
ORDER BY CPU_TIME DESC;
```

The preceding query returns the following results:

CLIENT_ID	CLIENT_APP	WKSTN	CPU_TIME
			987770013
			249375000
DB2BATCH			91181678
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003021324173			66097348
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1004201047173			28824420
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191536588			27555568
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191536434			16203116
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221122075			15759227
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221118191			15630121
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221531062			15236718
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221117466			14607249
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221116141			14427883
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003251550366			1312500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003051054311			


```

CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003051053301      1296875
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003051139066      1296875
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003051152281      1281250
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003041230283      1046875
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003291503479      1031250
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003291503479      515625
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003251506219      484375
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221444488      453125
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003021323249      406250
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003251544498      296875
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003171431559      171875
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003041227488      156250
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003221117188      109375
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003021333329      62500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191502148      62500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191527385      62500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191528492      62500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191530518      62500
CLP C:\DOCUME~1\ALLUSE~1\APPLIC~1\IBM\DB2\DB2COPY1\DB2\TMP\CCSCRIPT1003191533265      62500
CLP C:\Documents and Settings\A11 Users\Application Data\IBM\DB2\DB2COPY1\DB2DAS      62500

```

6. At this point, the unit of work event monitor TRACKWORK is still collecting information. Depending on how you want to track CPU time used by different applications, users or workloads, you can choose to take one of the following courses of action:

- If you want to calculate CPU usage on a daily basis, you can leave this unit of work event monitor active. Each day, run the EVMON_FORMAT_UE_TO_TABLES procedure to retrieve just the time-spent metrics for the preceding day:

```

CALL EVMON_FORMAT_UE_TO_TABLES
('UOW', NULL, NULL, NULL, NULL, NULL, NULL, -1,
 'SELECT * FROM TRACKWORK
  WHERE (DATE(EVENT_TIMESTAMP)=(CURRENT DATE - 1 DAY))'
)

```

With this approach, the three relational tables produced by the EVMON_FORMAT_UE_TO_TABLES procedure continue to grow, providing a history of CPU usage over time. The query in step 5 on page 234 returns the cumulative totals for CPU time since the tables were first created with the EVMON_FORMAT_UE_TO_TABLES procedure. You can modify that query to show only the results from the previous day as follows:

```

SELECT SUBSTR(E.CLIENT_USERID,1,10) AS CLIENT_ID,
       SUBSTR(E.CLIENT_APPLNAME,1,80) AS CLIENT_APP,
       SUBSTR(E.CLIENT_WRKSTNNAME,1,10) AS WKSTN,
       SUM(M.TOTAL_CPU_TIME) AS CPU_TIME
FROM UOW_EVENT E, UOW_METRICS M
WHERE M.APPLICATION_ID = E.APPLICATION_ID
      AND M.UOW_ID = E.UOW_ID
      AND M.MEMBER = E.MEMBER
      AND (DATE(E.EVENT_TIMESTAMP)=(CURRENT DATE - 1 DAY))
GROUP BY E.CLIENT_USERID, E.CLIENT_APPLNAME, E.CLIENT_WRKSTNNAME
ORDER BY CPU_TIME DESC;

```

Tip: If you want to track CPU usage on a daily basis, but also want to manage how much data you collect on your system, remove data you no longer need from the UE table after you have updated the relational tables. For example, to delete the data collected on the previous day from the UE table TRACKWORK, use a DELETE statement similar to the one that follows:

```
DELETE FROM TRACKWORK WHERE (DATE(EVENT_TIMESTAMP)=(CURRENT DATE - 1 DAY))
```

While an event monitor is active, it holds an intention exclusive (IX) table lock on any tables to which it writes information to prevent those tables from being dropped while it is using them. When a large number of rows is being deleted, the DELETE statement acquires a large number of row locks. In this

situation, lock escalation might occur, as row locks might be converted to a table lock. This request for table lock can cause the DELETE statement to hang, since the event monitor already has a lock on the table.

To avoid this situation, consider setting a lock timeout before issuing the DELETE statement:

```
SET CURRENT LOCK TIMEOUT 60
```

If increasing the lock timeout period does not resolve the problem, try deleting smaller subsets of the data, such as the records for smaller time periods (for example, 6 or 12 hours). This approach requires fewer locks, which will reduce the chance of lock escalation happening.

You can also prune the relational tables produced by `EVMON_FORMAT_UE_TO_TABLES` as needed to balance storage requirements with the need to view historical data.

- If you are finished calculating CPU time, you can stop the collection of event monitor information, and drop the event monitor and its related tables by performing the following steps:
 - a. Disable the collection of unit of work for this event monitor information using the **SET EVENT MONITOR TRACKWORK STATE 0** command.
 - b. Drop the event monitor itself using the `DROP EVENT MONITOR` statement.
 - c. Drop the tables related to the event monitor using a `DROP TABLE` statement. In this case, there are four tables in total to drop:
 - `TRACKWORK`, the UE table used to collect information from the event monitor
 - `UOW_EVENT`
 - `UOW_METRICS`
 - `UOW_PACKAGE_LIST`
 - d. Optional: If there are no remaining active event monitors, you might want to update the database configuration such that no unit of work event information is collected using the following command:

```
UPDATE DATABASE CONFIGURATION FOR dbname USING MON_UOW_DATA NONE
```

Variation: Collecting metrics for specific workloads

The previous example illustrates how you can capture unit of work metrics for all work done on the system. Setting the scope of data collected using the **UPDATE DATABASE CONFIGURATION** command might cause more information to be collected than you need. You might, for example, want to track only work done by specific workloads. In this case, rather than enable collection of unit of work information across the whole database as shown in step 2 on page 233, you can specify the `COLLECT UNIT OF WORK DATA` clause with the `CREATE` or `ALTER WORKLOAD` statements. This clause causes only data for the workload specified to be collected by the event monitor. For example, to collect unit of work data for the workload named `PAYROLL`, use the following statement:

```
ALTER WORKLOAD PAYROLL COLLECT UNIT OF WORK DATA BASE
```

You can collect data for multiple workloads by running an `ALTER WORKLOAD` statement for each.

The remaining steps are the same, except for step 5 on page 234, where you would change the query to resemble the one that follows:

```
SELECT E.WORKLOAD_NAME,
       SUM(M.TOTAL_CPU_TIME) AS CPU_TIME
       FROM UOW_EVENT E, UOW_METRICS M
WHERE  M.APPLICATION_ID = E.APPLICATION_ID
       AND M.UOW_ID = E.UOW_ID
       AND M.MEMBER = E.MEMBER
GROUP BY E.WORKLOAD_NAME
ORDER BY CPU_TIME DESC
```

The preceding statement reports the CPU time for each workload for which metrics collection is enabled:

WORKLOAD	CPU_TIME
PAYROLL	2143292042
MARKETING	492784916

2 record(s) selected.

Package cache statement eviction event monitoring

The package cache event monitor captures data related to statement entries that have been flushed from the database package cache. This event monitor provides the history of the contents of the package cache which can help with SQL query performance and problem determination issues.

Overview

The package cache event monitor collects the same information as the `MON_GET_PKG_CACHE_STMT` table function, including the full set of available activity metrics and the executable section information of an entry.

Starting in Version 10.1, you can get information about input arguments related to the longest-running statement. This statement is the one associated with the monitor element `max_coord_stmt_exec_time`. The input arguments associated with this statement are recorded as part of the `pkgcache_stmt_args` logical data group.

Two control mechanisms on the `CREATE EVENT MONITOR` statement help limit the volume of data that can be captured. The two control mechanisms provide the following capabilities:

- Filter entries with the `WHERE` clause based on one or more of the following conditions:
 - Whether the last update of the metrics for an entry occurs after a specific time before it is evicted (`UPDATED_SINCE_BOUNDARY_TIME`). An entry will only be collected if the time that the metrics were last updated is more recent than boundary time defined for the event monitor. The boundary time for an event monitor can be set using the `MON_GET_PKG_CACHE_STMT` table function. If no boundary time has been set for the event monitor, the `UPDATED_SINCE_BOUNDARY_TIME` clause will have no effect.
 - The number of times the section of an entry was executed (`NUM_EXECUTIONS`)
 - The total aggregated amount of time spent executing the statement (`STMT_EXEC_TIME`)
- `COLLECT DATA` clause options:
 - `COLLECT BASE DATA`

Same information collected as the MON_GET_PKG_CACHE_STMT table function, as well as the full set of available activity metrics

- **COLLECT DETAILED DATA**

Collects the same information gathered with the COLLECT BASE DATA clause and includes the executable section of the entry

When you need to investigate the individual execution of an SQL statement, you can use the MON_GET_PKG_CACHE_STMT table function (if the entries are still in the package cache) to compare the behavior of a cached entry relative to others. The execution metrics, compilation environment, and detailed descriptions for a cached entry are available for diagnostic purposes.

If an entry has already been flushed from the package cache, you can use the package cache event monitor to review the history of the cached entries which were flushed from the package cache. The history data contains the same information that the MON_GET_PKG_CACHE_STMT table function provides. In addition, the event monitor also provides the executable section of the statement. All of this applies to both dynamic and static SQL statements.

Creating a package cache event monitor

To create a package cache event monitor and collect package cache event monitor data, you must have DBADM or SQLADM authority.

A package cache event monitor can write its output to either a regular table or an unformatted event table.

Before you create a package cache event monitor, identify the table space where you plan to store the output for your event monitor. The CREATE EVENT MONITOR statement will assume a default table space if you do not specify one. However, the recommended practice is to have a table space dedicated and configured to store the output table or tables associated with any event monitor. If you are using an unformatted event table, create package cache event monitors in table spaces with at least an 8K pagesize to ensure that event data is contained within the inlined BLOB column of the UE table. If the BLOB column is not inlined, then the performance of writing and reading the events to the unformatted event table might not be efficient.

To setup a package cache event monitor using defaults and best practices, complete the following steps:

- Create the event monitor by issuing the CREATE EVENT MONITOR statement. The following example uses defaults where possible and specifies to store the unformatted event table in an existing table space MY_EVMON_TABLESPACE:

```
CREATE EVENT MONITOR MY_PKG_CACHE_EVMON
FOR PACKAGE CACHE
WRITE TO UNFORMATTED EVENT TABLE (IN MY_EVMON_TABLESPACE)
```

Enabling data collection

To enable data collection, you must activate the event monitor using the SET EVENT MONITOR STATE statement. The package cache event monitor is not a *passive* event monitor; following activation, it automatically starts collecting data whenever a statement is flushed from the package cache and meets the filter criteria set at the time of creation of the package cache event monitor.

Accessing event data captured by a package cache event monitor

A unit of work event monitor can write data to a regular table or it can write data in binary format to an unformatted event (UE) table. You can access the data in regular tables by using SQL.

To access data in a UE table, use one of the following table functions:

EVMON_FORMAT_UE_TO_XML

Extracts data from an unformatted event table into an XML document.

EVMON_FORMAT_UE_TO_TABLES

Extracts data from an unformatted event table into a set of relational tables.

When you use one of these table functions, you can specify which data to extract by including a `SELECT` statement as one of the parameters to the function. You have full control over selection, ordering, and other aspects provided by the `SELECT` statement.

The schema file `~/sql11ib/misc/DB2EvmonPkgCache.xsd` is used to document the expected output of the package cache event monitor report in an XML document. The schema file will reference a common monitor schema file (`DB2MonCommon.xsd`) to avoid duplicating the common contents.

An XML stylesheet is provided in `~/sql11ib/samples/jdbc/DB2EvmonPkgCache.xsl`.

Use these table functions to specify the data to extract using a `SELECT` statement. You have full control over selection, ordering, and other aspects provided by the `SELECT` statement.

You can also use the **db2evmonfmt** command to perform the following tasks:

- Select events of interest based on the following attributes: executable ID, section type, query cost estimate, statement package cache ID, and flush time.
- Choose whether to receive the output in the form of a text report or a formatted XML document.
- Control the output format by creating your own XSLT style sheets instead of using the ones provided by the **db2evmonfmt** command.

For example, the following command provides a package cache report that:

1. Selects package cache events that have occurred in the past 24 hours in the database `SAMPLE`. These event records are obtained from the unformatted event table called `SAMPLE_PKGCACHE_EVENTS`.
2. Provides formatted text output using the `DB2EvmonPkgCache.xsl` style sheet.

```
java db2evmonfmt -d SAMPLE -ue SAMPLE_PKGCACHE_EVENTS -ftext -ss DB2EvmonPkgCache.xsl -hours 24
```

Data generated by package cache event monitors

Package cache event monitors produce data about packages evicted from the package cache. You can choose to have the output from a package cache event monitor to regular tables, or to an unformatted event (UE) table.

If data is written to a UE table, you must perform post-processing on it to view the data.

Regardless of the output format you choose, all package cache event data comes from one of three logical groups:

- pkgcache
- pkgcache_metrics
- pkgcache_stmt_args

If you choose to have the package cache event data written to regular tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Note: Unlike the locking and unit of work event monitors, you do not need to enable the generation of package cache event data after you create a package cache event monitor; data collection begins as soon as the event monitor is activated.

Information written to tables for a package cache event monitor:

Information written by a package cache event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for a package cache event monitor, by default, three tables are produced, each containing monitor elements from one or more logical data groups.

Table 39. Tables produced by package cache write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
PKG_CACHE_ <i>evmon-name</i>	pkgcache
PKG_CACHE_METRICS_ <i>evmon-name</i>	pkgcache_metrics
PKG_CACHE_STMT_ARGS_ <i>evmon-name</i>	“pkgcache_stmt_args logical data group” on page 100
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statement. Refer to the reference topics for those statements for details.

Tables produced

*Table 40. Information returned for a package cache event monitor: Default table name: PKG_CACHE_*evmon-name**

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
COMP_ENV_DESC	BLOB	comp_env_desc - Compilation environment
EFFECTIVE_ISOLATION	CHARACTER (2)	effective_isolation - Effective isolation
EVENT_ID	BIGINT	event_id - Event ID monitor element

Table 40. Information returned for a package cache event monitor: Default table name: PKGCACHE_evmon-name (continued)

Column name	Data type	Description
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
EXECUTABLE_ID	VARCHAR (32)	executable_id - Executable ID
INSERT_TIMESTAMP	TIMESTAMP	insert_timestamp - Insert timestamp
LAST_METRICS_UPDATE	TIMESTAMP	last_metrics_update - Metrics last update timestamp
MAX_COORD_STMT_EXEC_TIME	BIGINT	max_coord_stmt_exec_time - Maximum coordinator statement execution time
MAX_COORD_STMT_EXEC_TIMESTAMP	TIMESTAMP	max_coord_stmt_exec_timestamp - Maximum coordinated statement execution timestamp
MEMBER	SMALLINT	member - Database member
METRICS	BLOB	
NUM_COORD_EXEC	BIGINT	num_coord_exec - Number of executions by coordinator agent
NUM_COORD_EXEC_WITH_METRICS	BIGINT	num_coord_exec_with_metrics - Number of executions by coordinator agent with metrics
NUM_EXEC_WITH_METRICS	BIGINT	num_exec_with_metrics - Number of executions with metrics collected
NUM_EXECUTIONS	BIGINT	num_executions - Statement executions
NUM_ROUTINES	BIGINT	num_routines -Number of routines
PACKAGE_NAME	VARCHAR (128)	package_name - Package name
PACKAGE_SCHEMA	VARCHAR (128)	package_schema - Package schema
PACKAGE_VERSION_ID	VARCHAR (64)	package_version_id - Package version
PREP_TIME	BIGINT	prep_time - Preparation time
QUERY_COST_ESTIMATE	BIGINT	query_cost_estimate - Query cost estimate
QUERY_DATA_TAG_LIST	VARCHAR (32)	query_data_tag_list - Query data tag list
ROUTINE_ID	BIGINT	routine_id - Routine ID
SECTION_ENV	BLOB(0)	section_env - Section environment
SECTION_NUMBER	BIGINT	section_number - Section number
SECTION_TYPE	CHARACTER (1)	section_type - Section type indicator
STMT_PKG_CACHE_ID	BIGINT	"stmt_pkgcache_id - Statement package cache identifier monitor element" on page 1354
STMT_TEXT	CLOB	stmt_text - SQL statement text
STMT_TYPE_ID	VARCHAR (32)	stmt_type_id - Statement type identifier
STMTNO	INTEGER	stmtno - Statement number monitor element
TOTAL_STATS_FABRICATION_TIME	BIGINT	total_stats_fabrication_time - Total statistics fabrication time
TOTAL_STATS_FABRICATIONS	BIGINT	total_stats_fabrications - Total statistics fabrications

Table 40. Information returned for a package cache event monitor: Default table name: PKGCACHE_evmon-name (continued)

Column name	Data type	Description
TOTAL_SYNC_RUNSTATS	BIGINT	total_sync_runstats - Total synchronous RUNSTATS activities
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	total_sync_runstats_time - Total synchronous RUNSTATS time

Table 41. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_ID	BIGINT	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
MEMBER	SMALLINT	member - Database member
WLM_QUEUE_TIME_TOTAL	BIGINT	wlm_queue_time_total - Workload manager total queue time
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	wlm_queue_assignments_total - Workload manager total queue assignments
FCM_TQ_RECV_WAIT_TIME	BIGINT	fcm_tq_recv_wait_time - FCM table queue received wait time
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	fcm_message_recv_wait_time - FCM message received wait time
FCM_TQ_SEND_WAIT_TIME	BIGINT	fcm_tq_send_wait_time - FCM table queue send wait time
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	fcm_message_send_wait_time - FCM message send wait time
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
LOG_BUFFER_WAIT_TIME	BIGINT	log_buffer_wait_time - Log buffer wait time
NUM_LOG_BUFFER_FULL	BIGINT	num_log_buffer_full - Number of full log buffers
LOG_DISK_WAIT_TIME	BIGINT	log_disk_wait_time - Log disk wait time
LOG_DISK_WAITS_TOTAL	BIGINT	log_disk_waits_total - Total log disk waits
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	audit_file_write_wait_time - Audit file write wait time
AUDIT_FILE_WRITES_TOTAL	BIGINT	audit_file_writes_total - Total audit files written
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	audit_subsystem_wait_time - Audit subsystem wait time
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	audit_subsystem_waits_total - Total audit subsystem waits
DIAGLOG_WRITE_WAIT_TIME	BIGINT	diaglog_write_wait_time - Diagnostic log file write wait time
DIAGLOG_WRITES_TOTAL	BIGINT	diaglog_writes_total - Total diagnostic log file writes
FCM_SEND_WAIT_TIME	BIGINT	fcm_send_wait_time - FCM send wait time
FCM_RECV_WAIT_TIME	BIGINT	fcm_recv_wait_time - FCM received wait time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time

Table 41. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	total_section_sort_proc_time - Total section sort processing time
TOTAL_SECTION_SORTS	BIGINT	total_section_sorts - Total section sorts
TOTAL_SECTION_SORT_TIME	BIGINT	total_section_sort_time - Total section sort time
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_ESCALS	BIGINT	lock_escals - Number of lock escalations
FCM_SENDS_TOTAL	BIGINT	fcm_sends_total - FCM sends total
FCM_RECVS_TOTAL	BIGINT	fcm_recvs_total - FCM receives total
FCM_SEND_VOLUME	BIGINT	fcm_send_volume - FCM send volume
FCM_RECV_VOLUME	BIGINT	fcm_recv_volume - FCM received volume
FCM_MESSAGE_SENDS_TOTAL	BIGINT	fcm_message_sends_total - Total FCM message sends
FCM_MESSAGE_RECVS_TOTAL	BIGINT	fcm_message_recvs_total - Total FCM message receives
FCM_MESSAGE_SEND_VOLUME	BIGINT	fcm_message_send_volume - FCM message send volume
FCM_MESSAGE_RECV_VOLUME	BIGINT	fcm_message_recv_volume - FCM message received volume
FCM_TQ_SENDS_TOTAL	BIGINT	fcm_tq_sends_total - FCM table queue send total
FCM_TQ_RECVS_TOTAL	BIGINT	fcm_tq_recvs_total - FCM table queue receives total

Table 41. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS_evmon-name (continued)

Column name	Data type	Description
FCM_TQ_SEND_VOLUME	BIGINT	fcm_tq_send_volume - FCM table queue send volume
FCM_TQ_RECV_VOLUME	BIGINT	fcm_tq_recv_volume - FCM table queue received volume
TQ_TOT_SEND_SPILLS	BIGINT	tq_tot_send_spills - Total number of table queue buffers overflowed
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
AUDIT_EVENTS_TOTAL	BIGINT	audit_events_total - Total audit events
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
STMT_EXEC_TIME	BIGINT	stmt_exec_time - Statement execution time
COORD_STMT_EXEC_TIME	BIGINT	coord_stmt_exec_time - Execution time for statement by coordinator agent
TOTAL_ROUTINE_NON_SECT_PROC_TIME	BIGINT	total_routine_non_sect_proc_time - Non-section processing time
TOTAL_ROUTINE_NON_SECT_TIME	BIGINT	total_routine_non_sect_time - Non-section routine execution time
TOTAL_SECTION_PROC_TIME	BIGINT	total_section_proc_time - Total section processing time
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	total_app_section_executions - Total application section executions
TOTAL_SECTION_TIME	BIGINT	total_section_time - Total section time
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	total_routine_user_code_proc_time - Total routine user code processing time
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	total_routine_user_code_time - Total routine user code time
TOTAL_ROUTINE_TIME	BIGINT	total_routine_time - Total routine time
THRESH_VIOLATIONS	BIGINT	thresh_violations - Number of threshold violations
NUM_LW_THRESH_EXCEEDED	BIGINT	num_lw_thresh_exceeded - Number of lock wait thresholds exceeded
TOTAL_ROUTINE_INVOCATIONS	BIGINT	total_routine_invocations - Total routine invocations
LOCK_WAIT_TIME_GLOBAL	BIGINT	lock_wait_time_global - Lock wait time global
LOCK_WAITS_GLOBAL	BIGINT	lock_waits_global - Lock waits global
RECLAIM_WAIT_TIME	BIGINT	reclaim_wait_time - Reclaim wait time
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	spacemappage_reclaim_wait_time - Space map page reclaim wait time
LOCK_TIMEOUTS_GLOBAL	BIGINT	lock_timeouts_global - Lock timeouts global
LOCK_ESCALS_MAXLOCKS	BIGINT	lock_escals_maxlocks - Number of maxlocks lock escalations
LOCK_ESCALS_LOCKLIST	BIGINT	lock_escals_locklist - Number of locklist lock escalations
LOCK_ESCALS_GLOBAL	BIGINT	lock_escals_global - Number of global lock escalations
CF_WAIT_TIME	BIGINT	cf_wait_time - cluster caching facility wait time
CF_WAITS	BIGINT	cf_waits - Number of cluster caching facility DB2 pureScale server waits
POOL_DATA_GBP_L_READS	BIGINT	pool_data_gbp_l_reads - Group buffer pool data logical reads
POOL_DATA_GBP_P_READS	BIGINT	pool_data_gbp_p_reads - Group buffer pool data physical reads
POOL_DATA_LBP_PAGES_FOUND	BIGINT	pool_data_lbp_pages_found - Local buffer pool found data pages

Table 41. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS_evmon-name (continued)

Column name	Data type	Description
POOL_DATA_GBP_INVALID_PAGES	BIGINT	pool_data_gbp_invalid_pages - Group buffer pool invalid data pages
POOL_INDEX_GBP_L_READS	BIGINT	pool_index_gbp_l_reads - Group buffer pool index logical reads
POOL_INDEX_GBP_P_READS	BIGINT	pool_index_gbp_p_reads - Group buffer pool index physical reads
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	pool_index_lbp_pages_found - Local buffer pool index pages found
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	pool_index_gbp_invalid_pages - Group buffer pool invalid index pages
POOL_XDA_GBP_L_READS	BIGINT	pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests
POOL_XDA_GBP_P_READS	BIGINT	pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests
POOL_XDA_LBP_PAGES_FOUND	BIGINT	pool_xda_lbp_pages_found - Local buffer pool XDA data pages found
POOL_XDA_GBP_INVALID_PAGES	BIGINT	pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages
EVMON_WAIT_TIME	BIGINT	evmon_wait_time - Event monitor wait time
EVMON_WAITS_TOTAL	BIGINT	evmon_waits_total - Event monitor total waits
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	total_extended_latch_wait_time - Total extended latch wait time
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	total_extended_latch_waits - Total extended latch waits
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	pool_queued_async_data_reqs - Data prefetch requests
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	pool_queued_async_index_reqs - Index prefetch requests
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	pool_queued_async_xda_reqs - XDA prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	pool_queued_async_other_reqs - Non-prefetch requests
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	pool_queued_async_data_pages - Data pages prefetch requests
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	pool_queued_async_index_pages - Index pages prefetch requests
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	pool_queued_async_xda_pages - XDA pages prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces

Table 41. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS_evmon-name (continued)

Column name	Data type	Description
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	pool_failed_async_data_reqs - Failed data prefetch requests
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	pool_failed_async_index_reqs - Failed index prefetch requests
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	pool_failed_async_xda_reqs - Failed XDA prefetch requests
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	pool_failed_async_other_reqs - Failed non-prefetch requests
TOTAL_PEDS	BIGINT	total_peds - Total partial early distincts
DISABLED_PEDS	BIGINT	“disabled_peds - Disabled partial early distincts monitor element” on page 870
POST_THRESHOLD_PEDS	BIGINT	post_threshold_peds - Partial early distincts threshold
TOTAL_PEAS	BIGINT	total_peas - Total partial early aggregations
POST_THRESHOLD_PEAS	BIGINT	post_threshold_peas - Partial early aggregation threshold
TQ_SORT_HEAP_REQUESTS	BIGINT	tq_sort_heap_requests - Table queue sort heap requests
TQ_SORT_HEAP_REJECTIONS	BIGINT	tq_sort_heap_rejections - Table queue sort heap rejections
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
PREFETCH_WAITS	BIGINT	prefetch_waits - Prefetcher wait count
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	“pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element” on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	“pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element” on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	“pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element” on page 1225

Table 42. Information returned for a package cache event monitor: Default table name: PKGCACHE_STMT_ARGS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
EVENT_ID	BIGINT	event_id - Event ID monitor element
EVENT_TIMESTAMP	TIMESTAMP	event_timestamp - Event timestamp monitor element
MEMBER	SMALLINT	member - Database member
STMT_VALUE_DATA	CLOB	stmt_value_data - Value data
STMT_VALUE_INDEX	INTEGER	stmt_value_index - Value index
STMT_VALUE_ISNULL	INTEGER	stmt_value_isnull - Value has null value

Table 42. Information returned for a package cache event monitor: Default table name: *PKG_CACHE_STMT_ARGS_evmon-name* (continued)

Column name	Data type	Description
STMT_VALUE_ISREOPT	INTEGER	stmt_value_isreopt - Variable used for statement reoptimization
STMT_VALUE_TYPE	CHARACTER(16)	stmt_value_type - Value type

Entries for the following data types are recorded in the preceding table, however, the actual values of the arguments are not recorded in the STMT_VALUE_DATA element:

- BLOB
- CLOB
- REF
- BOOLEAN
- Structured data types
- DATALINK
- LONG VARGRAPHIC
- LONG VARCHAR
- XML tyoes
- DBCLOB
- ARRAY types
- ROW types
- ROWID
- CURSOR variables

Table 43. Information returned for a package cache event monitor: Default table name: *CONTROL_evmon-name*

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a package cache event monitor:

Information written for a package cache event monitor from the EVMON_FORMAT_UE_TO_TABLES table function. This is also documented in the DB2EvmonPkgCache.xsd file.

Table 44. Information returned for a package cache event monitor: Table name: *PKG_CACHE_EVENT*

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	“xmlid - XML ID monitor element” on page 1547
EVENT_ID	BIGINT NOT NULL	event_id - Event ID monitor element
EVENT_TYPE	VARCHAR(128) NOT NULL	event_type - Event Type monitor element monitor element

Table 44. Information returned for a package cache event monitor: Table name: PKGCACHE_EVENT (continued)

Column Name	Data Type	Description
EVENT_TIMESTAMP	TIMESTAMP NOT NULL	event_timestamp - Event timestamp monitor element
MEMBER	SMALLINT NOT NULL	member - Database member
SECTION_TYPE	CHAR(1)	section_type - Section type indicator
INSERT_TIMESTAMP	TIMESTAMP	insert_timestamp - Insert timestamp
EXECUTABLE_ID	VARCHAR(32) FOR BIT DATA	executable_id - Executable ID
PACKAGE_SCHEMA	VARCHAR(128)	package_schema - Package schema
PACKAGE_NAME	VARCHAR(128)	package_name - Package name
PACKAGE_VERSION_ID	VARCHAR(64)	package_version_id - Package version
SECTION_NUMBER	BIGINT	section_number - Section number
EFFECTIVE_ISOLATION	CHAR(2)	effective_isolation - Effective isolation
NUM_EXECUTIONS	BIGINT	num_executions - Statement executions
NUM_EXEC_WITH_METRICS	BIGINT	num_exec_with_metrics - Number of executions with metrics collected
PREP_TIME	BIGINT	prep_time - Preparation time
LAST_METRICS_UPDATE	TIMESTAMP	last_metrics_update - Metrics last update timestamp
NUM_COORD_EXEC	BIGINT	num_coord_exec - Number of executions by coordinator agent
NUM_COORD_EXEC_WITH_METRICS	BIGINT	num_coord_exec_with_metrics - Number of executions by coordinator agent with metrics
STMT_TYPE_ID	VARCHAR(32)	stmt_type_id - Statement type identifier
QUERY_COST_ESTIMATE	BIGINT	query_cost_estimate - Query cost estimate
STMT_PKG_CACHE_ID	BIGINT	"stmt_pkgcache_id - Statement package cache identifier monitor element" on page 1354
STMT_TEXT	CLOB(2M)	stmt_text - SQL statement text
COMP_ENV_DESC	BLOB(10K)	comp_env_desc - Compilation environment
METRICS	BLOB(1M)	XML document containing metrics-related monitor elements. The metrics in this document are the same as those described in the PKGCACHE_METRICS table that appears later in this topic. See "Interfaces that return monitor data in XML documents" on page 18 for more information.

Table 44. Information returned for a package cache event monitor: Table name: PKGCACHE_EVENT (continued)

Column Name	Data Type	Description
SECTION_ENV	BLOB(150M)	section_env - Section environment
ROUTINE_ID	BIGINT	routine_id - Routine ID
QUERY_DATA_TAG_LIST	VARCHAR(32)	query_data_tag_list - Query data tag list
TOTAL_STATS_FABRICATION_TIME	BIGINT	total_stats_fabrication_time - Total statistics fabrication time
TOTAL_STATS_FABRICATIONS	BIGINT	total_stats_fabrications - Total statistics fabrications
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	total_sync_runstats_time - Total synchronous RUNSTATS time
TOTAL_SYNC_RUNSTATS	BIGINT	total_sync_runstats - Total synchronous RUNSTATS activities
MAX_COORD_STMT_EXEC_TIMESTAMP	TIMESTAMP	max_coord_stmt_exec_timestamp - Maximum coordinated statement execution timestamp
MAX_COORD_STMT_EXEC_TIME	BIGINT	max_coord_stmt_exec_time - Maximum coordinator statement execution time

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	"xmlid - XML ID monitor element" on page 1547
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
TOTAL_SECTION_SORT_TIME	BIGINT	total_section_sort_time - Total section sort time
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	total_section_sort_proc_time - Total section sort processing time
TOTAL_SECTION_SORTS	BIGINT	total_section_sorts - Total section sorts
LOCK_ESCALS	BIGINT	lock_escals - Number of lock escalations
LOCK_WAITS	BIGINT	lock_waits - Lock waits
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
ROWS_READ	BIGINT	rows_read - Rows read

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
WLM_QUEUE_TIME_TOTAL	BIGINT	wlm_queue_time_total - Workload manager total queue time

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	wlm_queue_assignments_total - Workload manager total queue assignments
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
FCM_RECV_VOLUME	BIGINT	fcm_recv_volume - FCM received volume
FCM_RECVS_TOTAL	BIGINT	fcm_recvs_total - FCM receives total
FCM_SEND_VOLUME	BIGINT	fcm_send_volume - FCM send volume
FCM_SENDS_TOTAL	BIGINT	fcm_sends_total - FCM sends total
FCM_RECV_WAIT_TIME	BIGINT	fcm_recv_wait_time - FCM received wait time
FCM_SEND_WAIT_TIME	BIGINT	fcm_send_wait_time - FCM send wait time
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOG_BUFFER_WAIT_TIME	BIGINT	log_buffer_wait_time - Log buffer wait time
NUM_LOG_BUFFER_FULL	BIGINT	num_log_buffer_full - Number of full log buffers
LOG_DISK_WAIT_TIME	BIGINT	log_disk_wait_time - Log disk wait time
LOG_DISK_WAITS_TOTAL	BIGINT	log_disk_waits_total - Total log disk waits
TOTAL_ROUTINE_TIME	BIGINT	total_routine_time - Total routine time
TOTAL_ROUTINE_INVOCATIONS	BIGINT	total_routine_invocations - Total routine invocations
COORD_STMT_EXEC_TIME	BIGINT	coord_stmt_exec_time - Execution time for statement by coordinator agent
STMT_EXEC_TIME	BIGINT	stmt_exec_time - Statement execution time
TOTAL_SECTION_TIME	BIGINT	total_section_time - Total section time
TOTAL_SECTION_PROC_TIME	BIGINT	total_section_proc_time - Total section processing time
TOTAL_ROUTINE_NON_SECT_TIME	BIGINT	total_routine_non_sect_time - Non-section routine execution time
TOTAL_ROUTINE_NON_SECT_PROC_TIME	BIGINT	total_routine_non_sect_proc_time - Non-section processing time
FCM_TQ_RECV_WAIT_TIME	BIGINT	fcm_tq_recv_wait_time - FCM table queue received wait time
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	fcm_message_recv_wait_time - FCM message received wait time
FCM_TQ_SEND_WAIT_TIME	BIGINT	fcm_tq_send_wait_time - FCM table queue send wait time
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	fcm_message_send_wait_time - FCM message send wait time

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	audit_file_write_wait_time - Audit file write wait time
AUDIT_FILE_WRITES_TOTAL	BIGINT	audit_file_writes_total - Total audit files written
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	audit_subsystem_wait_time - Audit subsystem wait time
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	audit_subsystem_waits_total - Total audit subsystem waits
DIAGLOG_WRITE_WAIT_TIME	BIGINT	diaglog_write_wait_time - Diagnostic log file write wait time
DIAGLOG_WRITES_TOTAL	BIGINT	diaglog_writes_total - Total diagnostic log file writes
FCM_MESSAGE_SENDS_TOTAL	BIGINT	fcm_message_sends_total - Total FCM message sends
FCM_MESSAGE_RECVS_TOTAL	BIGINT	fcm_message_recvs_total - Total FCM message receives
FCM_MESSAGE_SEND_VOLUME	BIGINT	fcm_message_send_volume - FCM message send volume
FCM_MESSAGE_RECV_VOLUME	BIGINT	fcm_message_recv_volume - FCM message received volume
FCM_TQ_SENDS_TOTAL	BIGINT	fcm_tq_sends_total - FCM table queue send total
FCM_TQ_RECVS_TOTAL	BIGINT	fcm_tq_recvs_total - FCM table queue receives total
FCM_TQ_SEND_VOLUME	BIGINT	fcm_tq_send_volume - FCM table queue send volume
FCM_TQ_RECV_VOLUME	BIGINT	fcm_tq_recv_volume - FCM table queue received volume
TQ_TOT_SEND_SPILLS	BIGINT	tq_tot_send_spills - Total number of table queue buffers overflowed
AUDIT_EVENTS_TOTAL	BIGINT	audit_events_total - Total audit events
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	total_app_section_executions - Total application section executions
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	total_routine_user_code_proc_time - Total routine user code processing time
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	total_routine_user_code_time - Total routine user code time
THRESH_VIOLATIONS	BIGINT	thresh_violations - Number of threshold violations
NUM_LW_THRESH_EXCEEDED	BIGINT	num_lw_thresh_exceeded - Number of lock wait thresholds exceeded
LOCK_WAITS_GLOBAL	BIGINT	lock_waits_global - Lock waits global
LOCK_WAIT_TIME_GLOBAL	BIGINT	lock_wait_time_global - Lock wait time global

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
LOCK_TIMEOUTS_GLOBAL	BIGINT	lock_timeouts_global - Lock timeouts global
LOCK_ESCALS_MAXLOCKS	BIGINT	lock_escals_maxlocks - Number of maxlocks lock escalations
LOCK_ESCALS_LOCKLIST	BIGINT	lock_escals_locklist - Number of locklist lock escalations
LOCK_ESCALS_GLOBAL	BIGINT	lock_escals_global - Number of global lock escalations
RECLAIM_WAIT_TIME	BIGINT	reclaim_wait_time - Reclaim wait time
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	spacemappage_reclaim_wait_time - Space map page reclaim wait time
CF_WAITS	BIGINT	cf_waits - Number of cluster caching facility DB2 pureScale server waits
CF_WAIT_TIME	BIGINT	cf_wait_time - cluster caching facility wait time
POOL_DATA_GBP_L_READS	BIGINT	pool_data_gbp_l_reads - Group buffer pool data logical reads
POOL_DATA_GBP_P_READS	BIGINT	pool_data_gbp_p_reads - Group buffer pool data physical reads
POOL_DATA_LBP_PAGES_FOUND	BIGINT	pool_data_lbp_pages_found - Local buffer pool found data pages
POOL_DATA_GBP_INVALID_PAGES	BIGINT	pool_data_gbp_invalid_pages - Group buffer pool invalid data pages
POOL_INDEX_GBP_L_READS	BIGINT	pool_index_gbp_l_reads - Group buffer pool index logical reads
POOL_INDEX_GBP_P_READS	BIGINT	pool_index_gbp_p_reads - Group buffer pool index physical reads
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	pool_index_lbp_pages_found - Local buffer pool index pages found
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	pool_index_gbp_invalid_pages - Group buffer pool invalid index pages
POOL_XDA_GBP_L_READS	BIGINT	pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests
POOL_XDA_GBP_P_READS	BIGINT	pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests
POOL_XDA_LBP_PAGES_FOUND	BIGINT	pool_xda_lbp_pages_found - Local buffer pool XDA data pages found
POOL_XDA_GBP_INVALID_PAGES	BIGINT	pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages
EVMON_WAIT_TIME	BIGINT	evmon_wait_time - Event monitor wait time
EVMON_WAITS_TOTAL	BIGINT	evmon_waits_total - Event monitor total waits

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	total_extended_latch_wait_time - Total extended latch wait time
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	total_extended_latch_waits - Total extended latch waits
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
TOTAL_PEDS	BIGINT	total_peds - Total partial early distincts
DISABLED_PEDS	BIGINT	“disabled_peds - Disabled partial early distincts monitor element” on page 870
POST_THRESHOLD_PEDS	BIGINT	post_threshold_peds - Partial early distincts threshold
TOTAL_PEAS	BIGINT	total_peas - Total partial early aggregations
POST_THRESHOLD_PEAS	BIGINT	post_threshold_peas - Partial early aggregation threshold
TQ_SORT_HEAP_REQUESTS	BIGINT	tq_sort_heap_requests - Table queue sort heap requests
TQ_SORT_HEAP_REJECTIONS	BIGINT	tq_sort_heap_rejections - Table queue sort heap rejections
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	pool_queued_async_data_reqs - Data prefetch requests
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	pool_queued_async_index_reqs - Index prefetch requests
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	pool_queued_async_xda_reqs - XDA prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	pool_queued_async_other_reqs - Non-prefetch requests
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	pool_queued_async_data_pages - Data pages prefetch requests
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	pool_queued_async_index_pages - Index pages prefetch requests
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	pool_queued_async_xda_pages - XDA pages prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces

Table 45. Information returned for a package cache event monitor: Table name: PKGCACHE_METRICS. The metrics in this table are the same as those returned in the METRICS monitor element in the PKGCACHE_EVENT table (continued)

Column Name	Data Type	Description
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	pool_failed_async_data_reqs - Failed data prefetch requests
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	pool_failed_async_index_reqs - Failed index prefetch requests
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	pool_failed_async_xda_reqs - Failed XDA prefetch requests
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	pool_failed_async_other_reqs - Failed non-prefetch requests
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
PREFETCH_WAITS	BIGINT	prefetch_waits - Prefetcher wait count
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225

Table 46. Information returned for a package cache event monitor: Table name: PKGCACHE_STMT_ARGS.

Column Name	Data Type	Description
XMLID	VARCHAR(256) NOT NULL	"xmlid - XML ID monitor element" on page 1547
STMT_VALUE_INDEX	INTEGER NOT NULL	stmt_value_index - Value index

Table 46. Information returned for a package cache event monitor: Table name: PKGCACHE_STMT_ARGS. (continued)

Column Name	Data Type	Description
STMT_VALUE_ISREOPT	INTEGER	stmt_value_isreopt - Variable used for statement reoptimization
STMT_VALUE_ISNULL	INTEGER	stmt_value_isnull - Value has null value
STMT_VALUE_TYPE	CHAR(16)	stmt_value_type - Value type
STMT_VALUE_DATA	CLOB(32K)	stmt_value_data - Value data

Entries for the following data types are recorded in the preceding table, however, the actual values of the arguments are not recorded in the STMT_VALUE_DATA element:

- BLOB
- CLOB
- REF
- BOOLEAN
- Structured data types
- DATALINK
- LONG VARGRAPHIC
- LONG VARCHAR
- XML tyoes
- DBCLOB
- ARRAY types
- ROW types
- ROWID
- CURSOR variables

Input arguments are recorded beginning with the one that appears first in the statement, and continuing with each one in succession. The number of input parameters that can be recorded in this table is constrained only by the upper limit on the size of the BLOB document that the UE event monitor uses to capture event information. In practical terms, it is unlikely the number input arguments captured would ever cause this limit to be reached.

Information written to XML for a package cache event monitor:

Information written for a package cache event monitor from the EVMON_FORMAT_UE_TO_XML table function. This is also documented in the DB2EvmonPkgCache.xsd file.

db2_pkgcache_event

The main schema that describes a package cache event event in details.

Element content: ("section_type" on page 257, "insert_timestamp" on page 257, "executable_id" on page 257, "package_schema" on page 258, "package_name" on page 258, "package_version_id" on page 258, "section_number" on page 258 {zero or one times (?)}, "effective_isolation" on page 258, "num_executions" on page 259, "num_exec_with_metrics" on page 259, "prep_time" on page 259, "last_metrics_update" on page 259, "num_coord_exec" on page 260, "num_coord_exec_with_metrics" on page 260, "stmt_type_id" on page 260, "query_cost_estimate" on page 260, "stmt_pkg_cache_id" on page 261, "stmt_text" on page 261, "comp_env_desc" on page 261, "section_env" on page 261

260, "activity_metrics" on page 261, "routine_id" on page 261, "query_data_tag_list" on page 261, "total_stats_fabrication_time" on page 262, "total_stats_fabrications" on page 262, "total_sync_runstats_time" on page 262, "total_sync_runstats" on page 262, "max_coord_stmt_exec_timestamp" on page 263 {zero or one times (?)}, "max_coord_stmt_exec_time_arg" on page 263 {zero or more (*)}, "max_coord_stmt_exec_time" on page 263, ANY content (skip) {zero or more (*)}

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			required	
type				required	
timestamp	xs:dateTime			required	
member				required	
release	xs:long			required	
ANY attribute from ANY namespace					

section_type

The type of SQL statement processed. Possible values: D:Dynamic or S:Static. See monitor element "section_type - Section type indicator monitor element" on page 1304 for more details.

Contained by: "db2_pkgcache_event" on page 256

insert_timestamp

The time when the variation or section was inserted into the cache. See monitor element "insert_timestamp - Insert timestamp monitor element" on page 961 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:dateTime	

executable_id

A binary token generated on the data server that uniquely identifies the SQL statement section that was executed. See monitor element "executable_id - Executable ID monitor element" on page 888 for more details.

Contained by: "db2_pkgcache_event" on page 256

package_schema

The schema name of the package associated with an SQL statement. See monitor element “package_schema - Package schema monitor element” on page 1096 for more details.

Contained by: “db2_pkgcache_event” on page 256

package_name

The name of the package that contains the SQL statement currently executing. See monitor element “package_name - Package name monitor element” on page 1095 for more details.

Contained by: “db2_pkgcache_event” on page 256

package_version_id

The package version identifies the version identifier of the package that contains the SQL statement currently executing. See monitor element “package_version_id - Package version monitor element” on page 1096 for more details.

Contained by: “db2_pkgcache_event” on page 256

section_number

The internal section number in the package for the SQL statement currently processing or most recently processed. See monitor element “section_number - Section number monitor element” on page 1303 for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

effective_isolation

The isolation value in effect for the SQL statement while it was being run. See monitor element “effective_isolation - Effective isolation monitor element” on page 875 for more details.

Contained by: “db2_pkgcache_event” on page 256

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	

num_executions

The number times the SQL statement has been executed. See monitor element “num_executions - Statement executions monitor element” on page 1061 for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

num_exec_with_metrics

The number times the SQL statement has been executed with the metrics collected. See monitor element “num_exec_with_metrics - Number of executions with metrics collected monitor element” on page 1062 for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

prep_time

Time in milliseconds required to prepare an SQL statement if the activity is an SQL statement. See monitor element “prep_time - Preparation time monitor element” on page 1253 for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

last_metrics_update

Timestamp reflecting the last time metrics were updated for this cache entry. See monitor element “last_metrics_update - Metrics last update timestamp monitor element” on page 978 for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:dateTime	

num_coord_exec

The number of times this section was executed by a coordinator agent. See monitor element “num_coord_exec - Number of executions by coordinator agent monitor element” on page 1060for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

num_coord_exec_with_metrics

The number of times this section was executed by a coordinator agent and monitoring metrics were being captured. See monitor element “num_coord_exec_with_metrics - Number of executions by coordinator agent with metrics monitor element” on page 1060for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

stmt_type_id

Statement type identifier. See monitor element “stmt_type_id - Statement type identifier monitor element” on page 1360for more details.

Contained by: “db2_pkgcache_event” on page 256

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:long			optional	

query_cost_estimate

Estimated cost for a query, as determined by the SQL compiler. See monitor element “query_cost_estimate - Query cost estimate monitor element” on page 1262for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

stmt_pkg_cache_id

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

stmt_text

The text of the SQL statement. See monitor element "stmt_text - SQL statement text monitor element" on page 1358 for more details.

Contained by: "db2_pkgcache_event" on page 256

comp_env_desc

"comp_env_desc - Compilation environment monitor element" on page 786

Contained by: "db2_pkgcache_event" on page 256

section_env

A BLOB that contains the section for an SQL statement. See monitor element "section_env - Section environment monitor element" on page 1302 for more details.

Contained by: "db2_pkgcache_event" on page 256

activity_metrics

The activity metrics for this cache entry.

Contained by: "db2_pkgcache_event" on page 256

routine_id

For CALL statements this element stores the routine identifier associated with the stored procedure invoked. See monitor element "routine_id - Routine ID monitor element" on page 1286 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

query_data_tag_list

The data tag list for this cache entry. See monitor element "query_data_tag_list - Estimated query data tag list monitor element" on page 1262 for more details.

Contained by: "db2_pkgcache_event" on page 256

total_stats_fabrication_time

Total time spent, in milliseconds, on statistics fabrications by real-time statistics gathering. See monitor element "total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

total_stats_fabrications

Total number of statistics fabrications performed by real-time statistics during query compilation. See monitor element "total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

total_sync_runstats_time

Total time spent, in milliseconds, on synchronous RUNSTATS activities triggered by real-time statistics gathering. See monitor element "total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

total_sync_runstats

Total number of synchronous RUNSTATS activities triggered by real-time statistics gathering. See monitor element "total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496 for more details.

Contained by: "db2_pkgcache_event" on page 256

Element content:

Type	Facet
xs:long	

max_coord_stmt_exec_timestamp

See monitor element “max_coord_stmt_exec_timestamp - Maximum coordinator statement execution timestamp monitor element” on page 1032for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:dateTime	

max_coord_stmt_exec_time_arg

Describes an input variable to this statement which produced the max_coord_stmt_exec_time.

Contained by: “db2_pkgcache_event” on page 256

Element content: (“stmt_value_index”, “stmt_value_isreopt”, “stmt_value_isnull” on page 264, “stmt_value_type” on page 264, “stmt_value_data” on page 264, ANY content (skip) {zero or more (*)})

max_coord_stmt_exec_time

See monitor element “max_coord_stmt_exec_time - Maximum coordinator statement execution time monitor element” on page 1029for more details.

Contained by: “db2_pkgcache_event” on page 256

Element content:

Type	Facet
xs:long	

stmt_value_index

The element represents the position of the input parameter marker or host variable used in the SQL statement. See monitor element “stmt_value_index - Value index” on page 1362for more details.

Contained by: “max_coord_stmt_exec_time_arg”

stmt_value_isreopt

The element shows whether the variable was used during statement reoptimization. See monitor element “stmt_value_isreopt - Variable used for statement reoptimization monitor element” on page 1363for more details.

Contained by: "max_coord_stmt_exec_time_arg" on page 263

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_isnull

The element shows whether a data value associated with the SQL statement is the NULL value. See monitor element "stmt_value_isnull - Value has null value monitor element" on page 1363 for more details.

Contained by: "max_coord_stmt_exec_time_arg" on page 263

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_type

"stmt_value_type - Value type monitor element" on page 1364

Contained by: "max_coord_stmt_exec_time_arg" on page 263

stmt_value_data

The element contains a string representation of a data value associated with an SQL statement. See monitor element "stmt_value_data - Value data" on page 1362 for more details.

Contained by: "max_coord_stmt_exec_time_arg" on page 263

Collecting package cache event data and generating reports

You can use the package cache event monitor to collect data about statement entries that were flushed from the database package cache. After the package cache event data has been collected in an unformatted event table, follow the directions in this task to obtain a text report.

Before you begin

To collect package cache event monitor data, you must have DBADM or SQLADM authority.

About this task

The package cache event monitor collects relevant history information about what was in the package cache to help with query performance and problem determination issues related to SQL statements. For example, some of the information the package cache event monitor collects from the database package cache is as follows:

- Executable ID (EXECUTABLE_ID)
- The estimated cost of the query (QUERY_COST_ESTIMATE)

- The time that the entry was flushed from the package cache (Event Timestamp)

This task provides instructions for collecting package cache event data.

Restrictions

Input data values are not viewable if you do not have DBADM or SQLADM authority.

Procedure

To collect detailed information regarding package cache events, perform the following steps:

1. Create a package cache event monitor called `cachestmtevmon` by using the `CREATE EVENT MONITOR FOR PACKAGE CACHE` statement, as shown in the following example:

```
CREATE EVENT MONITOR cachestmtevmon FOR PACKAGE CACHE
WRITE TO UNFORMATTED EVENT TABLE
```
2. Activate the package cache event monitor called `cachestmtevmon` by running the following statement:

```
SET EVENT MONITOR cachestmtevmon STATE 1
```
3. Unlike the locking and the unit of work event monitors, the package cache event monitor automatically starts collecting data after the event monitor is activated.
4. Connect to the database.
5. Run the application, workload or SQL statements for which you want to collect event monitor information.
6. If you want to turn OFF package cache data collection, deactivate the event monitor by running the following command:

```
SET EVENT MONITOR cachestmtevmon STATE 0
```
7. Obtain the package cache event report using the XML parser tool, `db2evmonfmt`, to produce a flat-text report based on the event data collected in the unformatted event table, for example:

```
java db2evmonfmt -d db_name -ue table_name -ftext -u user_id -p password
```
8. Analyze the report.

Example

The following is an example of a report obtained by using the `db2evmonfmt` Java-based report tool to convert data in the unformatted event table collected by the package cache event monitor:

```
-----
Event ID           : 1
Event Type        : PKGCACHEBASE
Event Timestamp   : 2009-11-06-12.32.06.442020
Member           : 0
Release          : 9070100
-----
```

Package Cache Details

```
-----
Section Type      : D
Insert Timestamp  : 2009-11-06-12.28.04.246930
Executable ID     : 010000000000000001000000000000000000000000020020091106122804246932
Package Schema    :
Package Name      :
Package Version ID :
Section Number    :
Effective Isolation : CS
Number Of Executions : 1
Number Of Executions With Metrics : 1
-----
```



```

FCM_MESSAGE_RECVS_TOTAL      : 0
FCM_MESSAGE_SEND_VOLUME     : 0
FCM_MESSAGE_RECV_VOLUME     : 0
FCM_TO_SENDS_TOTAL          : 0
FCM_TO_RECVS_TOTAL          : 0
FCM_TO_SEND_VOLUME          : 0
FCM_TO_RECV_VOLUME          : 0
TQ_TOT_SEND_SPILLS          : 0
POST_THRESHOLD_SORTS        : 0
POST_SHRTHRESHOLD_SORTS     : 0
SORT_OVERFLOW                : 0
AUDIT_EVENTS_TOTAL          : 0
TOTAL_SORTS                  : 0
THRESH_VIOLATIONS           : 0
NUM_LW_THRESH_EXCEEDED      : 0
TOTAL_ROUTINE_INVOCATIONS    : 0

```

Using package cache information to identify statements that are candidates for performance tuning:

You can use the package cache event monitor along with in-memory metrics to identify which statements from the package cache are costly to run. Once you know which statements take a long time to run, you can do performance tuning on them.

Before you begin

The CREATE EVENT MONITOR statement requires a table space with a page size of at least 8 K to store the unformatted event (UE) table produced by the event monitor. Unless a table space is explicitly named in the CREATE EVENT MONITOR statement, the default table space for the database is used.

About this task

This task shows how you can examine all work done on the system between two points in time to find the costliest statements in terms of total CPU time. Using the package cache event monitor together with package cache information reflected in in-memory monitor elements (as returned by the MON_GET_PKG_CACHE_STMT or MON_GET_PKG_CACHE_STMT_DETAILS table functions) is useful because you can see both statements in the cache as well as statements that have been evicted from the cache. Once the costly statements have been identified, you can then do performance tuning on these statements.

Note: You can choose from a number of monitor elements to use when determining which statements are costly to run. In this example, CPU time is used (“total_cpu_time - Total CPU time monitor element” on page 1436). This measurement shows actual CPU resources consumed; it does not reflect things like lock wait time or other time spent during statement execution. You might instead choose to use statement execution time (“stmt_exec_time - Statement execution time monitor element” on page 1348), which includes the time spent by all agents in the section, and includes wait times, among other things. You can also choose from many of the other time-spent elements returned by the package cache event monitor. See “Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a package cache event monitor” on page 247 or “Information written to XML for a package cache event monitor” on page 256 for more information about which monitor elements you can choose from.

Restrictions

In this particular example, the length of the analyzed statements is limited to 3000 characters. This limitation is due to the use of the GROUP BY clause used in the

statement, which cannot be used with LOB values, such as the `stmt_text` monitor element.

Procedure

1. Create a package cache event monitor to capture statements as they are removed (evicted) from the package cache. For example, to create an event monitor called `EXPENSIVESTMTS`, you could use the following SQL:

```
CREATE EVENT MONITOR EXPENSIVESTMTS FOR PACKAGE CACHE WRITE TO UNFORMATTED EVENT TABLE
```

This statement creates a package cache event monitor that writes to a UE table with the same name as the event monitor, `EXPENSIVESTMTS`, in the default table space for the database. You can override the default name for the UE table using the `TABLE table-name` clause. You can also override the table space used for the UE table by using the `IN tablespace-name` clause.

By default, all statements evicted from the package cache are captured by the package cache event monitor. To limit the amount of information collected, you can specify options as part of the `CREATE EVENT MONITOR` statement that restrict the information collected. See the documentation for the `CREATE EVENT MONITOR (package cache)` statement for more information.

2. Next, activate the event monitor:

```
SET EVENT MONITOR EXPENSIVESTMTS STATE 1
```

Note: By default, this event monitor starts automatically upon database activation, because the `AUTOSTART` option is applied by default. However, because this event monitor is being created in an already-active database, you must use the **SET EVENT MONITOR** command to start it manually.

3. Connect to the database and run whichever statements, workload, or applications for which you are interested in doing performance analysis. You can collect as much information as you like. However, this type of performance tuning works best when you have applications or workloads that run on a regular basis; otherwise adjustments you make for previously executed statements might not have any impact on statements that run in the future.
4. When you are finished collecting data, deactivate the event monitor:

```
SET EVENT MONITOR EXPENSIVESTMTS STATE 0
```

5. Extract the data from the UE table that was populated by the event monitor using the `EVMON_FORMAT_UE_TO_TABLES` procedure.

```
CALL EVMON_FORMAT_UE_TO_TABLES ('PKGCACHE', NULL, NULL, NULL, NULL, NULL, NULL, -1, 'SELECT * FROM EXPENSIVESTMTS')
```

This procedure examines the UE table `TRACKSTMTS` produced by the event monitor. It selects all of the records from the UE table, and from them, creates two relational tables from the data collected by the package cache event monitor:

- `PKGCACHE_EVENT`
- `PCKCACHE_METRICS`

The first table contains the most frequently used monitor elements and metrics associated with each event captured. The second contains detailed metrics for each event.

Note: The values in the columns of `PKGCACHE_METRICS` can also be found in the XML document contained in the `METRICS` column of the `PKGCACHE_EVENT` table. They are provided in the `PKGCACHE_METRICS` table for more convenient, column-oriented access.

6. Query the output from the event monitor to determine which statements took the longest time to run. In this example, total CPU time (“total_cpu_time - Total CPU time monitor element” on page 1436) is the time-spent monitor element used to determine overall cost:

```
WITH STMTS AS
(
  1 { SELECT SUM(TOTAL_CPU_TIME) AS TOTAL_CPU_TIME, EXECUTABLE_ID, VARCHAR(STMT_TEXT, 3000) AS STMT_TEXT
    FROM TABLE(MON_GET_PKG_CACHE_STMT(NULL,NULL,NULL,-2)) AS T
    GROUP BY EXECUTABLE_ID, VARCHAR(STMT_TEXT, 3000)
  UNION ALL
  2 { SELECT SUM(TOTAL_CPU_TIME) AS TOTAL_CPU_TIME, EXECUTABLE_ID, VARCHAR(STMT_TEXT, 3000) AS STMT_TEXT
    FROM PKGCACHE_EVENT E, PKGCACHE_METRICS M WHERE E.XMLID = M.XMLID
    GROUP BY EXECUTABLE_ID, VARCHAR(STMT_TEXT, 3000)
  )
SELECT SUM(TOTAL_CPU_TIME) AS TOTAL_CPU_TIME, STMT_TEXT, EXECUTABLE_ID
FROM STMTS
GROUP BY EXECUTABLE_ID, STMT_TEXT
ORDER BY TOTAL_EXEC_TIME DESC
FETCH FIRST 10 ROWS ONLY;
```

In the preceding example, both the data returned from by the MON_GET_PKG_CACHE_STMT table function (see **1**) and the package cache event monitor (see **2**) are retrieved. Looking at both data sets lets you see data for statements that still exist in the package cache, as well as data for statements that have been evicted from the package cache. Doing so assures that when you evaluate which statements are costly to run that all the statements run between two points in time are considered. The preceding query returns the following results:

Note: For the purposes of printing, the font size of the characters that comprise the sample output that follows has been reduced. This output might be easier to read from the online version of the topic (“Using package cache information to identify statements that are candidates for performance tuning”) in the DB2 Information Center.

TOTAL_CPU_TIME	STMT_TEXT	EXECUTABLE_ID
656250	CALL EVMON FORMAT UE TO TABLES	x'0100000000000000700000000000000000000000000020020101207125759221000'
SQL0445W	Value "WITH STMTS AS (SELECT SUM(TOTAL_CPU_TIME) AS TOTAL_CPU_TIME" has been truncated.	SQLSTATE=01004
500000	CALL XSR_COMPLETE(?,?,NULL,1)	x'0100000000000000160000000000000000000000000020020101207125801112004'
156250	CALL XSR_ADDSCHEMADOC(?,?,?,?)	x'0100000000000000900000000000000000000000000020020101207125759877000'
156250	CREATE INDEX PKGCACHE_EVENT_IN	x'0100000000000000120000000000000000000000000020020101207125800565003'
93750	CALL XSR_REGISTER(?,?,?, NUL	x'0100000000000000800000000000000000000000000020020101207125759643000'
93750	CALL XDB_DECOMP_XML_FROM_QUERY	x'0100000000000000180000000000000000000000000020020101207125801862001'
78125	CREATE INDEX PKGCACHE_METRICS	x'0100000000000000140000000000000000000000000020020101207125800924000'
46875	CREATE EVENT MONITOR EXPENSIV	x'0100000000000000100000000000000000000000000020020101207125758299000'
46875	SET EVENT MONITOR EXPENSIVESTM	x'0100000000000000050000000000000000000000000020020101207125758768001'
46875	CALL SYSPROC.SYSINSTALLOBJECTS	x'0100000000000000240000000000000000000000000020020101207125936286002'

10 record(s) selected with 1 warning messages printed.

Note: The STMT_TEXT column has been truncated for presentation purposes.

What to do next

Use the output from the query shown in step 6 to determine which statements to tune.

Using package cache information and db2advis to look for performance improvement opportunities:

The DB2 Design Advisor can analyze SQL statements to make recommendations for how to improve database performance.

You can use statements from the package cache (including statements captured by the package cache event monitor) as input to the Design Advisor to identify

changes you can make to improve the performance for a given workload, or even for all statements run between two points in time.

Before you begin

- The CREATE EVENT MONITOR statement requires a table space with a page size of at least 8 K to store the unformatted event (UE) table produced by the event monitor. Unless a table space is explicitly named in the CREATE EVENT MONITOR statement, the default table space for the database is used.
- You must have created the explain tables required by the Design Advisor.

About this task

This task shows how you can use the package cache event monitor to track all work done on the system between two points in time, and then use the **db2adv** command to analyze high-cost statements that were run during that period. The output of the db2adv command suggests adjustments or changes you can make to your database to improve its performance, based on the statements run while the package cache event monitor was active. Using the package cache event monitor to capture these statements is useful if the statements in question are no longer in the package cache.

Restrictions

In this particular example, the length of the analyzed statements is limited to 3000 characters. This limitation is due to the use of the GROUP BY clause used in the statement, which cannot be used with LOB values, such as the **stmt_text** monitor element.

Procedure

1. Create a package cache event monitor to capture statements as they are removed (evicted) from the package cache. For example, to create an event monitor called TRACKSTMTS, you could use the following SQL:

```
CREATE EVENT MONITOR TRACKSTMTS FOR PACKAGE CACHE WRITE TO UNFORMATTED EVENT TABLE
```

This statement creates a package cache event monitor that writes to a UE table with the same name as the event monitor, TRACKSTMTS.
2. Next, activate the event monitor:

```
SET EVENT MONITOR TRACKSTMTS STATE 1
```
3. Connect to the database and run whichever statements, workload or applications for which you are interested in doing performance analysis. You can collect as much information as you like. However, this type of performance tuning works best when you have applications or workloads that run on a regular basis; otherwise adjustments you make for previously executed statements might not have any impact on statements that run in the future.
4. When you are finished collecting data, deactivate the event monitor:

```
SET EVENT MONITOR TRACKSTMTS STATE 0
```
5. Extract the data from the UE table that was populated by the event monitor using the EVMON_FORMAT_UE_TO_TABLES procedure.

```
CALL EVMON_FORMAT_UE_TO_TABLES  
('PKG_CACHE', NULL, NULL, NULL, NULL, NULL, -1,  
'SELECT * FROM TRACKSTMTS')
```

This procedure creates two relational tables from the data collected by the package cache event monitor:

- PKGCACHE_EVENT

- PCKCACHE_METRICS

The first table contains the most frequently used monitor elements and metrics associated with each event captured. The second contains detailed metrics for each event.

Note: The values in the columns of PKGCACHE_METRICS can also be found in the XML document contained in the METRICS column of the PKGCACHE_EVENT table. They are provided in the PKGCACHE_METRICS table for more convenient, column-oriented access.

6. Query the output from the event monitor to determine which statements took the longest time to run. In this example, statement execution time (“stmt_exec_time - Statement execution time monitor element” on page 1348) is the time-spent monitor element used to determine overall cost. This monitor element is summed across all database partitions.

Tip: Save the output from the query into a text file. You will use this file in the next step.

```
WITH STMTS AS
(
  SELECT SUM(TOTAL_STMT_EXEC_TIME)/SUM(TOTAL_NUM_COORD_EXEC_WITH_METRICS) AS AVG_TIME_PER_EXEC,
         STMT_TEXT, SUM(NUM_EXECUTIONS) AS NUM_EXECUTIONS, STMT_TYPE_ID
  FROM (
    (
      SELECT      SUM(STMT_EXEC_TIME) AS TOTAL_STMT_EXEC_TIME,
                 SUM(NUM_COORD_EXEC_WITH_METRICS) AS TOTAL_NUM_COORD_EXEC_WITH_METRICS,
                 SUM(NUM_COORD_EXEC) AS NUM_EXECUTIONS,
                 VARCHAR(STMT_TEXT, 3000) AS STMT_TEXT,
                 STMT_TYPE_ID
      FROM        PKGCACHE_EVENT AS E, PKGCACHE_METRICS AS M
      WHERE       E.XMLID = M.XMLID
      AND         NUM_COORD_EXEC_WITH_METRICS > 0
      GROUP BY   VARCHAR(STMT_TEXT, 3000), STMT_TYPE_ID
      ORDER BY  TOTAL_NUM_COORD_EXEC_WITH_METRICS DESC
      FETCH FIRST 50 ROWS ONLY
    )
    UNION ALL
    (
      SELECT      SUM(STMT_EXEC_TIME) AS TOTAL_STMT_EXEC_TIME,
                 SUM(NUM_COORD_EXEC_WITH_METRICS) AS TOTAL_NUM_COORD_EXEC_WITH_METRICS,
                 SUM(NUM_COORD_EXEC) AS NUM_EXECUTIONS,
                 VARCHAR(STMT_TEXT, 3000) AS STMT_TEXT,
                 STMT_TYPE_ID
      FROM        TABLE(MON_GET_PKG_CACHE_STMT(NULL,NULL,NULL,-2)) AS T
      WHERE       NUM_COORD_EXEC_WITH_METRICS > 0
      GROUP BY   VARCHAR(STMT_TEXT, 3000), STMT_TYPE_ID
      ORDER BY  TOTAL_NUM_COORD_EXEC_WITH_METRICS DESC
      FETCH FIRST 50 ROWS ONLY
    )
  ) AS Q_UA
  GROUP BY STMT_TEXT, STMT_TYPE_ID
)
SELECT      '--# SET FREQUENCY ' || NUM_EXECUTIONS || X'0A' || STMT_TEXT || ';'
FROM        STMTS WHERE STMT_TYPE_ID LIKE 'DML, Select%' OR STMT_TYPE_ID LIKE 'DML, Insert%' 1
ORDER BY   AVG_TIME_PER_EXEC DESC
FETCH FIRST 50 ROWS ONLY;
```

In the preceding sample statement, both the data from the package cache event monitor and the in-memory information from the MON_GET_PKG_CACHE_STMT table function are retrieved. Looking at both data sets lets you see data for statements evicted from the package cache, as well as statements that still exist in the package cache. Doing so assures that when you evaluate which statements are costly to run that you also include statements not yet evicted from the cache. In each case, the query retrieves the top 50 statements from both the active package cache, and the package cache event monitor, based on the number of times the statements ran. Then, from these statements, the top 50 SELECT or INSERT statements are chosen **1** based on the average length of time the statements ran for.

Note: You can choose from a number of monitor elements to use when determining which statements are costly to run. In this example, statement execution time is used. This measurement includes shows the amount of time spent in execution by all members and agents executing this section, and includes things like wait time. You might instead choose to use CPU time (“total_cpu_time - Total CPU time monitor element” on page 1436), which reports only the time spent by the CPU processing the statement. You could also choose from many of the other time-spent elements returned by the package cache event monitor. See “Information written to relational tables by EVMON_FORMAT_UE_TO_TABLES for a package cache event monitor” on page 247 or “Information written to XML for a package cache event monitor” on page 256 for more information about which monitor elements you can choose from.

In addition, the query presents the output in the --# SET FREQUENCY format the Design Advisor uses for its analysis. The preceding query returns results like the ones that follow:

```
-----
--# SET FREQUENCY 1
WITH STMTS AS ( SELECT SUM(TOTAL_STMT_EXEC_TIME)/SUM(TOTAL_NUM_COORD_EXEC_WITH_METRICS) AS AVG_TIME_PER_EXEC, STMT
--# SET FREQUENCY 2
WITH STMTS AS ( SELECT SUM(TOTAL_CPU_TIME) AS TOTAL_CPU_TIME, EXECUTABLE_ID, VARCHAR(STMT_TEXT, 3000) AS STMT_TEXT
--# SET FREQUENCY 1055
SELECT POLICY FROM SYSTOOLS.POLICY WHERE MED='DB2CommonMED' AND DECISION='NOP' AND NAME='CommonPolicy';
--# SET FREQUENCY 99
SELECT CREATOR, NAME, CTIME FROM SYSIBM.SYSTABLES WHERE TYPE='T' OR TYPE='S' OR TYPE='N' WITH UR;
--# SET FREQUENCY 1
UPDATE SYSTOOLS.HMON_ATM_INFO SET STATS_LOCK = 'N', REORG_LOCK = 'N';
--# SET FREQUENCY 1
UPDATE SYSTOOLS.HMON_ATM_INFO AS ATM SET STATS_FLAG = 'N', REORG_FLAG = 'N' WHERE (ATM.SCHEMA, ATM.NAME) IN (SEL
--# SET FREQUENCY 1
SELECT POLICY FROM SYSTOOLS.POLICY WHERE MED='DB2TableMaintenanceMED' AND DECISION='TableRunstatsDecision' AND NAM
--# SET FREQUENCY 83
WITH JTAB(JSHEMA,JNAME) AS (VALUES(TABLE_SCHEMA(CAST(? AS varchar(128))), CAST(? AS varchar(128))), TABLE_NAME (CA
--# SET FREQUENCY 122
WITH VTYPED (NAME, SCHEMA) AS (VALUES(TABLE_NAME (CAST(? AS varchar(128))), CAST(? AS varchar(128))), TABLE_SCHEMA(
--# SET FREQUENCY 1210
SELECT COLNAME, TYPENAME FROM SYSCAT.COLUMNS WHERE TABNAME='POLICY' AND TABSCHEMA='SYSTOOLS';
--# SET FREQUENCY 105
SELECT TABNAME FROM SYSCAT.TABLES WHERE TABNAME='HMON_ATM_INFO' AND TABSCHEMA='SYSTOOLS';
--# SET FREQUENCY 104
DELETE FROM SYSTOOLS.HMON_ATM_INFO AS ATM WHERE NOT EXISTS ( SELECT * FROM SYSIBM.SYSTABLES AS IBM WHERE ATM.NAME
--# SET FREQUENCY 1118
VALUES(SUBSTR(:H00003 ,:H00014,:H00015 )) INTO :H00009:H00017 ;
--# SET FREQUENCY 274
INSERT INTO "ASRISK"."PKGCACHE_EVENT"("EVENT_ID","XMLID","EVENT_TYPE","EVENT_TIMESTAMP","MEMBER","SECTION_TYPE","I
--# SET FREQUENCY 1
SELECT IBM.TID, IBM.FID FROM SYSIBM.SYSTABLES AS IBM, SYSTOOLS.HMON_ATM_INFO AS ATM WHERE ATM.STATS_FLAG <> 'Y' AN
--# SET FREQUENCY 115
VALUES(SUBSTR(CAST(? AS CLOB(162)),CAST(? AS INTEGER),CAST(? AS INTEGER)));
--# SET FREQUENCY 8227
:
--# SET FREQUENCY 532
SELECT TBNAME, TBCreator FROM "ASRISK ".SYSINDEXES WHERE NAME = 'INDCOLUMNS01' AND CREATOR = 'SYSIBM ';
--# SET FREQUENCY 105
SELECT TABNAME FROM SYSCAT.TABLES WHERE TABNAME='HMON_COLLECTION' AND TABSCHEMA='SYSTOOLS';
--# SET FREQUENCY 4091
SELECT STATS_LOCK, REORG_LOCK FROM SYSTOOLS.HMON_ATM_INFO WHERE SCHEMA = ? AND NAME = ? AND CREATE_TIME = ? FOR UP
--# SET FREQUENCY 17100
SELECT CREATE_TIME FROM SYSTOOLS.HMON_ATM_INFO WHERE SCHEMA = ? AND NAME = ? FOR UPDATE;
--# SET FREQUENCY 524
SELECT COUNT(*) FROM "SYSIBM".SYSTABLES WHERE NAME = 'SYSDATAPARTITIONEXPRESSION' AND CREATOR = 'SYSIBM ' AND TYP
--# SET FREQUENCY 532
SELECT COUNT(*) FROM "SYSIBM".SYSTABLES WHERE NAME = 'SYSCOLUMNS' AND CREATOR = 'SYSIBM ' AND TYPE = 'S';

47 record(s) selected
```

Note: The lines in the preceding sample output have been truncated for presentation purposes.

7. Create an input file for the **db2adv** command using the statements returned by the query in step 6 on page 271. (For more information about creating input files for the **db2adv** command, refer to the reference documentation for that command.)

8. Run the **db2adv** command using the input file created in step 7 on page 272. For example, if the input file you create is called `pkgcache_stmts.txt`, run a command like the one that follows:

```
db2adv -d customer -i pkgcache_stmts.txt -m MICP
```

where

- **-d CUSTOMER** identifies the name of the database for which you are getting recommendations
- **-i pkgcache_stmts.txt** identifies the name of the input file for **db2adv**
- **-m MICP** is a directive to the `db2adv` command to produce the following recommendations to improve performance:
 - M** New materialized query tables
 - I** New indexes
 - C** Converting standard tables to multidimensional clustering tables (MQTs)
 - P** Repartitioning existing indexes

Results

The Design Advisor returns recommendations like ones that follow:

```

execution started at timestamp 2010-03-16-14.25.57.562000
Using the default table space name USERSPACE1
found [47] SQL statements from the input file
excluding statement [0] from the workload.
excluding statement [1] from the workload.
excluding statement [19] from the workload.
excluding statement [39] from the workload.
Recommending indexes...
Recommending MQTs...
Recommending Multi-Dimensional Clusterings...
Found 19 user defined views in the catalog table
Found [17] candidate MQTs
Getting cost of workload with MQTs
total disk space needed for initial set [ 0.159] MB
total disk space constrained to [ 69.215] MB
  2 indexes in current solution
  0 MQTs in current solution
total disk space needed for initial set [ 0.024] MB
total disk space constrained to [ 103.822] MB
No useful Multi-dimensional Clustering dimensions for this workload
[5651.8281] timerons (without recommendations)
[5519.8281] timerons (with current solution)
[2.34%] improvement

--
--
-- LIST OF MODIFIED CREATE-TABLE STATEMENTS WITH RECOMMENDED PARTITIONING KEYS AND TABLESPACES AND/OR RECOMMENDED MULTI-DIMENSIONAL CLUSTERINGS
-- =====
-- No new partitioning keys or tablespaces are recommended for this workload.

--
--
-- LIST OF RECOMMENDED MQTs
-- =====

--
--
-- RECOMMENDED EXISTING MQTs
-- =====

--
--
-- UNUSED EXISTING MQTs
-- =====
-- DROP TABLE "ASRISK " ."ADEFUSR";

--
--
-- RECOMMENDED CLUSTERING INDEXES
-- =====

--
--

```

```

-- LIST OF RECOMMENDED INDEXES
-- =====
-- index[1], 0.024MB
CREATE INDEX "ASRISK"."IDX003161830530000" ON "ASRISK"."SYSINDEXES"
("CREATOR" ASC, "NAME" ASC, "TBCREATOR" ASC, "TBNAME"
ASC) ALLOW REVERSE SCANS COLLECT SAMPLED DETAILED STATISTICS;
COMMIT WORK ;

--
--
-- RECOMMENDED EXISTING INDEXES
-- =====
-- RUNSTATS ON TABLE "SYSTOOLS"."POLICY" FOR SAMPLED DETAILED INDEX "SYSTOOLS"."POLICY_UNQ" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSTOOLS"."HMON_ATM_INFO" FOR SAMPLED DETAILED INDEX "SYSTOOLS"."ATM_UNIQ" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSDATAPARTITIONS" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDDATAPARTITIONS03" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSTABLES" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDTABLES01" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSTABLESPACES" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDTABLESPACES04" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSCOLUMNS" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDCOLUMNS01" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSINDEXES" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDINDEXES02" ;
-- COMMIT WORK ;
-- RUNSTATS ON TABLE "SYSIBM"."SYSTRIGGERS" FOR SAMPLED DETAILED INDEX "SYSIBM"."INDTRIGGERS02" ;
-- COMMIT WORK ;

--
--
-- UNUSED EXISTING INDEXES
-- =====
-- DROP INDEX "ASRISK"."PKG_CACHE_EVENT_IND1";
-- =====
--

-- ====ADVISOR DETAILED XML OUTPUT=====
-- ==(Benefits do not include clustering recommendations)==
:

```

Note: The output from the Design Advisor has been truncated for presentation purposes.

What to do next

Use the output from the Design Advisor to help when deciding what changes to make to your database to improve performance.

Activity event monitoring

The activity event monitor captures data that is related to activities that run on the system. You can use this event monitor to gather data to help you better understand the performance and behaviour of statements and of the load on your system in general.

The activity event monitor records information after the completion of each activity in the system. By contrast, the unit of work event monitor records data at the completion of each transaction. Using the activity event monitor, you can examine monitor elements related to the execution of individual statements.

The data that the activity event monitor returns complements the data that the following table functions return:

- MON_GET_ACTIVITY_DETAILS
- MON_GET_PKG_CACHE_STMT
- MON_GET_PKG_CACHE_STMT_DETAILS

Whereas the event monitor returns historical information about activities that ran on the system, the table functions provide information about activities that have run or have recently run on the system.

Uses of the activity event monitor

Use with other event monitors

The activity event monitor is particularly useful in conjunction with other event monitors. For example, you might want to capture information about the execution of a statement that violates a threshold that you define. In this case, you perform the following steps:

1. Define the threshold by using the `CREATE THRESHOLD` statement. As part of defining the threshold, specify the `COLLECT ACTIVITY DATA` clause to have activity data recorded by any active activity event monitors.
2. Create a threshold violations event monitor to capture details about when the threshold was violated, along with other data about what was happening in the system at that time.
3. Create an activity event monitor that captures the activity information that the threshold violation generates.
4. Run your application or workload.
5. Query the event monitor output to view information about what was happening when the threshold was violated. You might perform a join of data from the threshold violations event monitor with the data from the activity event monitor to pinpoint the statement that was running when the violation occurred.

This process is illustrated in more detail in “Example: Capturing activity information related to the execution of a statement” on page 291.

Other applications of the activity event monitor include the following ones:

- Capturing information about long-running queries. In this case, you run the `WLM_CAPTURE_ACTIVITY_IN_PROGRESS` procedure to force the collection of information about an activity before the activity is finished. Running this procedure is useful if you want to terminate a long-running statement but also want to capture information about it.
- Seeing what statements the applications in a specific workload are running.

Input to commands, procedures, or tools

The data produced by the activity event monitor can be used as input for various tools and stored procedures, including the ones that follow:

db2adviz - DB2 Design Advisor command

The `db2adviz` command can use the output of the activity event monitor to produce recommendations about the following items and activities:

- Materialized query tables (MQTs)
- Indexes
- Repartitioning of tables
- Conversion to multidimensional clustering (MDC) tables
- Deletion of unused objects

db2expln - SQL and XQuery Explain command

The **db2expln** command can use section information from the activity event monitor to describe the access plan for statements related to a section.

EXPLAIN_FROM_ACTIVITY stored procedure

The EXPLAIN_FROM_ACTIVITY stored procedure explains a specific execution of a statement by using the contents of the section that the procedure obtains from an activity event monitor. The Explain output is placed in the Explain tables for processing using Explain tools (for example, the **db2exfmt** command). The Explain output contains, if available, both the access plan and section actuals (runtime statistics for operators in the access plan).

Workload management historical analysis tools

The `wlmhist.pl` and `wlmhistrep.pl` Perl scripts perform historical analysis by using information that the activities event monitor captures.

Section actuals

Another use of the activity event monitor is to capture section actuals. You can use this data to compare the actual values that an activity event monitor captures with the estimated costs in an access plan. Doing this comparison can let you see whether the access plan is still valid.

Creating an activity event monitor

To create an event monitor that captures activity events, use the CREATE EVENT MONITOR FOR ACTIVITIES statement.

Before you begin

You must have either DBADM or SQLADM authority to create an activity event monitor.

Procedure

To create an activities event monitor:

1. Formulate a CREATE EVENT MONITOR FOR ACTIVITIES statement. For example, to create an event monitor called `myactevmon`, you might use a statement such as the one that follows:

```
CREATE EVENT MONITOR myactevmon FOR ACTIVITIES  
WRITE TO TABLE
```
2. Run the statement. This example creates an activities event monitor called `myactevmon` with the following characteristics:
 - Monitor elements for all logical data groups that are applicable to activity event monitors are collected.
 - Output is written to relational tables. Default table names are assigned to each table.
 - The event monitor is configured to start automatically when the database is first activated.
 -

These results are due to using the default settings for activity event monitors. You can override the defaults if necessary.

3. Activate the event monitor. Although the event monitor is configured to start automatically, it will not do so until the first database activation subsequent to

the creation of the event monitor. To force the event monitor to start collecting data immediately, use the SET EVENT MONITOR STATE statement, as shown in the following example:

```
SET EVENT MONITOR myactevmon STATE 1
```

What to do next

Configure the event monitor to collect the data that you want.

Configuring data collection for an activity event monitor

Before you can collect event data related to activities, you must configure data collection. The configuration options that you can use depend on your purpose for collecting data.

About this task

There are two ways to configure data collection for an activity event monitor:

- You can have activity event data generated whenever a threshold that you created by using the CREATE THRESHOLD statement is violated.
- You can specify the COLLECT ACTIVITY METRICS clause for the CREATE or ALTER statement for WLM objects.

Procedure

To collect event data that is related to activities:

1. Determine the activities for which you want to collect data. The table that follows outlines the options:

For which activities is data to be collected?	Configuration controlled by:
Activities related to a threshold violation	For activities that are related to a threshold violation, issue the CREATE THRESHOLD or ALTER THRESHOLD statement, specifying the COLLECT ACTIVITY DATA clause. When you specify the COLLECT ACTIVITY DATA clause, activity data is sent to any active activities event monitors whenever the threshold is violated. Optionally, specify one of the following additional clauses: WITH DETAILS; WITH DETAILS, SECTION; or AND VALUES. Tip: Consider changing the value of the <code>mon_act_metrics</code> configuration parameter to NONE. Doing so restricts the activities for which event data that is collected to just those activities that are related to threshold violations.

For which activities is data to be collected?	Configuration controlled by:
<p>Activities related to specific workload management objects</p>	<p>For activities related to workload management, issue one of the following statements, specifying the COLLECT ACTIVITY DATA clause. Optionally, specify one of the following additional clauses: WITH DETAILS; WITH DETAILS, SECTION; WITH SECTION INCLUDE ACTUALS BASE; or AND VALUES:</p> <ul style="list-style-type: none"> • CREATE WORKLOAD • ALTER WORKLOAD • CREATE WORK ACTION SET • ALTER WORK ACTION SET • CREATE SERVICE CLASS • ALTER SERVICE CLASS <p>When you specify a COLLECT ACTIVITY DATA clause for any of these statements, activity data for the workload objects that are referenced in the statement is sent to any active activity event monitor.</p> <p>For example, to collect activity event data for the PAYROLL workload, you can alter the workload by issuing this statement:</p> <pre>ALTER WORKLOAD PAYROLL COLLECT ACTIVITY DATA WITH SECTION INCLUDE ACTUALS BASE</pre> <p>In this example, activity data is collected along with data for section actuals.</p>

- Set the collection level using one of the configuration options described in the previous step. For example, to collect activity event data for the PAYROLL workload, you can alter the workload with this statement:

```
ALTER WORKLOAD PAYROLL COLLECT ACTIVITY DATA WITH SECTION INCLUDE ACTUALS BASE
```

In this last example, activity data is collected, along with data for section actuals.

Results

Data collection is configured.

Collecting activity data for the default user workload

If you want to collect activity event data for activities that do not map to a specific workload, you can collect data for the default user workload by issuing a statement such as the one that follows:

```
ALTER WORKLOAD SYSDEFAULTUSERWORKLOAD COLLECT ACTIVITY DATA ON COORDINATOR WITH DETAILS
```

This statement causes detailed activity data to be collected for any activity that is not associated with a user-defined workload object. By default, all database connections are associated with the SYSDEFAULTUSERWORKLOAD workload if there are no user-defined workload objects.

What to do next

Run your application or workload. As activities that satisfy the collection criteria are run, event data is sent to any active activity event monitors.

Data generated by activities event monitors

You can choose to have the output from a activities event monitor written to regular tables, files or named pipes.

Regardless of the output format you choose, all data captured by activities event monitors comes from one of four logical data groups:

- event_activity
- event_activitymetrics
- event_activitystmt
- event_activityvals

If you choose to have the statistics event monitor data written to regular tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for an activities event monitor:

Information written by an activities event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for an activities event monitor, by default, five tables are produced, each containing monitor elements from one or more logical data groups:

Table 47. Tables produced by ACTIVITIES write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
ACTIVITY_ <i>evmon-name</i>	event_activity
ACTIVITYSTMT_ <i>evmon-name</i>	event_activitystmt
ACTIVITYVALS_ <i>evmon-name</i>	event_activityvals
ACTIVITYMETRICS_ <i>evmon-name</i>	event_activitymetrics
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

Table 48. Information returned for a activities event monitor: Default table name: ACTIVITY_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACT_EXEC_TIME	BIGINT	act_exec_time - Activity execution time
ACTIVATE_TIMESTAMP	TIMESTAMP	activate_timestamp - Activate timestamp
ACTIVITY_ID	BIGINT	activity_id - Activity ID
ACTIVITY_SECONDARY_ID	SMALLINT	activity_secondary_id - Activity secondary ID
ACTIVITY_TYPE	VARCHAR(64)	activity_type - Activity type
ADDRESS	VARCHAR(128)	address - IP address from which the connection was initiated
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
APPL_NAME	VARCHAR(255)	appl_name - Application name
ARM_CORRELATOR	BLOB(0)	arm_correlator - Application response measurement correlator
COORD_PARTITION_NUM	INTEGER	coord_partition_num - Coordinator partition number
DB_WORK_ACTION_SET_ID	INTEGER	db_work_action_set_id - Database work action set ID
DB_WORK_CLASS_ID	INTEGER	db_work_class_id - Database work class ID
DETAILS_XML	BLOB(0)	
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
NUM_REMAPS	BIGINT	num_remaps - Number of remaps
PARENT_ACTIVITY_ID	BIGINT	parent_activity_id - Parent activity ID
PARENT_UOW_ID	INTEGER	parent_uow_id - Parent unit of work ID
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads

Table 48. Information returned for a activities event monitor: Default table name: ACTIVITY_evmon-name (continued)

Column Name	Data Type	Description
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
PREP_TIME	BIGINT	prep_time - Preparation time
QUERY_ACTUAL_DEGREE	INTEGER	query_actual_degree - Actual runtime degree of intrapartition parallelism
QUERY_CARD_ESTIMATE	BIGINT	query_card_estimate - Query number of rows estimate
QUERY_COST_ESTIMATE	BIGINT	query_cost_estimate - Query cost estimate
QUERY_DATA_TAG_LIST	VARCHAR(32)	query_data_tag_list - Query data tag list
ROWS_FETCHED	BIGINT	rows_fetched - Rows fetched
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
SC_WORK_ACTION_SET_ID	INTEGER	sc_work_action_set_id - Service class work action set ID
SC_WORK_CLASS_ID	INTEGER	sc_work_class_id - Service class work class ID
SECTION_ACTUALS	BLOB(0)	section_actuals - Section actuals
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
SESSION_AUTH_ID	VARCHAR(128)	session_auth_id - Session authorization ID
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
SQLCABC	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLCAID	CHARACTER(8)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLCODE	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD1	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD2	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD3	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD4	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD5	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD6	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRM	VARCHAR(72)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .

Table 48. Information returned for a activities event monitor: Default table name: ACTIVITY_evmon-name (continued)

Column Name	Data Type	Description
SQLERRP	CHARACTER(8)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLSTATE	CHARACTER(5)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLWARN	CHARACTER(11)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SYSTEM_CPU_TIME	BIGINT	system_cpu_time - System CPU time
TIME_COMPLETED	TIMESTAMP	time_completed - Time completed
TIME_CREATED	TIMESTAMP	time_created - Time created
TIME_STARTED	TIMESTAMP	time_started - Time started
TOTAL_SORT_TIME	BIGINT	total_sort_time - Total sort time
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
TOTAL_STATS_FABRICATION_TIME	BIGINT	total_stats_fabrication_time - Total statistics fabrication time
TOTAL_STATS_FABRICATIONS	BIGINT	total_stats_fabrications - Total statistics fabrications
TOTAL_SYNC_RUNSTATS	BIGINT	total_sync_runstats - Total synchronous RUNSTATS activities
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	total_sync_runstats_time - Total synchronous RUNSTATS time
TPMON_ACC_STR	VARCHAR(200)	tpmon_acc_str - TP monitor client accounting string
TPMON_CLIENT_APP	VARCHAR(255)	tpmon_client_app - TP monitor client application name
TPMON_CLIENT_USERID	VARCHAR(255)	tpmon_client_userid - TP monitor client user ID
TPMON_CLIENT_WKSTN	VARCHAR(255)	tpmon_client_wkstn - TP monitor client workstation name
UOW_ID	INTEGER	uow_id - Unit of work ID
USER_CPU_TIME	BIGINT	user_cpu_time - User CPU time
WL_WORK_ACTION_SET_ID	INTEGER	wl_work_action_set_id - Workload work action set identifier
WL_WORK_CLASS_ID	INTEGER	wl_work_class_id - Workload work class identifier
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_OCCURRENCE_ID	INTEGER	workload_occurrence_id - Workload occurrence identifier

Table 49. Information returned for an activities event monitor: Table name: ACTIVITYSTMT_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACTIVATE_TIMESTAMP	TIMESTAMP	activate_timestamp - Activate timestamp
ACTIVITY_ID	BIGINT	activity_id - Activity ID
ACTIVITY_SECONDARY_ID	SMALLINT	activity_secondary_id - Activity secondary ID
APPL_ID	VARCHAR(64)	appl_id - Application ID

Table 49. Information returned for an activities event monitor: Table name: ACTIVITYSTMT_evmon-name (continued)

Column Name	Data Type	Description
COMP_ENV_DESC	BLOB(0)	comp_env_desc - Compilation environment
CREATOR	VARCHAR(128)	creator - Application creator
EFF_STMT_TEXT	CLOB	eff_stmt_text - Effective statement text
EXECUTABLE_ID	VARCHAR(32)	executable_id - Executable ID
NUM_ROUTINES	BIGINT	num_routines -Number of routines
PACKAGE_NAME	VARCHAR(128)	package_name - Package name
PACKAGE_VERSION_ID	VARCHAR(64)	package_version_id - Package version
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
ROUTINE_ID	BIGINT	routine_id - Routine ID
SECTION_ENV	BLOB(0)	section_env - Section environment
SECTION_NUMBER	BIGINT	section_number - Section number
STMT_FIRST_USE_TIME	TIMESTAMP	stmt_first_use_time - Statement first use timestamp
STMT_INVOCATION_ID	BIGINT	stmt_invocation_id - Statement invocation identifier
STMT_ISOLATION	BIGINT	stmt_isolation - Statement isolation
STMT_LAST_USE_TIME	TIMESTAMP	stmt_last_use_time - Statement last use timestamp
STMT_LOCK_TIMEOUT	INTEGER	stmt_lock_timeout - Statement lock timeout
STMT_NEST_LEVEL	BIGINT	stmt_nest_level - Statement nesting level
STMT_PKG_CACHE_ID	BIGINT	stmt_pkgcache_id - Statement package cache identifier
STMT_QUERY_ID	BIGINT	stmt_query_id - Statement query identifier
STMT_SOURCE_ID	BIGINT	stmt_source_id - Statement source identifier
STMT_TEXT	CLOB	stmt_text - SQL statement text
STMT_TYPE	BIGINT	stmt_type - Statement type
STMTNO	INTEGER	stmtno - Statement number monitor element
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACTIVITY_ID	BIGINT	activity_id - Activity ID
ACTIVITY_SECONDARY_ID	SMALLINT	activity_secondary_id - Activity secondary ID
APPL_ID	VARCHAR(64)	appl_id - Application ID
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
UOW_ID	INTEGER	uow_id - Unit of work ID
WLM_QUEUE_TIME_TOTAL	BIGINT	wlm_queue_time_total - Workload manager total queue time
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	wlm_queue_assignments_total - Workload manager total queue assignments
FCM_TQ_RECV_WAIT_TIME	BIGINT	fcm_tq_recv_wait_time - FCM table queue received wait time

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	fcm_message_recv_wait_time - FCM message received wait time
FCM_TQ_SEND_WAIT_TIME	BIGINT	fcm_tq_send_wait_time - FCM table queue send wait time
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	fcm_message_send_wait_time - FCM message send wait time
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
LOG_BUFFER_WAIT_TIME	BIGINT	log_buffer_wait_time - Log buffer wait time
NUM_LOG_BUFFER_FULL	BIGINT	num_log_buffer_full - Number of full log buffers
LOG_DISK_WAIT_TIME	BIGINT	log_disk_wait_time - Log disk wait time
LOG_DISK_WAITS_TOTAL	BIGINT	log_disk_waits_total - Total log disk waits
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	audit_file_write_wait_time - Audit file write wait time
AUDIT_FILE_WRITES_TOTAL	BIGINT	audit_file_writes_total - Total audit files written
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	audit_subsystem_wait_time - Audit subsystem wait time
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	audit_subsystem_waits_total - Total audit subsystem waits
DIAGLOG_WRITE_WAIT_TIME	BIGINT	diaglog_write_wait_time - Diagnostic log file write wait time
DIAGLOG_WRITES_TOTAL	BIGINT	diaglog_writes_total - Total diagnostic log file writes
FCM_SEND_WAIT_TIME	BIGINT	fcm_send_wait_time - FCM send wait time
FCM_RECV_WAIT_TIME	BIGINT	fcm_recv_wait_time - FCM received wait time
TOTAL_ACT_WAIT_TIME	BIGINT	total_act_wait_time - Total activity wait time
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	total_section_sort_proc_time - Total section sort processing time
TOTAL_SECTION_SORTS	BIGINT	total_section_sorts - Total section sorts
TOTAL_SECTION_SORT_TIME	BIGINT	total_section_sort_time - Total section sort time
TOTAL_ACT_TIME	BIGINT	total_act_time - Total activity time
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_MODIFIED	BIGINT	rows_modified - Rows modified
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
ROWS_RETURNED	BIGINT	rows_returned - Rows returned
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_ESCALS	BIGINT	lock_escalations - Number of lock escalations
FCM_SENDS_TOTAL	BIGINT	fcm_sends_total - FCM sends total
FCM_RECVS_TOTAL	BIGINT	fcm_recvs_total - FCM receives total
FCM_SEND_VOLUME	BIGINT	fcm_send_volume - FCM send volume
FCM_RECV_VOLUME	BIGINT	fcm_recv_volume - FCM received volume
FCM_MESSAGE_SENDS_TOTAL	BIGINT	fcm_message_sends_total - Total FCM message sends
FCM_MESSAGE_RECVS_TOTAL	BIGINT	fcm_message_recvs_total - Total FCM message receives
FCM_MESSAGE_SEND_VOLUME	BIGINT	fcm_message_send_volume - FCM message send volume
FCM_MESSAGE_RECV_VOLUME	BIGINT	fcm_message_recv_volume - FCM message received volume
FCM_TQ_SENDS_TOTAL	BIGINT	fcm_tq_sends_total - FCM table queue send total

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
FCM_TQ_RECVS_TOTAL	BIGINT	fcm_tq_recvs_total - FCM table queue receives total
FCM_TQ_SEND_VOLUME	BIGINT	fcm_tq_send_volume - FCM table queue send volume
FCM_TQ_RECV_VOLUME	BIGINT	fcm_tq_recv_volume - FCM table queue received volume
TQ_TOT_SEND_SPILLS	BIGINT	tq_tot_send_spills - Total number of table queue buffers overflowed
POST_THRESHOLD_SORTS	BIGINT	post_threshold_sorts - Post threshold sorts
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
AUDIT_EVENTS_TOTAL	BIGINT	audit_events_total - Total audit events
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
STMT_EXEC_TIME	BIGINT	stmt_exec_time - Statement execution time
COORD_STMT_EXEC_TIME	BIGINT	coord_stmt_exec_time - Execution time for statement by coordinator agent
TOTAL_ROUTINE_NON_SECT_PROC_TIME	BIGINT	total_routine_non_sect_proc_time - Non-section processing time
TOTAL_ROUTINE_NON_SECT_TIME	BIGINT	total_routine_non_sect_time - Non-section routine execution time
TOTAL_SECTION_PROC_TIME	BIGINT	total_section_proc_time - Total section processing time
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	total_app_section_executions - Total application section executions
TOTAL_SECTION_TIME	BIGINT	total_section_time - Total section time
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	total_routine_user_code_proc_time - Total routine user code processing time
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	total_routine_user_code_time - Total routine user code time
TOTAL_ROUTINE_TIME	BIGINT	total_routine_time - Total routine time
THRESH_VIOLATIONS	BIGINT	thresh_violations - Number of threshold violations
NUM_LW_THRESH_EXCEEDED	BIGINT	num_lw_thresh_exceeded - Number of lock wait thresholds exceeded
TOTAL_ROUTINE_INVOCATIONS	BIGINT	total_routine_invocations - Total routine invocations
LOCK_WAIT_TIME_GLOBAL	BIGINT	lock_wait_time_global - Lock wait time global
LOCK_WAITS_GLOBAL	BIGINT	lock_waits_global - Lock waits global
RECLAIM_WAIT_TIME	BIGINT	reclaim_wait_time - Reclaim wait time
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	spacemappage_reclaim_wait_time - Space map page reclaim wait time
LOCK_TIMEOUTS_GLOBAL	BIGINT	lock_timeouts_global - Lock timeouts global
LOCK_ESCALS_MAXLOCKS	BIGINT	lock_escals_maxlocks - Number of maxlocks lock escalations
LOCK_ESCALS_LOCKLIST	BIGINT	lock_escals_locklist - Number of locklist lock escalations

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
LOCK_ESCALS_GLOBAL	BIGINT	lock_escals_global - Number of global lock escalations
CF_WAIT_TIME	BIGINT	cf_wait_time - cluster caching facility wait time
CF_WAITS	BIGINT	cf_waits - Number of cluster caching facility DB2 pureScale server waits
POOL_DATA_GBP_L_READS	BIGINT	pool_data_gbp_l_reads - Group buffer pool data logical reads
POOL_DATA_GBP_P_READS	BIGINT	pool_data_gbp_p_reads - Group buffer pool data physical reads
POOL_DATA_LBP_PAGES_FOUND	BIGINT	pool_data_lbp_pages_found - Local buffer pool found data pages
POOL_DATA_GBP_INVALID_PAGES	BIGINT	pool_data_gbp_invalid_pages - Group buffer pool invalid data pages
POOL_INDEX_GBP_L_READS	BIGINT	pool_index_gbp_l_reads - Group buffer pool index logical reads
POOL_INDEX_GBP_P_READS	BIGINT	pool_index_gbp_p_reads - Group buffer pool index physical reads
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	pool_index_lbp_pages_found - Local buffer pool index pages found
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	pool_index_gbp_invalid_pages - Group buffer pool invalid index pages
POOL_XDA_GBP_L_READS	BIGINT	pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests
POOL_XDA_GBP_P_READS	BIGINT	pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests
POOL_XDA_LBP_PAGES_FOUND	BIGINT	pool_xda_lbp_pages_found - Local buffer pool XDA data pages found
POOL_XDA_GBP_INVALID_PAGES	BIGINT	pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages
EVMON_WAIT_TIME	BIGINT	evmon_wait_time - Event monitor wait time
EVMON_WAITS_TOTAL	BIGINT	evmon_waits_total - Event monitor total waits
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	total_extended_latch_wait_time - Total extended latch wait time
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	total_extended_latch_waits - Total extended latch waits
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	pool_queued_async_data_reqs - Data prefetch requests
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	pool_queued_async_index_reqs - Index prefetch requests
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	pool_queued_async_xda_reqs - XDA prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	pool_queued_async_other_reqs - Non-prefetch requests
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	pool_queued_async_data_pages - Data pages prefetch requests
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	pool_queued_async_index_pages - Index pages prefetch requests
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	pool_queued_async_xda_pages - XDA pages prefetch requests
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	pool_failed_async_data_reqs - Failed data prefetch requests
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	pool_failed_async_index_reqs - Failed index prefetch requests
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	pool_failed_async_xda_reqs - Failed XDA prefetch requests
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	pool_failed_async_other_reqs - Failed non-prefetch requests
TOTAL_PEDS	BIGINT	total_peds - Total partial early distincts
DISABLED_PEDS	BIGINT	“disabled_peds - Disabled partial early distincts monitor element” on page 870
POST_THRESHOLD_PEDS	BIGINT	post_threshold_peds - Partial early distincts threshold
TOTAL_PEAS	BIGINT	total_peas - Total partial early aggregations
POST_THRESHOLD_PEAS	BIGINT	post_threshold_peas - Partial early aggregation threshold
TQ_SORT_HEAP_REQUESTS	BIGINT	tq_sort_heap_requests - Table queue sort heap requests
TQ_SORT_HEAP_REJECTIONS	BIGINT	tq_sort_heap_rejections - Table queue sort heap rejections
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
PREFETCH_WAITS	BIGINT	prefetch_waits - Prefetcher wait count

Table 50. Information returned for an activities event monitor: Table name: ACTIVITYMETRICS_evmon-name (continued)

Column Name	Data Type	Description
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225

Table 51. Information returned for an activities event monitor: Table name: ACTIVITYVALS_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACTIVATE_TIMESTAMP	TIMESTAMP	activate_timestamp - Activate timestamp
ACTIVITY_ID	BIGINT	activity_id - Activity ID
ACTIVITY_SECONDARY_ID	SMALLINT	activity_secondary_id - Activity secondary ID
APPL_ID	VARCHAR(64)	appl_id - Application ID
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
STMT_VALUE_DATA	CLOB	stmt_value_data - Value data
STMT_VALUE_INDEX	INTEGER	stmt_value_index - Value index
STMT_VALUE_ISNULL	INTEGER	stmt_value_isnull - Value has null value
STMT_VALUE_ISREOPT	INTEGER	stmt_value_isreopt - Variable used for statement reoptimization
STMT_VALUE_TYPE	CHARACTER(16)	stmt_value_type - Value type
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 52. Information returned for an activities event monitor: Default table name: CONTROL_evmon-name

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Accessing event information written by an activity event monitor to a table

Activity event monitors can write their output to tables, files, and pipes.

For more information about using data written to files and pipes, see “Event monitor self-describing data stream” on page 130.

Before you begin

You must have created and activated an activity event monitor and enabled data collection.

About this task

The tables that an activity event monitor produces are described in “Target tables, control tables, and event monitor table management” on page 110. Before DB2 Version 10.1, metrics monitor elements were written to an XML document in the `DETAIL_XML` column of the `ACTIVITIES` table. The schema for the XML document is in the `sql1lib/misc/DB2MonCommon.xsd` file, and the top-level element is `activity_metrics`. Starting in Version 10.1, the metrics formerly available only from the `details_xml` XML document are also available in an `ACTIVITYMETRICS` table that the activity event monitor produces.

Procedure

To access the data produced by an activity event monitor:

1. Formulate a query that returns the columns that you want to see. For example, if you are interested in information about the text of the statements that are associated with a specific unit of work, you might formulate a query such as the one that follows:

```
SELECT UOW_ID, SUBSTR(STMT_TEXT, 1,70) AS STMT_TEXT FROM ACTIVITYSTMT_ACTEVMON
WHERE UOW_ID=11
```

In this case, the event monitor is named `actevmon`.

2. Run the query. The preceding query might return results similar to the ones that follow:

```
UOW_ID    STMT_TEXT
-----
11 select * from gosaleshr.employee_expense_detail order by expense_date

1 record(s) selected.
```

Results

Example

If you want to access the data in the `DETAILS_XML` column of the `ACTIVITY` table, you can use any of the interfaces that are provided with the DB2 product for this purpose. For example, to see metrics information that an activity event monitor collects for a unit of work, you might use a statement such as the one that follows:

```
SELECT SUBSTR(B.METRIC_NAME, 1, 20) METRIC_NAME, B.VALUE
FROM ACTIVITY_ACTEVMON AS A,
TABLE(MON_FORMAT_XML_METRICS_BY_ROW(A.DETAILS_XML)) AS B
WHERE UOW_ID=23
ORDER BY B.VALUE DESC
```

This statement returns all of the activity metrics collected for the unit of work with the `UOW_ID` of 23:

METRIC_NAME	VALUE
TOTAL_CPU_TIME	140625
ROWS_READ	977
TOTAL_ACT_TIME	880
STMT_EXEC_TIME	880
COORD_STMT_EXEC_TIME	880
TOTAL_SECTION_PROC_T	880
TOTAL_SECTION_TIME	880
:	
:	
FCM_TQ_SEND_WAITS_TO	0
FCM_MESSAGE_SEND_WAI	0
FCM_SEND_WAITS_TOTAL	0
FCM_RECV_WAITS_TOTAL	0

92 record(s) selected.

For more information about working with XML data returned by event monitors, see “Interfaces that return monitor data in XML documents” on page 18.

Example: Capturing activity information related to the execution of a statement

If you identify a statement that is taking a long time to execute, you can define a threshold that causes an activity event monitor to capture information about the execution of that statement when the threshold is exceeded.

You can then correlate statement execution information with information collected by the activity event monitor to view activity metrics that can help you understand what might be causing the slowdown.

Before you begin

Before capturing activity information, you must identify the statement in question; for example, a user or application developer might complain that a specific statement runs longer than expected. Or, you might identify a statement that is taking longer to run by using the package cache event monitor.

About this task

In this example, the query that is being investigated runs as part of an application. The query is as follows:

```
SELECT DISTINCT PARTS_BIN FROM STOCK WHERE PART_NUMBER = ?
```

One possible reason for a slowdown might be unfavorable data distribution. For example, if the STOCK table has only a few rows for most part numbers, but has several thousand for one particular part number, it takes longer to run this SELECT statement. The example that follows shows how you can retrieve the actual values that are processed for the parameter marker (“?”) by the activity associated with the preceding query.

Procedure

To test the hypothesis that unfavorable data distribution is the cause of the slow-running query, you can create a threshold for the statement in question. Then you can use the threshold and activity event monitors to capture information about

the execution of that particular statement. From this information, you can determine the actual value that was processed by the query that ran for longer than expected.

1. Create a threshold for the statement in question, specifying that a threshold violation event occurs when the statement runs for longer than 10 seconds:

```
CREATE THRESHOLD TH1
  FOR STATEMENT TEXT 'SELECT DISTINCT PARTS_BIN
  FROM STOCK WHERE PART_NUMBER = ?' ACTIVITIES
  ENFORCEMENT DATABASE
  WHEN ACTIVITYTOTALTIME > 10 SECONDS
  COLLECT ACTIVITY DATA WITH DETAILS, SECTION AND VALUES
  CONTINUE
```

2. Create a threshold event monitor to record threshold violations:

```
CREATE EVENT MONITOR STMT_THRESH_VIOLATIONS
  FOR THRESHOLD VIOLATIONS
  WRITE TO TABLE
  AUTOSTART
```

3. Create an activity event monitor to record detailed activity information:

```
CREATE EVENT MONITOR ACTIVITIES
  FOR ACTIVITIES
  WRITE TO TABLE
```

4. Enable the new event monitors:

```
SET EVENT MONITOR ACTIVITIES STATE 1
SET EVENT MONITOR STMT_THRESH_VIOLATIONS STATE 1
```

5. Run the application that executes the statement. If a threshold violation occurs, the threshold violations event monitor STMT_THRESH_VIOLATIONS records information about the threshold violation; information about the activity associated with the threshold violation is recorded by the activity event monitor ACTIVITIES.

6. To determine whether a threshold violation occurred, query the number of violations recorded by the threshold event monitor for the threshold TH1 defined in step 1. To perform this query, join the view SYSCAT.THRESHOLDS with the table that was produced by the thresholds event monitor that contains the threshold violation information. This join is necessary because the threshold name TH1 is maintained in SYSCAT.THRESHOLDS:

```
SELECT COUNT(1) NUM_VIOLATIONS
  FROM THRESHOLDVIOLATIONS_DB2THRESHOLDVIOLATIONS T
  JOIN SYSCAT.THRESHOLDS S ON T.THRESHOLDID = S.THRESHOLDID
  WHERE S.THRESHOLDNAME = 'TH1';
```

```
NUM_VIOLATIONS
```

```
-----
```

```
1
```

```
1 record(s) selected.
```

In this case, there was one threshold violation; one execution of the statement identified in step 1 ran for longer than 10 seconds.

7. Examine the data (the part number) that is represented by the parameter marker ("??") in the statement that you identified in 1. In the following example, the SELECT statement retrieves the value for the parameter marker (represented by STMT_VALUE_DATA in the SQL that follows) from one of the ACTIVITYVALS tables that the activity event monitor produces:

```
SELECT SUBSTR(V.STMT_VALUE_DATA, 1, 80) PARAM_MARKER_VALUE
  FROM ACTIVITYVALS_ACTIVITIES V
  JOIN THRESHOLDVIOLATIONS_STMT_THRESH_VIOLATIONS T
  ON T.APPL_ID = V.APPL_ID
  AND T.UOW_ID = V.UOW_ID
```

```
AND T.ACTIVITY_ID = V.ACTIVITY_ID
JOIN SYSCAT.THRESHOLDS S
ON T.THRESHOLDID = S.THRESHOLDID
WHERE S.THRESHOLDNAME = 'TH1';
```

In the preceding example, the select statement retrieves the value for the parameter marker (STMT_VALUE_DATA) from the one of the tables produced by the activity event monitor.

```
PARAM_MARKER_VALUE
-----
475299
```

8. Now that you know the value for the PART_NUMBER associated with the long-running statement, you can examine the STOCK table to see if there is anything about the occurrences of that part number in the table that might lead to longer query times. For example, many rows that contain 475299 as the value for the PART_NUMBMER (as compared to the number of rows for other part numbers) might be a reason that the query runs longer when this value is encountered.

Variation: Defining a threshold for a statement by using the executable ID

In the preceding example, the threshold is identified in step 1 on page 292 explicitly, by using the actual text of the statement. You can also define the threshold indirectly, identifying the executable ID for a statement contained in the package cache. For example, you can define the threshold as follows:

```
CREATE THRESHOLD TH1
FOR STATEMENT REFERENCE
x'010000000000000020000000000000000000000020020100304162158584850' ACTIVITIES
ENFORCEMENT DATABASE
WHEN ACTIVITYTOTALTIME > 10 SECONDS
COLLECT ACTIVITY DATA WITH DETAILS, SECTION AND VALUES
CONTINUE;
```

In this example, the executable ID that follows the keywords STATEMENT REFERENCE is used to look up the corresponding statement text in the package cache. The executable ID for a statement can be determined by examining the package cache. For more information about how to view information contained in the package cache, including the executable ID for a statement, see “Using package cache information to identify statements that are candidates for performance tuning” on page 267.

If the executable ID is found in the package cache, the associated statement text is retrieved from the package cache and is used for defining the statement threshold. For statements in static SQL sections, if the executable ID is not in the package cache, the statement text is retrieved from the system catalogs. For statements in dynamic SQL sections, consider using the PREPARE statement to create a prepared statement from the statement string. If the executable ID cannot be found in the package cache or the system catalogs, an error (SQL4721N) is returned.

Statistics event monitoring

The statistics event monitor captures data that can be used to measure different aspects of system operation.

You can use the statistics event monitor to collect two types of information:

Metrics

Metrics are request monitor elements that capture measurement information about the system. These metrics include time-spent monitor elements like the time waited on locks and counter monitor elements like the number of deadlocks that occurred. Collection of these metrics can be configured for the entire database with the **mon_req_metrics** database configuration parameter, or for specific service classes through the COLLECT REQUEST METRICS clause of CREATE or ALTER SERVICE CLASS statements. Some system metrics are collected as part of the **details_xml** and **metrics** monitor elements in the EVENT_SCSTATS and EVENT_WLSTATS logical data groups. Both these monitor elements are XML documents.

Statistics

Statistics are maintained for workload manager objects. Workload manager objects include service classes, work classes, workloads, and threshold queues. These statistics include high watermark monitor elements like temporary table space usage and calculated monitor elements like estimated cost averages. The statistics reside in memory and can be viewed in real time by using workload manager statistics table functions. Alternatively, the statistics can be collected and sent to a statistics event monitor where they can be viewed later for historical analysis. By default, a minimal set of statistics is collected for each workload manager object. You can modify the scope of statistics collection by using the clauses in the CREATE or ALTER statements for the various workload manager objects.

The XML documents in the **details_xml** and **metrics** monitor elements contain the same metrics with one important difference. The metrics in **details_xml** generally start at 0 and continue to accumulate until the next database activation, while the metrics in **metrics** are calculated to show the change in value for the metric since the last time statistics were collected. The schema for the XML documents returned is available in the file `sql1lib/misc/DB2MonCommon.xsd`. The top-level element is **system_metrics**.

In addition to viewing system metrics from the XML document in the **metrics** monitor element, you can also view the individual metrics directly from the output associated with the EVENT_SCMETRICS and EVENT_WLMETRICS logical data groups.

Important: Starting with Version 10.1 Fix Pack 1, the XML document in **details_xml** is deprecated for the statistics event monitor and might be removed in a future release. If you use the XML metrics data returned in **details_xml**, start by using the **metrics** document instead. Alternatively, you can include the EVENT_SCMETRICS and EVENT_WLMETRICS logical data groups in the information collected by the event monitor, and then you can access the metrics monitor elements directly.

The metrics collected by the statistics event monitor are the same set of metrics that are reported by the MON_GET_SERVICE_SUBCLASS_DETAILS and MON_GET_WORKLOAD_DETAILS table functions. The XML document in the DETAILS column of the tables returned by these two table functions contain many other monitor elements in addition to the system metrics monitor elements.

System metrics monitor elements are only collected for a request if the request is processed by an agent in a service subclass whose parent service superclass has request monitor element collection enabled, or if system metrics collection is enabled for the entire database. If system metrics collection is disabled at the

database level, as well as for a service superclass, the metrics reported in the `details.xml` document stop increasing (or remain at 0 if request metrics were disabled at database activation time).

Data generated by statistics event monitors

Statistics event monitors record statistics events that occur when using the database. The definition of the statistics event monitor specifies where the database records the events. You can choose to have the output from a statistics event monitor written to regular tables, files, or named pipes.

Regardless of the output format you choose, all data captured by statistics event monitors is written to one of the following logical data groups: The statistics event monitor can write captured data for the following logical data groups to tables, files, or named pipes:

- EVENT_SCSTATS
- EVENT_WCSTATS
- EVENT_WLSTATS
- EVENT_QSTATS
- EVENT_HISTOGRAMBIN

If you choose to have the statistics event monitor data written to regular tables, then the following three additional logical data groups are available:

- EVENT_SCMETRICS
- EVENT_WLMETRICS
- The CONTROL logical data group is used to generate metadata about the event monitor itself

Information written to tables for a statistics event monitor:

When you choose WRITE TO TABLE as the output type for a statistics event monitor, a number of tables are produced. Each table contains monitor elements from one or more logical data groups.

The following table contains a list of the logical data groups and associated tables used by the statistics event monitor. The default table name for each logical data group is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor when it was created by using the CREATE EVENT MONITOR statement. The table names shown are the default table names when a name is not specified as part of the CREATE EVENT MONITOR statement.

Table 53. Tables produced by STATISTICS write-to-table event monitors

Default table name	Logical data groups reported
<code>QSTATS_evmon-name</code>	"event_qstats logical data group" on page 67
<code>SCSTATS_evmon-name</code>	"event_scstats logical data group" on page 76
<code>HISTOGRAMBIN_evmon-name</code>	"event_histogrambin logical data group" on page 67
<code>WCSTATS_evmon-name</code>	"event_wcstats logical data group" on page 82
<code>WLSTATS_evmon-name</code>	"event_wlstats logical data group" on page 90
<code>SCMETRICS_evmon-name</code>	"event_scmetrics logical data group" on page 68
<code>WLMETRICS_evmon-name</code>	"event_wlmetrics logical data group" on page 83

Table 53. Tables produced by STATISTICS write-to-table event monitors (continued)

Default table name	Logical data groups reported
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. You can refer to the reference topics for those statements for details.

Tables produced

Table 54. Information returned for a statistics event monitor: Default table name: QSTATS_ *evmon-name*

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
LAST_WLM_RESET	TIMESTAMP	last_wlm_reset - Time of last reset
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
QUEUE_ASSIGNMENTS_TOTAL	BIGINT	queue_assignments_total - Queue assignments total
QUEUE_SIZE_TOP	INTEGER	queue_size_top - Queue size top
QUEUE_TIME_TOTAL	BIGINT	queue_time_total - Queue time total
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp
THRESHOLD_DOMAIN	VARCHAR(64)	threshold_domain - Threshold domain
THRESHOLD_NAME	VARCHAR(128)	threshold_name - Threshold name
THRESHOLD_PREDICATE	VARCHAR(64)	threshold_predicate - Threshold predicate
THRESHOLDID	INTEGER	thresholdid - Threshold ID
WORK_ACTION_SET_NAME	VARCHAR(128)	work_action_set_name - Work action set name
WORK_CLASS_NAME	VARCHAR(128)	work_class_name - Work class name

Table 55. Information returned for a statistics event monitor: Table name: SCSTATS_ *evmon-name*

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
ACT_CPU_TIME_TOP	BIGINT	act_cpu_time_top - Activity CPU time top
ACT_REMAPPED_IN	BIGINT	act_remapped_in - Activities remapped in
ACT_REMAPPED_OUT	BIGINT	act_remapped_out - Activities remapped out
ACT_ROWS_READ_TOP	BIGINT	act_rows_read_top - Activity rows read top
ACT_THROUGHPUT	BIGINT	act_throughput - Activity throughput
AGG_TEMP_TABLESPACE_TOP	BIGINT	agg_temp_tablespace_top - Aggregate temporary table space top
APP_ACT_ABORTED_TOTAL	BIGINT	app_act_aborted_total - Total failed external coordinator activities

Table 55. Information returned for a statistics event monitor: Table name: SCSTATS_evmon-name (continued)

Column name	Data type	Description
APP_ACT_COMPLETED_TOTAL	BIGINT	app_act_completed_total - Total successful external coordinator activities
APP_ACT_REJECTED_TOTAL	BIGINT	app_act_rejected_total - Total rejected external coordinator activities
CONCURRENT_ACT_TOP	INTEGER	concurrent_act_top - Concurrent activity top
CONCURRENT_CONNECTION_TOP	INTEGER	concurrent_connection_top - Concurrent connection top
CONCURRENT_WLO_TOP	INTEGER	concurrent_wlo_top - Concurrent workload occurrences top
COORD_ACT_ABORTED_TOTAL	BIGINT	coord_act_aborted_total - Coordinator activities aborted total
COORD_ACT_COMPLETED_TOTAL	BIGINT	coord_act_completed_total - Coordinator activities completed total
COORD_ACT_EST_COST_AVG	BIGINT	coord_act_est_cost_avg - Coordinator activity estimated cost average
COORD_ACT_EXEC_TIME_AVG	BIGINT	coord_act_exec_time_avg - Coordinator activities execution time average
COORD_ACT_INTERARRIVAL_TIME_AVG	BIGINT	coord_act_interarrival_time_avg - Coordinator activity arrival time average
COORD_ACT_LIFETIME_AVG	BIGINT	coord_act_lifetime_avg - Coordinator activity lifetime average
COORD_ACT_LIFETIME_TOP	BIGINT	coord_act_lifetime_top - Coordinator activity lifetime top
COORD_ACT_QUEUE_TIME_AVG	BIGINT	coord_act_queue_time_avg - Coordinator activity queue time average
COORD_ACT_REJECTED_TOTAL	BIGINT	coord_act_rejected_total - Coordinator activities rejected total
COST_ESTIMATE_TOP	BIGINT	cost_estimate_top - Cost estimate top
CPU_UTILIZATION	BIGINT	cpu_utilization - CPU utilization
DETAILS_XML	BLOB	details_xml - Details XMLMetrics reported in this document for the default subclass SYSDEFAULTSUBCLASS under the superclass SYSDEFAULTSYSTEMCLASS have a value of 0.
LAST_WLM_RESET	TIMESTAMP	last_wlm_reset - Time of last reset
MEMBER	SMALLINT	member - Database member
METRICS	BLOB	metrics - Metrics
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
REQUEST_EXEC_TIME_AVG	BIGINT	request_exec_time_avg - Request execution time average
ROWS_RETURNED_TOP	BIGINT	rows_returned_top - Actual rows returned top
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
SERVICE_SUBCLASS_NAME	VARCHAR(128)	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR(128)	service_superclass_name - Service superclass name
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp

Table 55. Information returned for a statistics event monitor: Table name: SCSTATS_evmon-name (continued)

Column name	Data type	Description
TEMP_TABLESPACE_TOP	BIGINT	temp_tablespace_top - Temporary table space top
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
UOW_COMPLETED_TOTAL	BIGINT	uow_completed_total - Total completed units of work
UOW_LIFETIME_AVG	BIGINT	uow_lifetime_avg - Unit of work lifetime average
UOW_THROUGHPUT	BIGINT	uow_throughput - Unit of work throughput
UOW_TOTAL_TIME_TOP	BIGINT	uow_total_time_top - UOW total time top

Table 56. Information returned for a statistics event monitor: Table name: HISTOGRAMBIN_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
BIN_ID	INTEGER	bin_id - Histogram bin identifier
BOTTOM	BIGINT	bottom - Histogram bin bottom
HISTOGRAM_TYPE	VARCHAR(64)	histogram_type - Histogram type
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
NUMBER_IN_BIN	BIGINT	number_in_bin - Number in bin
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp
TOP	BIGINT	top - Histogram bin top
WORK_ACTION_SET_ID	INTEGER	work_action_set_id - Work action set ID
WORK_CLASS_ID	INTEGER	work_class_id - Work class ID
WORKLOAD_ID	INTEGER	workload_id - Workload ID

Table 57. Information returned for a statistics event monitor: Table name: WCSTATS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
ACT_CPU_TIME_TOP	BIGINT	act_cpu_time_top - Activity CPU time top
ACT_ROWS_READ_TOP	BIGINT	act_rows_read_top - Activity rows read top
ACT_TOTAL	BIGINT	act_total - Activities total
COORD_ACT_EST_COST_AVG	BIGINT	coord_act_est_cost_avg - Coordinator activity estimated cost average
COORD_ACT_EXEC_TIME_AVG	BIGINT	coord_act_exec_time_avg - Coordinator activities execution time average
COORD_ACT_INTERARRIVAL_TIME_AVG	BIGINT	coord_act_exec_time_avg - Coordinator activities execution time average
COORD_ACT_LIFETIME_AVG	BIGINT	coord_act_lifetime_avg - Coordinator activity lifetime average

Table 57. Information returned for a statistics event monitor: Table name: WCSTATS_evmon-name (continued)

Column name	Data type	Description
COORD_ACT_LIFETIME_TOP	BIGINT	coord_act_lifetime_top - Coordinator activity lifetime top
COORD_ACT_QUEUE_TIME_AVG	BIGINT	coord_act_queue_time_avg - Coordinator activity queue time average
COST_ESTIMATE_TOP	BIGINT	cost_estimate_top - Cost estimate top
LAST_WLM_RESET	TIMESTAMP	last_wlm_reset - Time of last reset
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
ROWS_RETURNED_TOP	BIGINT	rows_returned_top - Actual rows returned top
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp
TEMP_TABLESPACE_TOP	BIGINT	temp_tablespace_top - Temporary table space top
WORK_ACTION_SET_ID	INTEGER	work_action_set_id - Work action set ID
WORK_ACTION_SET_NAME	VARCHAR(128)	work_action_set_name - Work action set name
WORK_CLASS_ID	INTEGER	work_class_id - Work class ID
WORK_CLASS_NAME	VARCHAR(128)	work_class_name - Work class name

Table 58. Information returned for a statistics event monitor: Table name: WLSTATS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	“partition_key - Partitioning key monitor element” on page 1105
ACT_CPU_TIME_TOP	BIGINT	act_cpu_time_top - Activity CPU time top
ACT_ROWS_READ_TOP	BIGINT	act_rows_read_top - Activity rows read top
ACT_THROUGHPUT	BIGINT	act_throughput - Activity throughput
APP_ACT_ABORTED_TOTAL	BIGINT	app_act_aborted_total - Total failed external coordinator activities
APP_ACT_COMPLETED_TOTAL	BIGINT	app_act_completed_total - Total successful external coordinator activities
APP_ACT_REJECTED_TOTAL	BIGINT	app_act_rejected_total - Total rejected external coordinator activities
CONCURRENT_WLO_ACT_TOP	INTEGER	concurrent_wlo_act_top - Concurrent WLO activity top
CONCURRENT_WLO_TOP	INTEGER	concurrent_wlo_top - Concurrent workload occurrences top
COORD_ACT_ABORTED_TOTAL	BIGINT	coord_act_aborted_total - Coordinator activities aborted total
COORD_ACT_COMPLETED_TOTAL	BIGINT	coord_act_completed_total - Coordinator activities completed total
COORD_ACT_EST_COST_AVG	BIGINT	coord_act_est_cost_avg - Coordinator activity estimated cost average
COORD_ACT_EXEC_TIME_AVG	BIGINT	coord_act_exec_time_avg - Coordinator activities execution time average
COORD_ACT_INTERARRIVAL_TIME_AVG	BIGINT	“coord_act_interarrival_time_avg - Coordinator activity arrival time average monitor element” on page 809

Table 58. Information returned for a statistics event monitor: Table name: WLSTATS_evmon-name (continued)

Column name	Data type	Description
COORD_ACT_LIFETIME_AVG	BIGINT	coord_act_lifetime_avg - Coordinator activity lifetime average
COORD_ACT_LIFETIME_TOP	BIGINT	coord_act_lifetime_top - Coordinator activity lifetime top
COORD_ACT_QUEUE_TIME_AVG	BIGINT	coord_act_queue_time_avg - Coordinator activity queue time average
COORD_ACT_REJECTED_TOTAL	BIGINT	coord_act_rejected_total - Coordinator activities rejected total
COST_ESTIMATE_TOP	BIGINT	cost_estimate_top - Cost estimate top
CPU_UTILIZATION	BIGINT	cpu_utilization - CPU utilization
DETAILS_XML	BLOB	details_xml - Details XML
LAST_WLM_RESET	TIMESTAMP	last_wlm_reset - Time of last reset
LOCK_WAIT_TIME_GLOBAL_TOP	BIGINT	lock_wait_time_global_top - Top global lock wait time
LOCK_WAIT_TIME_TOP	BIGINT	lock_wait_time_top - Lock wait time top
MEMBER	SMALLINT	member - Database member
METRICS	BLOB	metrics - Metrics
MON_INTERVAL_ID	BIGINT	mon_interval_id - Monitor interval identifier
ROWS_RETURNED_TOP	BIGINT	rows_returned_top - Actual rows returned top
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp
TEMP_TABLESPACE_TOP	BIGINT	temp_tablespace_top - Temporary table space top
TOTAL_CPU_TIME	BIGINT	total_cpu_time - Total CPU time
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	total_disp_run_queue_time - Total dispatcher run queue time
UOW_COMPLETED_TOTAL	BIGINT	uow_completed_total - Total completed units of work
UOW_LIFETIME_AVG	BIGINT	uow_lifetime_avg - Unit of work lifetime average
UOW_THROUGHPUT	BIGINT	uow_throughput - Unit of work throughput
UOW_TOTAL_TIME_TOP	BIGINT	uow_total_time_top - UOW total time top
WLO_COMPLETED_TOTAL	BIGINT	wlo_completed_total - Workload occurrences completed total
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_NAME	VARCHAR(128)	workload_name - Workload name

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
SERVICE_CLASS_ID	INTEGER	service_class_id - Service class ID
SERVICE_SUBCLASS_NAME	VARCHAR	service_subclass_name - Service subclass name
SERVICE_SUPERCLASS_NAME	VARCHAR	service_superclass_name - Service superclass name
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
WLM_QUEUE_TIME_TOTAL	BIGINT	"wlm_queue_time_total - Workload manager total queue time monitor element" on page 1538
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	"wlm_queue_assignments_total - Workload manager total queue assignments monitor element" on page 1537
FCM_TQ_RECV_WAIT_TIME	BIGINT	"fcm_tq_recv_wait_time - FCM table queue received wait time monitor element" on page 913
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	"fcm_message_recv_wait_time - FCM message received wait time monitor element" on page 894
FCM_TQ_SEND_WAIT_TIME	BIGINT	"fcm_tq_send_wait_time - FCM table queue send wait time monitor element" on page 917
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	"fcm_message_send_wait_time - FCM message send wait time monitor element" on page 899
AGENT_WAIT_TIME	BIGINT	"agent_wait_time - Agent wait time monitor element" on page 715
AGENT_WAITS_TOTAL	BIGINT	"agent_waits_total - Total agent waits monitor element" on page 716
LOCK_WAIT_TIME	BIGINT	"lock_wait_time - Time waited on locks monitor element" on page 1009
LOCK_WAITS	BIGINT	"lock_waits - Lock waits monitor element" on page 1014
DIRECT_READ_TIME	BIGINT	"direct_read_time - Direct read time monitor element" on page 860
DIRECT_READ_REQS	BIGINT	"direct_read_reqs - Direct read requests monitor element" on page 858
DIRECT_WRITE_TIME	BIGINT	"direct_write_time - Direct write time monitor element" on page 866
DIRECT_WRITE_REQS	BIGINT	"direct_write_reqs - Direct write requests monitor element" on page 864
LOG_BUFFER_WAIT_TIME	BIGINT	"log_buffer_wait_time - Log buffer wait time monitor element" on page 1019
NUM_LOG_BUFFER_FULL	BIGINT	"num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element" on page 1063
LOG_DISK_WAIT_TIME	BIGINT	"log_disk_wait_time - Log disk wait time monitor element" on page 1021
LOG_DISK_WAITS_TOTAL	BIGINT	"log_disk_waits_total - Total log disk waits monitor element" on page 1022
TCPIP_RECV_WAIT_TIME	BIGINT	"tcpip_recv_wait_time - TCP/IP received wait time monitor element" on page 1402
TCPIP_RECVS_TOTAL	BIGINT	"tcpip_recvs_total - TCP/IP receives total monitor element" on page 1403
CLIENT_IDLE_WAIT_TIME	BIGINT	"client_idle_wait_time - Client idle wait time monitor element" on page 776
IPC_RECV_WAIT_TIME	BIGINT	"ipc_recv_wait_time - Interprocess communication received wait time monitor element" on page 971

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
IPC_RECVS_TOTAL	BIGINT	"ipc_recvs_total - Interprocess communication receives total monitor element" on page 972
IPC_SEND_WAIT_TIME	BIGINT	"ipc_send_wait_time - Interprocess communication send wait time monitor element" on page 974
IPC_SENDS_TOTAL	BIGINT	"ipc_sends_total - Interprocess communication send total monitor element" on page 975
TCPIP_SEND_WAIT_TIME	BIGINT	"tcpip_send_wait_time - TCP/IP send wait time monitor element" on page 1405
TCPIP_SENDS_TOTAL	BIGINT	"tcpip_sends_total - TCP/IP sends total monitor element" on page 1406
POOL_WRITE_TIME	BIGINT	"pool_write_time - Total buffer pool physical write time monitor element" on page 1223
POOL_READ_TIME	BIGINT	"pool_read_time - Total buffer pool physical read time monitor element" on page 1207
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	"audit_file_write_wait_time - Audit file write wait time monitor element" on page 741
AUDIT_FILE_WRITES_TOTAL	BIGINT	"audit_file_writes_total - Total audit files written monitor element" on page 743
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	"audit_subsystem_wait_time - Audit subsystem wait time monitor element" on page 745
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	"audit_subsystem_waits_total - Total audit subsystem waits monitor element" on page 747
DIAGLOG_WRITE_WAIT_TIME	BIGINT	"diaglog_write_wait_time - Diagnostic log file write wait time monitor element" on page 854
DIAGLOG_WRITES_TOTAL	BIGINT	"diaglog_writes_total - Total diagnostic log file writes monitor element" on page 856
FCM_SEND_WAIT_TIME	BIGINT	"fcm_send_wait_time - FCM send wait time monitor element" on page 908
FCM_RECV_WAIT_TIME	BIGINT	"fcm_recv_wait_time - FCM received wait time monitor element" on page 904
TOTAL_WAIT_TIME	BIGINT	"total_wait_time - Total wait time monitor element" on page 1501
RQSTS_COMPLETED_TOTAL	BIGINT	"rqsts_completed_total - Total requests completed monitor element" on page 1298
TOTAL_RQST_TIME	BIGINT	"total_rqst_time - Total request time monitor element" on page 1474
APP_RQSTS_COMPLETED_TOTAL	BIGINT	"app_rqsts_completed_total - Total application requests completed monitor element" on page 726
TOTAL_APP_RQST_TIME	BIGINT	"total_app_rqst_time - Total application request time monitor element" on page 1420
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	"total_section_sort_proc_time - Total section sort processing time monitor element" on page 1480
TOTAL_SECTION_SORTS	BIGINT	"total_section_sorts - Total section sorts monitor element" on page 1484
TOTAL_SECTION_SORT_TIME	BIGINT	"total_section_sort_time - Total section sort time monitor element" on page 1482

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
ROWS_READ	BIGINT	"rows_read - Rows read monitor element" on page 1292
ROWS_MODIFIED	BIGINT	"rows_modified - Rows modified monitor element" on page 1290
POOL_DATA_L_READS	BIGINT	"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139
POOL_INDEX_L_READS	BIGINT	"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173
POOL_TEMP_DATA_L_READS	BIGINT	"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210
POOL_TEMP_INDEX_L_READS	BIGINT	"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214
POOL_XDA_L_READS	BIGINT	"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
POOL_TEMP_XDA_L_READS	BIGINT	"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218
TOTAL_CPU_TIME	BIGINT	"total_cpu_time - Total CPU time monitor element" on page 1436
ACT_COMPLETED_TOTAL	BIGINT	"act_completed_total - Total completed activities monitor element" on page 698
POOL_DATA_P_READS	BIGINT	"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142
POOL_TEMP_DATA_P_READS	BIGINT	"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212
POOL_XDA_P_READS	BIGINT	"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
POOL_TEMP_XDA_P_READS	BIGINT	"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220
POOL_INDEX_P_READS	BIGINT	"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175
POOL_TEMP_INDEX_P_READS	BIGINT	"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216
POOL_DATA_WRITES	BIGINT	"pool_data_writes - Buffer pool data writes monitor element" on page 1144
POOL_XDA_WRITES	BIGINT	"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238
POOL_INDEX_WRITES	BIGINT	"pool_index_writes - Buffer pool index writes monitor element" on page 1177
DIRECT_READS	BIGINT	"direct_reads - Direct reads from database monitor element" on page 862
DIRECT_WRITES	BIGINT	"direct_writes - Direct writes to database monitor element" on page 868
ROWS_RETURNED	BIGINT	"rows_returned - Rows returned monitor element" on page 1294

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
DEADLOCKS	BIGINT	"deadlocks - Deadlocks detected monitor element" on page 849
LOCK_TIMEOUTS	BIGINT	"lock_timeouts - Number of lock timeouts monitor element" on page 1005
LOCK_ESCALS	BIGINT	"lock_escalations - Number of lock escalations monitor element" on page 989
FCM_SENDS_TOTAL	BIGINT	"fcm_sends_total - FCM sends total monitor element" on page 910
FCM_RECVS_TOTAL	BIGINT	"fcm_recvs_total - FCM receives total monitor element" on page 905
FCM_SEND_VOLUME	BIGINT	"fcm_send_volume - FCM send volume monitor element" on page 907
FCM_RECV_VOLUME	BIGINT	"fcm_recv_volume - FCM received volume monitor element" on page 902
FCM_MESSAGE_SENDS_TOTAL	BIGINT	"fcm_message_sends_total - Total FCM message sends monitor element" on page 901
FCM_MESSAGE_RECVS_TOTAL	BIGINT	"fcm_message_recvs_total - Total FCM message receives monitor element" on page 896
FCM_MESSAGE_SEND_VOLUME	BIGINT	"fcm_message_send_volume - FCM message send volume monitor element" on page 898
FCM_MESSAGE_RECV_VOLUME	BIGINT	"fcm_message_recv_volume - FCM message received volume monitor element" on page 893
FCM_TQ_SENDS_TOTAL	BIGINT	"fcm_tq_sends_total - FCM table queue send total monitor element" on page 919
FCM_TQ_RECVS_TOTAL	BIGINT	"fcm_tq_recvs_total - FCM table queue receives total monitor element" on page 914
FCM_TQ_SEND_VOLUME	BIGINT	"fcm_tq_send_volume - FCM table queue send volume monitor element" on page 916
FCM_TQ_RECV_VOLUME	BIGINT	"fcm_tq_recv_volume - FCM table queue received volume monitor element" on page 911
TQ_TOT_SEND_SPILLS	BIGINT	"tq_tot_send_spills - Total number of table queue buffers overflowed monitor element" on page 1511
TCPIP_SEND_VOLUME	BIGINT	"tcpip_send_volume - TCP/IP send volume monitor element" on page 1404
TCPIP_RECV_VOLUME	BIGINT	"tcpip_recv_volume - TCP/IP received volume monitor element" on page 1401
IPC_SEND_VOLUME	BIGINT	"ipc_send_volume - Interprocess communication send volume monitor element" on page 973
IPC_RECV_VOLUME	BIGINT	"ipc_recv_volume - Interprocess communication received volume monitor element" on page 970
POST_THRESHOLD_SORTS	BIGINT	"post_threshold_sorts - Post threshold sorts monitor element" on page 1248
POST_SHRTHRESHOLD_SORTS	BIGINT	"post_shrthreshold_sorts - Post shared threshold sorts monitor element" on page 1241
SORT_OVERFLOWS	BIGINT	"sort_overflows - Sort overflows monitor element" on page 1326

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
AUDIT_EVENTS_TOTAL	BIGINT	"audit_events_total - Total audit events monitor element" on page 740
TOTAL_RQST_MAPPED_IN	BIGINT	"total_rqst_mapped_in - Total request mapped-in monitor element" on page 1473
TOTAL_RQST_MAPPED_OUT	BIGINT	"total_rqst_mapped_out - Total request mapped-out monitor element" on page 1473
ACT_REJECTED_TOTAL	BIGINT	"act_rejected_total - Total rejected activities monitor element" on page 700
ACT_ABORTED_TOTAL	BIGINT	"act_aborted_total - Total aborted activities monitor element" on page 696
TOTAL_SORTS	BIGINT	"total_sorts - Total sorts monitor element" on page 1488
TOTAL_ROUTINE_TIME	BIGINT	"total_routine_time - Total routine time monitor element" on page 1468
TOTAL_COMPILE_PROC_TIME	BIGINT	"total_compile_proc_time - Total compile processing time monitor element" on page 1428
TOTAL_COMPILATIONS	BIGINT	"total_compilations - Total compilations monitor element" on page 1427
TOTAL_COMPILE_TIME	BIGINT	"total_compile_time - Total compile time monitor element" on page 1429
TOTAL_IMPLICIT_COMPILE_PROC_TIME	BIGINT	"total_implicit_compile_proc_time - Total implicit compile processing time monitor element" on page 1448
TOTAL_IMPLICIT_COMPILATIONS	BIGINT	"total_implicit_compilations - Total implicit complications monitor element" on page 1446
TOTAL_IMPLICIT_COMPILE_TIME	BIGINT	"total_implicit_compile_time - Total implicit compile time monitor element" on page 1449
TOTAL_RUNSTATS_PROC_TIME	BIGINT	"total_runstats_proc_time - Total runtime statistics processing time monitor element" on page 1476
TOTAL_RUNSTATS	BIGINT	"total_runstats - Total runtime statistics monitor element" on page 1475
TOTAL_RUNSTATS_TIME	BIGINT	"total_runstats_time - Total runtime statistics time monitor element" on page 1477
TOTAL_REORG_PROC_TIME	BIGINT	"total_reorg_proc_time - Total reorganization processing time monitor element" on page 1460
TOTAL_REORGS	BIGINT	"total_reorgs - Total reorganizations monitor element" on page 1462
TOTAL_REORG_TIME	BIGINT	"total_reorg_time - Total reorganization time monitor element" on page 1461
TOTAL_LOAD_PROC_TIME	BIGINT	"total_load_proc_time - Total load processing time monitor element" on page 1450
TOTAL_LOADS	BIGINT	"total_loads - Total loads monitor element" on page 1452
TOTAL_LOAD_TIME	BIGINT	"total_load_time - Total load time monitor element" on page 1451

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_SECTION_PROC_TIME	BIGINT	"total_section_proc_time - Total section processing time monitor element" on page 1479
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	"total_app_section_executions - Total application section executions monitor element" on page 1422
TOTAL_SECTION_TIME	BIGINT	"total_section_time - Total section time monitor element" on page 1485
TOTAL_COMMIT_PROC_TIME	BIGINT	"total_commit_proc_time - Total commits processing time monitor element" on page 1424
TOTAL_APP_COMMITS	BIGINT	"total_app_commits - Total application commits monitor elements" on page 1418
TOTAL_COMMIT_TIME	BIGINT	"total_commit_time - Total commit time monitor element" on page 1426
TOTAL_ROLLBACK_PROC_TIME	BIGINT	"total_rollback_proc_time - Total rollback processing time monitor element" on page 1463
TOTAL_APP_ROLLBACKS	BIGINT	"total_app_rollbacks - Total application rollbacks monitor element" on page 1419
TOTAL_ROLLBACK_TIME	BIGINT	"total_rollback_time - Total rollback time monitor element" on page 1464
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	"total_routine_user_code_proc_time - Total routine user code processing time monitor element" on page 1470
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	"total_routine_user_code_time - Total routine user code time monitor element" on page 1471
THRESH_VIOLATIONS	BIGINT	"thresh_violations - Number of threshold violations monitor element" on page 1408
NUM_LW_THRESH_EXCEEDED	BIGINT	"num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element" on page 1067
TOTAL_ROUTINE_INVOCATIONS	BIGINT	"total_routine_invocations - Total routine invocations monitor elements" on page 1465
INT_COMMITS	BIGINT	"int_commits - Internal commits monitor element" on page 962
INT_ROLLBACKS	BIGINT	"int_rollbacks - Internal rollbacks monitor element" on page 965
CAT_CACHE_INSERTS	BIGINT	"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
CAT_CACHE_LOOKUPS	BIGINT	"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
PKG_CACHE_INSERTS	BIGINT	"pkg_cache_inserts - Package cache inserts monitor element" on page 1109
PKG_CACHE_LOOKUPS	BIGINT	"pkg_cache_lookups - Package cache lookups monitor element" on page 1111
ACT_RQSTS_TOTAL	BIGINT	"act_rqsts_total - Total activity requests monitor elements" on page 702
TOTAL_ACT_WAIT_TIME	BIGINT	"total_act_wait_time - Total activity wait time monitor element" on page 1417

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_ACT_TIME	BIGINT	"total_act_time - Total activity time monitor element" on page 1415
LOCK_WAIT_TIME_GLOBAL	BIGINT	"lock_wait_time_global - Lock wait time global monitor element" on page 1011
LOCK_WAITS_GLOBAL	BIGINT	"lock_waits_global - Lock waits global monitor element" on page 1016
RECLAIM_WAIT_TIME	BIGINT	"reclaim_wait_time - Reclaim wait time monitor element" on page 1269
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	"spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element" on page 1339
LOCK_TIMEOUTS_GLOBAL	BIGINT	"lock_timeouts_global - Lock timeouts global monitor element" on page 1006
LOCK_ESCALS_MAXLOCKS	BIGINT	"lock_escals_maxlocks - Number of maxlocks lock escalations monitor element" on page 994
LOCK_ESCALS_LOCKLIST	BIGINT	"lock_escals_locklist - Number of locklist lock escalations monitor element" on page 993
LOCK_ESCALS_GLOBAL	BIGINT	"lock_escals_global - Number of global lock escalations monitor element" on page 991
CF_WAIT_TIME	BIGINT	"cf_wait_time - cluster caching facility wait time monitor element" on page 767
CF_WAITS	BIGINT	"cf_waits - Number of cluster caching facility waits monitor element" on page 767
POOL_DATA_GBP_L_READS	BIGINT	"pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element" on page 1134
POOL_DATA_GBP_P_READS	BIGINT	"pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element" on page 1136
POOL_DATA_LBP_PAGES_FOUND	BIGINT	"pool_data_lbp_pages_found - Local buffer pool found data pages monitor element" on page 1138
POOL_DATA_GBP_INVALID_PAGES	BIGINT	"pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element" on page 1133
POOL_INDEX_GBP_L_READS	BIGINT	"pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element" on page 1168
POOL_INDEX_GBP_P_READS	BIGINT	"pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements" on page 1169
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	"pool_index_lbp_pages_found - Local buffer pool index pages found monitor element" on page 1171
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	"pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element" on page 1166
POOL_XDA_GBP_L_READS	BIGINT	"pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element" on page 1228
POOL_XDA_GBP_P_READS	BIGINT	"pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element" on page 1230

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
POOL_XDA_LBP_PAGES_FOUND	BIGINT	"pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element" on page 1234
POOL_XDA_GBP_INVALID_PAGES	BIGINT	"pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element" on page 1226
EVMON_WAIT_TIME	BIGINT	"evmon_wait_time - Event monitor wait time monitor element" on page 883
EVMON_WAITS_TOTAL	BIGINT	"evmon_waits_total - Event monitor total waits monitor element" on page 885
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	"total_extended_latch_wait_time - Total extended latch wait time monitor element" on page 1441
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	"total_extended_latch_waits - Total extended latch waits monitor element" on page 1443
TOTAL_STATS_FABRICATION_PROC_TIME	BIGINT	"total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element" on page 1490
TOTAL_STATS_FABRICATIONS	BIGINT	"total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492
TOTAL_STATS_FABRICATION_TIME	BIGINT	"total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491
TOTAL_SYNC_RUNSTATS_PROC_TIME	BIGINT	"total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element" on page 1495
TOTAL_SYNC_RUNSTATS	BIGINT	"total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	"total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	"total_disp_run_queue_time - Total dispatcher run queue time monitor element" on page 1439
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	"pool_queued_async_data_reqs - Data prefetch requests monitor element" on page 1183
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	"pool_queued_async_index_reqs - Index prefetch requests monitor element" on page 1187
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	"pool_queued_async_xda_reqs - XDA prefetch requests monitor element" on page 1205
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	"pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces monitor element" on page 1193
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	"pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element" on page 1195
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	"pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces monitor element" on page 1201

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	"pool_queued_async_other_reqs - Other requests handled by prefetchers monitor element" on page 1189
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	"pool_queued_async_data_pages - Data pages prefetch requests monitor element" on page 1181
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	"pool_queued_async_index_pages - Index pages prefetch requests monitor element" on page 1185
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	"pool_queued_async_xda_pages - XDA pages prefetch requests monitor element" on page 1203
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	"pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces monitor element" on page 1191
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	"pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element" on page 1195
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	"pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces monitor element" on page 1199
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	"pool_failed_async_data_reqs - Failed data prefetch requests monitor element" on page 1148
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	"pool_failed_async_index_reqs - Failed index prefetch requests monitor element" on page 1150
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	"pool_failed_async_xda_reqs - Failed XDA prefetch requests monitor element" on page 1161
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	"pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces monitor element" on page 1154
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	"pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces monitor element" on page 1157
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	"pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces monitor element" on page 1159
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	"pool_failed_async_other_reqs - Failed non-prefetch requests monitor element" on page 1153
APP_ACT_COMPLETED_TOTAL	BIGINT	"app_act_completed_total - Total successful external coordinator activities monitor element" on page 723
APP_ACT_ABORTED_TOTAL	BIGINT	"app_act_aborted_total - Total failed external coordinator activities monitor element" on page 722
APP_ACT_REJECTED_TOTAL	BIGINT	"app_act_rejected_total - Total rejected external coordinator activities monitor element" on page 724
TOTAL_PEDS	BIGINT	"total_peds - Total partial early distincts monitor element" on page 1458
DISABLED_PEDS	BIGINT	"disabled_peds - Disabled partial early distincts monitor element" on page 870
POST_THRESHOLD_PEDS	BIGINT	"post_threshold_peds - Partial early distincts threshold monitor element" on page 1246

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_PEAS	BIGINT	"total_peas - Total partial early aggregations monitor element" on page 1455
POST_THRESHOLD_PEAS	BIGINT	"post_threshold_peas - Partial early aggregation threshold monitor element" on page 1243
TQ_SORT_HEAP_REQUESTS	BIGINT	"tq_sort_heap_requests - Table queue sort heap requests monitor element" on page 1509
TQ_SORT_HEAP_REJECTIONS	BIGINT	"tq_sort_heap_rejections - Table queue sort heap rejections monitor element" on page 1507
TOTAL_CONNECT_REQUEST_PROC_TIME	BIGINT	"total_connect_request_proc_time - Total connection or switch user request processing time monitor element" on page 1434
TOTAL_CONNECT_REQUESTS	BIGINT	"total_connect_requests - Connection or switch user requests monitor element" on page 1435
TOTAL_CONNECT_REQUEST_TIME	BIGINT	"total_connect_request_time - Total connection or switch user request time monitor element" on page 1436
TOTAL_CONNECT_AUTHENTICATION_PROC_TIME	BIGINT	"total_connect_authentication_proc_time - Total connection authentication processing time monitor element" on page 1431
TOTAL_CONNECT_AUTHENTIFICATIONS	BIGINT	"total_connect_authentications - Connections or switch user authentications performed monitor element" on page 1432
TOTAL_CONNECT_AUTHENTICATION_TIME	BIGINT	"total_connect_authentication_time - Total connection or switch user authentication request time monitor element" on page 1433
PREFETCH_WAIT_TIME	BIGINT	"prefetch_wait_time - Time waited for prefetch monitor element" on page 1249
PREFETCH_WAITS	BIGINT	"prefetch_waits - Prefetcher wait count monitor element" on page 1251
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225
COMM_EXIT_WAIT_TIME	BIGINT	"comm_exit_wait_time - Communication buffer exit wait time monitor element" on page 784
COMM_EXIT_WAITS	BIGINT	"comm_exit_waits - Communication buffer exit number of waits monitor element" on page 785
FCM_TQ_RECV_WAITS_TOTAL	BIGINT	
FCM_MESSAGE_RECV_WAITS_TOTAL	BIGINT	
FCM_TQ_SEND_WAITS_TOTAL	BIGINT	

Table 59. Information returned for a statistics event monitor: Default table name: SCMETRICS_evmon-name (continued)

Column name	Data type	Description
FCM_MESSAGE_SEND_WAITS_TOTAL	BIGINT	
FCM_SEND_WAITS_TOTAL	BIGINT	
FCM_RECV_WAITS_TOTAL	BIGINT	
IDA_SEND_WAIT_TIME	BIGINT	"ida_send_wait_time - Time spent waiting to send data monitor element" on page 952
IDA_SENDS_TOTAL	BIGINT	"ida_sends_total - Number of times data sent monitor element" on page 953
IDA_SEND_VOLUME	BIGINT	"ida_send_volume - Total data volume sent monitor element" on page 950
IDA_RECV_WAIT_TIME	BIGINT	"ida_recv_wait_time - Time spent waiting to receive data monitor element" on page 947
IDA_RECVS_TOTAL	BIGINT	"ida_recvs_total - Number of times data received monitor element" on page 949
IDA_RECV_VOLUME	BIGINT	"ida_recv_volume - Total data volume received monitor element" on page 946

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
STATISTICS_TIMESTAMP	TIMESTAMP	statistics_timestamp - Statistics timestamp
WORKLOAD_ID	INTEGER	workload_id - Workload ID
WORKLOAD_NAME	VARCHAR	workload_name - Workload name
WLM_QUEUE_TIME_TOTAL	BIGINT	"wlm_queue_time_total - Workload manager total queue time monitor element" on page 1538
WLM_QUEUE_ASSIGNMENTS_TOTAL	BIGINT	"wlm_queue_assignments_total - Workload manager total queue assignments monitor element" on page 1537
FCM_TQ_RECV_WAIT_TIME	BIGINT	"fcm_tq_recv_wait_time - FCM table queue received wait time monitor element" on page 913
FCM_MESSAGE_RECV_WAIT_TIME	BIGINT	"fcm_message_recv_wait_time - FCM message received wait time monitor element" on page 894
FCM_TQ_SEND_WAIT_TIME	BIGINT	"fcm_tq_send_wait_time - FCM table queue send wait time monitor element" on page 917
FCM_MESSAGE_SEND_WAIT_TIME	BIGINT	"fcm_message_send_wait_time - FCM message send wait time monitor element" on page 899
AGENT_WAIT_TIME	BIGINT	"agent_wait_time - Agent wait time monitor element" on page 715
AGENT_WAITS_TOTAL	BIGINT	"agent_waits_total - Total agent waits monitor element" on page 716
LOCK_WAIT_TIME	BIGINT	"lock_wait_time - Time waited on locks monitor element" on page 1009
LOCK_WAITS	BIGINT	"lock_waits - Lock waits monitor element" on page 1014

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
DIRECT_READ_TIME	BIGINT	"direct_read_time - Direct read time monitor element" on page 860
DIRECT_READ_REQS	BIGINT	"direct_read_reqs - Direct read requests monitor element" on page 858
DIRECT_WRITE_TIME	BIGINT	"direct_write_time - Direct write time monitor element" on page 866
DIRECT_WRITE_REQS	BIGINT	"direct_write_reqs - Direct write requests monitor element" on page 864
LOG_BUFFER_WAIT_TIME	BIGINT	"log_buffer_wait_time - Log buffer wait time monitor element" on page 1019
NUM_LOG_BUFFER_FULL	BIGINT	"num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element" on page 1063
LOG_DISK_WAIT_TIME	BIGINT	"log_disk_wait_time - Log disk wait time monitor element" on page 1021
LOG_DISK_WAITS_TOTAL	BIGINT	"log_disk_waits_total - Total log disk waits monitor element" on page 1022
TCPIP_RECV_WAIT_TIME	BIGINT	"tcpip_recv_wait_time - TCP/IP received wait time monitor element" on page 1402
TCPIP_RECVS_TOTAL	BIGINT	"tcpip_recvs_total - TCP/IP receives total monitor element" on page 1403
CLIENT_IDLE_WAIT_TIME	BIGINT	"client_idle_wait_time - Client idle wait time monitor element" on page 776
IPC_RECV_WAIT_TIME	BIGINT	"ipc_recv_wait_time - Interprocess communication received wait time monitor element" on page 971
IPC_RECVS_TOTAL	BIGINT	"ipc_recvs_total - Interprocess communication receives total monitor element" on page 972
IPC_SEND_WAIT_TIME	BIGINT	"ipc_send_wait_time - Interprocess communication send wait time monitor element" on page 974
IPC_SENDS_TOTAL	BIGINT	"ipc_sends_total - Interprocess communication send total monitor element" on page 975
TCPIP_SEND_WAIT_TIME	BIGINT	"tcpip_send_wait_time - TCP/IP send wait time monitor element" on page 1405
TCPIP_SENDS_TOTAL	BIGINT	"tcpip_sends_total - TCP/IP sends total monitor element" on page 1406
POOL_WRITE_TIME	BIGINT	"pool_write_time - Total buffer pool physical write time monitor element" on page 1223
POOL_READ_TIME	BIGINT	"pool_read_time - Total buffer pool physical read time monitor element" on page 1207
AUDIT_FILE_WRITE_WAIT_TIME	BIGINT	"audit_file_write_wait_time - Audit file write wait time monitor element" on page 741
AUDIT_FILE_WRITES_TOTAL	BIGINT	"audit_file_writes_total - Total audit files written monitor element" on page 743
AUDIT_SUBSYSTEM_WAIT_TIME	BIGINT	"audit_subsystem_wait_time - Audit subsystem wait time monitor element" on page 745

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
AUDIT_SUBSYSTEM_WAITS_TOTAL	BIGINT	"audit_subsystem_waits_total - Total audit subsystem waits monitor element" on page 747
DIAGLOG_WRITE_WAIT_TIME	BIGINT	"diaglog_write_wait_time - Diagnostic log file write wait time monitor element" on page 854
DIAGLOG_WRITES_TOTAL	BIGINT	"diaglog_writes_total - Total diagnostic log file writes monitor element" on page 856
FCM_SEND_WAIT_TIME	BIGINT	"fcm_send_wait_time - FCM send wait time monitor element" on page 908
FCM_RECV_WAIT_TIME	BIGINT	"fcm_recv_wait_time - FCM received wait time monitor element" on page 904
TOTAL_WAIT_TIME	BIGINT	"total_wait_time - Total wait time monitor element" on page 1501
RQSTS_COMPLETED_TOTAL	BIGINT	"rqsts_completed_total - Total requests completed monitor element" on page 1298
TOTAL_RQST_TIME	BIGINT	"total_rqst_time - Total request time monitor element" on page 1474
APP_RQSTS_COMPLETED_TOTAL	BIGINT	"app_rqsts_completed_total - Total application requests completed monitor element" on page 726
TOTAL_APP_RQST_TIME	BIGINT	"total_app_rqst_time - Total application request time monitor element" on page 1420
TOTAL_SECTION_SORT_PROC_TIME	BIGINT	"total_section_sort_proc_time - Total section sort processing time monitor element" on page 1480
TOTAL_SECTION_SORTS	BIGINT	"total_section_sorts - Total section sorts monitor element" on page 1484
TOTAL_SECTION_SORT_TIME	BIGINT	"total_section_sort_time - Total section sort time monitor element" on page 1482
ROWS_READ	BIGINT	"rows_read - Rows read monitor element" on page 1292
ROWS_MODIFIED	BIGINT	"rows_modified - Rows modified monitor element" on page 1290
POOL_DATA_L_READS	BIGINT	"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139
POOL_INDEX_L_READS	BIGINT	"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173
POOL_TEMP_DATA_L_READS	BIGINT	"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210
POOL_TEMP_INDEX_L_READS	BIGINT	"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214
POOL_XDA_L_READS	BIGINT	"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
POOL_TEMP_XDA_L_READS	BIGINT	"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218
TOTAL_CPU_TIME	BIGINT	"total_cpu_time - Total CPU time monitor element" on page 1436

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
ACT_COMPLETED_TOTAL	BIGINT	"act_completed_total - Total completed activities monitor element" on page 698
POOL_DATA_P_READS	BIGINT	"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142
POOL_TEMP_DATA_P_READS	BIGINT	"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212
POOL_XDA_P_READS	BIGINT	"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
POOL_TEMP_XDA_P_READS	BIGINT	"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220
POOL_INDEX_P_READS	BIGINT	"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175
POOL_TEMP_INDEX_P_READS	BIGINT	"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216
POOL_DATA_WRITES	BIGINT	"pool_data_writes - Buffer pool data writes monitor element" on page 1144
POOL_XDA_WRITES	BIGINT	"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238
POOL_INDEX_WRITES	BIGINT	"pool_index_writes - Buffer pool index writes monitor element" on page 1177
DIRECT_READS	BIGINT	"direct_reads - Direct reads from database monitor element" on page 862
DIRECT_WRITES	BIGINT	"direct_writes - Direct writes to database monitor element" on page 868
ROWS_RETURNED	BIGINT	"rows_returned - Rows returned monitor element" on page 1294
DEADLOCKS	BIGINT	"deadlocks - Deadlocks detected monitor element" on page 849
LOCK_TIMEOUTS	BIGINT	"lock_timeouts - Number of lock timeouts monitor element" on page 1005
LOCK_ESCALS	BIGINT	"lock_escals - Number of lock escalations monitor element" on page 989
FCM_SENDS_TOTAL	BIGINT	"fcm_sends_total - FCM sends total monitor element" on page 910
FCM_RECVS_TOTAL	BIGINT	"fcm_recvs_total - FCM receives total monitor element" on page 905
FCM_SEND_VOLUME	BIGINT	"fcm_send_volume - FCM send volume monitor element" on page 907
FCM_RECV_VOLUME	BIGINT	"fcm_recv_volume - FCM received volume monitor element" on page 902
FCM_MESSAGE_SENDS_TOTAL	BIGINT	"fcm_message_sends_total - Total FCM message sends monitor element" on page 901
FCM_MESSAGE_RECVS_TOTAL	BIGINT	"fcm_message_recvs_total - Total FCM message receives monitor element" on page 896

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
FCM_MESSAGE_SEND_VOLUME	BIGINT	"fcm_message_send_volume - FCM message send volume monitor element" on page 898
FCM_MESSAGE_RECV_VOLUME	BIGINT	"fcm_message_rcv_volume - FCM message received volume monitor element" on page 893
FCM_TQ_SENDS_TOTAL	BIGINT	"fcm_tq_sends_total - FCM table queue send total monitor element" on page 919
FCM_TQ_RECVS_TOTAL	BIGINT	"fcm_tq_rcvs_total - FCM table queue receives total monitor element" on page 914
FCM_TQ_SEND_VOLUME	BIGINT	"fcm_tq_send_volume - FCM table queue send volume monitor element" on page 916
FCM_TQ_RECV_VOLUME	BIGINT	"fcm_tq_rcv_volume - FCM table queue received volume monitor element" on page 911
TQ_TOT_SEND_SPILLS	BIGINT	"tq_tot_send_spills - Total number of table queue buffers overflowed monitor element" on page 1511
TCPIP_SEND_VOLUME	BIGINT	"tcpip_send_volume - TCP/IP send volume monitor element" on page 1404
TCPIP_RECV_VOLUME	BIGINT	"tcpip_rcv_volume - TCP/IP received volume monitor element" on page 1401
IPC_SEND_VOLUME	BIGINT	"ipc_send_volume - Interprocess communication send volume monitor element" on page 973
IPC_RECV_VOLUME	BIGINT	"ipc_rcv_volume - Interprocess communication received volume monitor element" on page 970
POST_THRESHOLD_SORTS	BIGINT	"post_threshold_sorts - Post threshold sorts monitor element" on page 1248
POST_SHRTHRESHOLD_SORTS	BIGINT	"post_shrthreshold_sorts - Post shared threshold sorts monitor element" on page 1241
SORT_OVERFLOWS	BIGINT	"sort_overflows - Sort overflows monitor element" on page 1326
AUDIT_EVENTS_TOTAL	BIGINT	"audit_events_total - Total audit events monitor element" on page 740
TOTAL_RQST_MAPPED_IN	BIGINT	"total_rqst_mapped_in - Total request mapped-in monitor element" on page 1473
TOTAL_RQST_MAPPED_OUT	BIGINT	"total_rqst_mapped_out - Total request mapped-out monitor element" on page 1473
ACT_REJECTED_TOTAL	BIGINT	"act_rejected_total - Total rejected activities monitor element" on page 700
ACT_ABORTED_TOTAL	BIGINT	"act_aborted_total - Total aborted activities monitor element" on page 696
TOTAL_SORTS	BIGINT	"total_sorts - Total sorts monitor element" on page 1488
TOTAL_ROUTINE_TIME	BIGINT	"total_routine_time - Total routine time monitor element" on page 1468
TOTAL_COMPILE_PROC_TIME	BIGINT	"total_compile_proc_time - Total compile processing time monitor element" on page 1428
TOTAL_COMPILATIONS	BIGINT	"total_compilations - Total compilations monitor element" on page 1427

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_COMPILE_TIME	BIGINT	"total_compile_time - Total compile time monitor element" on page 1429
TOTAL_IMPLICIT_COMPILE_PROC_TIME	BIGINT	"total_implicit_compile_proc_time - Total implicit compile processing time monitor element" on page 1448
TOTAL_IMPLICIT_COMPILATIONS	BIGINT	"total_implicit_compilations - Total implicit complications monitor element" on page 1446
TOTAL_IMPLICIT_COMPILE_TIME	BIGINT	"total_implicit_compile_time - Total implicit compile time monitor element" on page 1449
TOTAL_RUNSTATS_PROC_TIME	BIGINT	"total_runstats_proc_time - Total runtime statistics processing time monitor element" on page 1476
TOTAL_RUNSTATS	BIGINT	"total_runstats - Total runtime statistics monitor element" on page 1475
TOTAL_RUNSTATS_TIME	BIGINT	"total_runstats_time - Total runtime statistics time monitor element" on page 1477
TOTAL_REORG_PROC_TIME	BIGINT	"total_reorg_proc_time - Total reorganization processing time monitor element" on page 1460
TOTAL_REORGS	BIGINT	"total_reorgs - Total reorganizations monitor element" on page 1462
TOTAL_REORG_TIME	BIGINT	"total_reorg_time - Total reorganization time monitor element" on page 1461
TOTAL_LOAD_PROC_TIME	BIGINT	"total_load_proc_time - Total load processing time monitor element" on page 1450
TOTAL_LOADS	BIGINT	"total_loads - Total loads monitor element" on page 1452
TOTAL_LOAD_TIME	BIGINT	"total_load_time - Total load time monitor element" on page 1451
TOTAL_SECTION_PROC_TIME	BIGINT	"total_section_proc_time - Total section processing time monitor element" on page 1479
TOTAL_APP_SECTION_EXECUTIONS	BIGINT	"total_app_section_executions - Total application section executions monitor element" on page 1422
TOTAL_SECTION_TIME	v	"total_section_time - Total section time monitor element" on page 1485
TOTAL_COMMIT_PROC_TIME	BIGINT	"total_commit_proc_time - Total commits processing time monitor element" on page 1424
TOTAL_APP_COMMITS	BIGINT	"total_app_commits - Total application commits monitor elements" on page 1418
TOTAL_COMMIT_TIME	BIGINT	"total_commit_time - Total commit time monitor element" on page 1426
TOTAL_ROLLBACK_PROC_TIME	BIGINT	"total_rollback_proc_time - Total rollback processing time monitor element" on page 1463
TOTAL_APP_ROLLBACKS	BIGINT	"total_app_rollbacks - Total application rollbacks monitor element" on page 1419
TOTAL_ROLLBACK_TIME	BIGINT	"total_rollback_time - Total rollback time monitor element" on page 1464

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_ROUTINE_USER_CODE_PROC_TIME	BIGINT	"total_routine_user_code_proc_time - Total routine user code processing time monitor element" on page 1470
TOTAL_ROUTINE_USER_CODE_TIME	BIGINT	"total_routine_user_code_time - Total routine user code time monitor element" on page 1471
THRESH_VIOLATIONS	BIGINT	"thresh_violations - Number of threshold violations monitor element" on page 1408
NUM_LW_THRESH_EXCEEDED	BIGINT	"num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element" on page 1067
TOTAL_ROUTINE_INVOCATIONS	BIGINT	"total_routine_invocations - Total routine invocations monitor elements" on page 1465
INT_COMMITS	BIGINT	"int_commits - Internal commits monitor element" on page 962
INT_ROLLBACKS	BIGINT	"int_rollbacks - Internal rollbacks monitor element" on page 965
CAT_CACHE_INSERTS	BIGINT	"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
CAT_CACHE_LOOKUPS	BIGINT	"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
PKG_CACHE_INSERTS	BIGINT	"pkg_cache_inserts - Package cache inserts monitor element" on page 1109
PKG_CACHE_LOOKUPS	BIGINT	"pkg_cache_lookups - Package cache lookups monitor element" on page 1111
ACT_RQSTS_TOTAL	BIGINT	"act_rqsts_total - Total activity requests monitor elements" on page 702
TOTAL_ACT_WAIT_TIME	BIGINT	"total_act_wait_time - Total activity wait time monitor element" on page 1417
TOTAL_ACT_TIME	BIGINT	"total_act_time - Total activity time monitor element" on page 1415
LOCK_WAIT_TIME_GLOBAL	BIGINT	"lock_wait_time_global - Lock wait time global monitor element" on page 1011
LOCK_WAITS_GLOBAL	BIGINT	"lock_waits_global - Lock waits global monitor element" on page 1016
RECLAIM_WAIT_TIME	BIGINT	"reclaim_wait_time - Reclaim wait time monitor element" on page 1269
SPACEMAPPAGE_RECLAIM_WAIT_TIME	BIGINT	"spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element" on page 1339
LOCK_TIMEOUTS_GLOBAL	BIGINT	"lock_timeouts_global - Lock timeouts global monitor element" on page 1006
LOCK_ESCALS_MAXLOCKS	BIGINT	"lock_escals_maxlocks - Number of maxlocks lock escalations monitor element" on page 994
LOCK_ESCALS_LOCKLIST	BIGINT	"lock_escals_locklist - Number of locklist lock escalations monitor element" on page 993
LOCK_ESCALS_GLOBAL	BIGINT	"lock_escals_global - Number of global lock escalations monitor element" on page 991

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
CF_WAIT_TIME	BIGINT	"cf_wait_time - cluster caching facility wait time monitor element" on page 767
CF_WAITS	BIGINT	"cf_waits - Number of cluster caching facility waits monitor element" on page 767
POOL_DATA_GBP_L_READS	BIGINT	"pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element" on page 1134
POOL_DATA_GBP_P_READS	BIGINT	"pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element" on page 1136
POOL_DATA_LBP_PAGES_FOUND	BIGINT	"pool_data_lbp_pages_found - Local buffer pool found data pages monitor element" on page 1138
POOL_DATA_GBP_INVALID_PAGES	BIGINT	"pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element" on page 1133
POOL_INDEX_GBP_L_READS	BIGINT	"pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element" on page 1168
POOL_INDEX_GBP_P_READS	BIGINT	"pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements" on page 1169
POOL_INDEX_LBP_PAGES_FOUND	BIGINT	"pool_index_lbp_pages_found - Local buffer pool index pages found monitor element" on page 1171
POOL_INDEX_GBP_INVALID_PAGES	BIGINT	"pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element" on page 1166
POOL_XDA_GBP_L_READS	BIGINT	"pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element" on page 1228
POOL_XDA_GBP_P_READS	BIGINT	"pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element" on page 1230
POOL_XDA_LBP_PAGES_FOUND	BIGINT	"pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element" on page 1234
POOL_XDA_GBP_INVALID_PAGES	BIGINT	"pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element" on page 1226
EVMON_WAIT_TIME	BIGINT	"evmon_wait_time - Event monitor wait time monitor element" on page 883
EVMON_WAITS_TOTAL	BIGINT	"evmon_waits_total - Event monitor total waits monitor element" on page 885
TOTAL_EXTENDED_LATCH_WAIT_TIME	BIGINT	"total_extended_latch_wait_time - Total extended latch wait time monitor element" on page 1441
TOTAL_EXTENDED_LATCH_WAITS	BIGINT	"total_extended_latch_waits - Total extended latch waits monitor element" on page 1443
TOTAL_STATS_FABRICATION_PROC_TIME	BIGINT	"total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element" on page 1490
TOTAL_STATS_FABRICATIONS	BIGINT	"total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_STATS_FABRICATION_TIME	BIGINT	"total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491
TOTAL_SYNC_RUNSTATS_PROC_TIME	BIGINT	"total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element" on page 1495
TOTAL_SYNC_RUNSTATS	BIGINT	"total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496
TOTAL_SYNC_RUNSTATS_TIME	BIGINT	"total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494
TOTAL_DISP_RUN_QUEUE_TIME	BIGINT	"total_disp_run_queue_time - Total dispatcher run queue time monitor element" on page 1439
POOL_QUEUED_ASYNC_DATA_REQS	BIGINT	"pool_queued_async_data_reqs - Data prefetch requests monitor element" on page 1183
POOL_QUEUED_ASYNC_INDEX_REQS	BIGINT	"pool_queued_async_index_reqs - Index prefetch requests monitor element" on page 1187
POOL_QUEUED_ASYNC_XDA_REQS	BIGINT	"pool_queued_async_xda_reqs - XDA prefetch requests monitor element" on page 1205
POOL_QUEUED_ASYNC_TEMP_DATA_REQS	BIGINT	"pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces monitor element" on page 1193
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS	BIGINT	"pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element" on page 1195
POOL_QUEUED_ASYNC_TEMP_XDA_REQS	BIGINT	"pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces monitor element" on page 1201
POOL_QUEUED_ASYNC_OTHER_REQS	BIGINT	"pool_queued_async_other_reqs - Other requests handled by prefetchers monitor element" on page 1189
POOL_QUEUED_ASYNC_DATA_PAGES	BIGINT	"pool_queued_async_data_pages - Data pages prefetch requests monitor element" on page 1181
POOL_QUEUED_ASYNC_INDEX_PAGES	BIGINT	"pool_queued_async_index_pages - Index pages prefetch requests monitor element" on page 1185
POOL_QUEUED_ASYNC_XDA_PAGES	BIGINT	"pool_queued_async_xda_pages - XDA pages prefetch requests monitor element" on page 1203
POOL_QUEUED_ASYNC_TEMP_DATA_PAGES	BIGINT	"pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces monitor element" on page 1191
POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES	BIGINT	"pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element" on page 1195
POOL_QUEUED_ASYNC_TEMP_XDA_PAGES	BIGINT	"pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces monitor element" on page 1199
POOL_FAILED_ASYNC_DATA_REQS	BIGINT	"pool_failed_async_data_reqs - Failed data prefetch requests monitor element" on page 1148

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
POOL_FAILED_ASYNC_INDEX_REQS	BIGINT	"pool_failed_async_index_reqs - Failed index prefetch requests monitor element" on page 1150
POOL_FAILED_ASYNC_XDA_REQS	BIGINT	"pool_failed_async_xda_reqs - Failed XDA prefetch requests monitor element" on page 1161
POOL_FAILED_ASYNC_TEMP_DATA_REQS	BIGINT	"pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces monitor element" on page 1154
POOL_FAILED_ASYNC_TEMP_INDEX_REQS	BIGINT	"pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces monitor element" on page 1157
POOL_FAILED_ASYNC_TEMP_XDA_REQS	BIGINT	"pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces monitor element" on page 1159
POOL_FAILED_ASYNC_OTHER_REQS	BIGINT	"pool_failed_async_other_reqs - Failed non-prefetch requests monitor element" on page 1153
APP_ACT_COMPLETED_TOTAL	BIGINT	"app_act_completed_total - Total successful external coordinator activities monitor element" on page 723
APP_ACT_ABORTED_TOTAL	BIGINT	"app_act_aborted_total - Total failed external coordinator activities monitor element" on page 722
APP_ACT_REJECTED_TOTAL	BIGINT	"app_act_rejected_total - Total rejected external coordinator activities monitor element" on page 724
TOTAL_PEDS	BIGINT	"total_peds - Total partial early distincts monitor element" on page 1458
DISABLED_PEDS	BIGINT	"disabled_peds - Disabled partial early distincts monitor element" on page 870
POST_THRESHOLD_PEDS	BIGINT	"post_threshold_peds - Partial early distincts threshold monitor element" on page 1246
TOTAL_PEAS	BIGINT	"total_peas - Total partial early aggregations monitor element" on page 1455
POST_THRESHOLD_PEAS	BIGINT	"post_threshold_peas - Partial early aggregation threshold monitor element" on page 1243
TQ_SORT_HEAP_REQUESTS	BIGINT	"tq_sort_heap_requests - Table queue sort heap requests monitor element" on page 1509
TQ_SORT_HEAP_REJECTIONS	BIGINT	"tq_sort_heap_rejections - Table queue sort heap rejections monitor element" on page 1507
TOTAL_CONNECT_REQUEST_PROC_TIME	BIGINT	"total_connect_request_proc_time - Total connection or switch user request processing time monitor element" on page 1434
TOTAL_CONNECT_REQUESTS	BIGINT	"total_connect_requests - Connection or switch user requests monitor element" on page 1435
TOTAL_CONNECT_REQUEST_TIME	BIGINT	"total_connect_request_time - Total connection or switch user request time monitor element" on page 1436
TOTAL_CONNECT_AUTHENTICATION_PROC_TIME	BIGINT	"total_connect_authentication_proc_time - Total connection authentication processing time monitor element" on page 1431

Table 60. Information returned for a statistics event monitor: Default table name: WLMETRICS_evmon-name (continued)

Column name	Data type	Description
TOTAL_CONNECT_AUTHENTICATIONS	BIGINT	"total_connect_authentications - Connections or switch user authentications performed monitor element" on page 1432
TOTAL_CONNECT_AUTHENTICATION_TIME	BIGINT	"total_connect_authentication_time - Total connection or switch user authentication request time monitor element" on page 1433
PREFETCH_WAIT_TIME	BIGINT	"prefetch_wait_time - Time waited for prefetch monitor element" on page 1249
PREFETCH_WAITS	BIGINT	"prefetch_waits - Prefetcher wait count monitor element" on page 1251
POOL_DATA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element" on page 1131
POOL_INDEX_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element" on page 1165
POOL_XDA_GBP_INDEP_PAGES_FOUND_IN_LBP	BIGINT	"pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element" on page 1225
COMM_EXIT_WAIT_TIME	BIGINT	"comm_exit_wait_time - Communication buffer exit wait time monitor element" on page 784
COMM_EXIT_WAITS	BIGINT	"comm_exit_waits - Communication buffer exit number of waits monitor element" on page 785
FCM_TQ_RECV_WAITS_TOTAL	BIGINT	
FCM_MESSAGE_RECV_WAITS_TOTAL	BIGINT	
FCM_TQ_SEND_WAITS_TOTAL	BIGINT	
FCM_MESSAGE_SEND_WAITS_TOTAL	BIGINT	
FCM_SEND_WAITS_TOTAL	BIGINT	
FCM_RECV_WAITS_TOTAL	BIGINT	
IDA_SEND_WAIT_TIME	BIGINT	"ida_send_wait_time - Time spent waiting to send data monitor element" on page 952
IDA_SENDS_TOTAL	BIGINT	"ida_sends_total - Number of times data sent monitor element" on page 953
IDA_SEND_VOLUME	BIGINT	"ida_send_volume - Total data volume sent monitor element" on page 950
IDA_RECV_WAIT_TIME	BIGINT	"ida_recv_wait_time - Time spent waiting to receive data monitor element" on page 947
IDA_RECVS_TOTAL	BIGINT	"ida_recvs_total - Number of times data received monitor element" on page 949
IDA_RECV_VOLUME	BIGINT	"ida_recv_volume - Total data volume received monitor element" on page 946

Table 61. Information returned for a statistics event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Information written to XML for system_metrics and activity_metrics monitor elements:

The **activity_metrics** monitor element is reported in the MON_GET_ACTIVITY_DETAILS table function, the MON_GET_PKG_CACHE_STMT_DETAILS table function, and the activity event monitor. The **system_metrics** monitor element is reported in the MON_GET_CONNECTION_DETAILS, MON_GET_UNIT_OF_WORK_DETAILS, MON_GET_SERVICE_SUBCLASS_DETAILS, MON_GET_WORKLOAD_DETAILS table functions, and the statistics event monitor. This is also documented in the sql/lib/misc/DB2MonCommon.xsd file.

system_metrics

System level metrics.

Element content: ("wlm_queue_time_total" on page 343, "wlm_queue_assignments_total" on page 343, "fcm_tq_recv_wait_time" on page 343, "fcm_message_recv_wait_time" on page 343, "fcm_tq_send_wait_time" on page 344, "fcm_message_send_wait_time" on page 344, "agent_wait_time" on page 327, "agent_waits_total" on page 327, "lock_wait_time" on page 344, "lock_waits" on page 344, "direct_read_time" on page 345, "direct_read_reqs" on page 345, "direct_write_time" on page 345, "direct_write_reqs" on page 345, "log_buffer_wait_time" on page 346, "num_log_buffer_full" on page 346, "log_disk_wait_time" on page 346, "log_disk_waits_total" on page 346, "tcpip_recv_wait_time" on page 327, "tcpip_recvs_total" on page 328, "client_idle_wait_time" on page 328, "ipc_recv_wait_time" on page 328, "ipc_recvs_total" on page 328, "ipc_send_wait_time" on page 329, "ipc_sends_total" on page 329, "tcpip_send_wait_time" on page 329, "tcpip_sends_total" on page 329, "pool_write_time" on page 346, "pool_read_time" on page 347, "audit_file_write_wait_time" on page 347, "audit_file_writes_total" on page 347, "audit_subsystem_wait_time" on page 347, "audit_subsystem_waits_total" on page 348, "diaglog_write_wait_time" on page 348, "diaglog_writes_total" on page 348, "fcm_send_wait_time" on page 348, "fcm_recv_wait_time" on page 349, "total_wait_time" on page 330, "total_rqst_time" on page 330, "rqsts_completed_total" on page 330, "total_app_rqst_time" on page 330, "app_rqsts_completed_total" on page 330, "total_section_sort_proc_time" on page 349, "total_section_sort_time" on page 349, "total_section_sorts" on page 349, "rows_read" on page 350, "rows_modified" on page 350, "pool_data_l_reads" on page 350, "pool_index_l_reads" on page 351, "pool_temp_data_l_reads" on page 351, "pool_temp_index_l_reads" on page 351, "pool_xda_l_reads" on page 351, "pool_temp_xda_l_reads" on page 352,

"total_cpu_time" on page 352, "act_completed_total" on page 331,
 "pool_data_p_reads" on page 352, "pool_temp_data_p_reads" on page 352,
 "pool_xda_p_reads" on page 352, "pool_temp_xda_p_reads" on page 353,
 "pool_index_p_reads" on page 353, "pool_temp_index_p_reads" on page 353,
 "pool_data_writes" on page 353, "pool_xda_writes" on page 354,
 "pool_index_writes" on page 354, "direct_reads" on page 354, "direct_writes" on
 page 354, "rows_returned" on page 355, "deadlocks" on page 355, "lock_timeouts"
 on page 355, "lock_escals" on page 355, "fcm_sends_total" on page 355,
 "fcm_recvs_total" on page 356, "fcm_send_volume" on page 356,
 "fcm_rcv_volume" on page 356, "fcm_message_sends_total" on page 356,
 "fcm_message_rcvs_total" on page 357, "fcm_message_send_volume" on page
 357, "fcm_message_rcv_volume" on page 357, "fcm_tq_sends_total" on page 357,
 "fcm_tq_recvs_total" on page 358, "fcm_tq_send_volume" on page 358,
 "fcm_tq_rcv_volume" on page 358, "tq_tot_send_spills" on page 358,
 "tcpip_send_volume" on page 331, "tcpip_rcv_volume" on page 331,
 "ipc_send_volume" on page 331, "ipc_rcv_volume" on page 332,
 "post_threshold_sorts" on page 358, "post_shrthreshold_sorts" on page 359,
 "sort_overflows" on page 359, "audit_events_total" on page 359,
 "total_rqst_mapped_in" on page 332 {zero or one times (?)},
 "total_rqst_mapped_out" on page 332 {zero or one times (?)}, "act_rejected_total"
 on page 332, "act_aborted_total" on page 333, "total_sorts" on page 359,
 "total_routine_time" on page 362, "total_compile_proc_time" on page 333,
 "total_compile_time" on page 333, "total_compilations" on page 333,
 "total_implicit_compile_proc_time" on page 333, "total_implicit_compile_time" on
 page 334, "total_implicit_compilations" on page 334, "total_runstats_proc_time" on
 page 334, "total_runstats_time" on page 334, "total_runstats" on page 335,
 "total_reorg_proc_time" on page 335, "total_reorg_time" on page 335,
 "total_reorgs" on page 335, "total_load_proc_time" on page 336, "total_load_time"
 on page 336, "total_loads" on page 336, "total_section_proc_time" on page 361,
 "total_section_time" on page 361, "total_app_section_executions" on page 361,
 "total_commit_proc_time" on page 336, "total_commit_time" on page 336,
 "total_app_commits" on page 337, "total_rollback_proc_time" on page 337,
 "total_rollback_time" on page 337, "total_app_rollbacks" on page 337,
 "total_routine_user_code_proc_time" on page 361, "total_routine_user_code_time"
 on page 361, "thresh_violations" on page 362, "num_lw_thresh_exceeded" on page
 362, "total_routine_invocations" on page 362, "int_commits" on page 338,
 "int_rollbacks" on page 338, "cat_cache_inserts" on page 338, "cat_cache_lookups"
 on page 338, "pkg_cache_inserts" on page 339, "pkg_cache_lookups" on page 339,
 "act_rqsts_total" on page 339, "total_act_wait_time" on page 349, "total_act_time"
 on page 350, "lock_wait_time_global" on page 363, "lock_waits_global" on page
 363, "reclaim_wait_time" on page 363, "spacemappage_reclaim_wait_time" on
 page 363, "lock_timeouts_global" on page 364, "lock_escals_maxlocks" on page
 364, "lock_escals_locklist" on page 364, "lock_escals_global" on page 364,
 "cf_wait_time" on page 364, "cf_waits" on page 365, "pool_data_gbp_l_reads" on
 page 365, "pool_data_gbp_p_reads" on page 365, "pool_data_lbp_pages_found" on
 page 365, "pool_data_gbp_invalid_pages" on page 366, "pool_index_gbp_l_reads"
 on page 366, "pool_index_gbp_p_reads" on page 366,
 "pool_index_lbp_pages_found" on page 366, "pool_index_gbp_invalid_pages" on
 page 367, "pool_xda_gbp_l_reads" on page 367, "pool_xda_gbp_p_reads" on page
 367, "pool_xda_lbp_pages_found" on page 367, "pool_xda_gbp_invalid_pages" on
 page 367, "evmon_wait_time" on page 368, "evmon_waits_total" on page 368,
 "total_extended_latch_wait_time" on page 368, "total_extended_latch_waits" on
 page 368, "total_stats_fabrication_proc_time" on page 339,
 "total_stats_fabrication_time" on page 339, "total_stats_fabrications" on page 340,
 "total_sync_runstats_proc_time" on page 340, "total_sync_runstats_time" on page
 340, "total_sync_runstats" on page 340, "total_disp_run_queue_time" on page 369,

"pool_queued_async_data_reqs" on page 369, "pool_queued_async_index_reqs" on page 369, "pool_queued_async_xda_reqs" on page 369, "pool_queued_async_temp_data_reqs" on page 370, "pool_queued_async_temp_index_reqs" on page 370, "pool_queued_async_temp_xda_reqs" on page 370, "pool_queued_async_other_reqs" on page 370, "pool_queued_async_data_pages" on page 371, "pool_queued_async_index_pages" on page 371, "pool_queued_async_xda_pages" on page 371, "pool_queued_async_temp_data_pages" on page 371, "pool_queued_async_temp_index_pages" on page 372, "pool_queued_async_temp_xda_pages" on page 372, "pool_failed_async_data_reqs" on page 372, "pool_failed_async_index_reqs" on page 372, "pool_failed_async_xda_reqs" on page 373, "pool_failed_async_temp_data_reqs" on page 373, "pool_failed_async_temp_index_reqs" on page 373, "pool_failed_async_temp_xda_reqs" on page 373, "pool_failed_async_other_reqs" on page 374, "app_act_completed_total" on page 341, "app_act_aborted_total" on page 341, "app_act_rejected_total" on page 341, "total_peds" on page 374, "disabled_peds" on page 374, "post_threshold_peds" on page 374, "total_peas" on page 374, "post_threshold_peas" on page 375, "tq_sort_heap_requests" on page 375, "tq_sort_heap_rejections" on page 375, "total_connect_request_proc_time" on page 341, "total_connect_request_time" on page 342, "total_connect_requests" on page 342, "total_connect_authentication_proc_time" on page 342, "total_connect_authentication_time" on page 342, "total_connect_authentications" on page 343, "prefetch_wait_time" on page 375, "prefetch_waits" on page 376, "pool_data_gbp_indep_pages_found_in_lbp" on page 376, "pool_index_gbp_indep_pages_found_in_lbp" on page 376, "pool_xda_gbp_indep_pages_found_in_lbp" on page 376, ANY content (skip) {zero or more (*))

Attributes:

QName	Type	Fixed	Default	Use	Annotation
release	xs:long			required	
ANY attribute from ANY namespace					

activity_metrics

Activity level metrics.

Element content: ("wlm_queue_time_total" on page 343, "wlm_queue_assignments_total" on page 343, "fcm_tq_rcv_wait_time" on page 343, "fcm_message_rcv_wait_time" on page 343, "fcm_tq_send_wait_time" on page 344, "fcm_message_send_wait_time" on page 344, "lock_wait_time" on page 344, "lock_waits" on page 344, "direct_read_time" on page 345, "direct_read_reqs" on page 345, "direct_write_time" on page 345, "direct_write_reqs" on page 345, "log_buffer_wait_time" on page 346, "num_log_buffer_full" on page 346, "log_disk_wait_time" on page 346, "log_disk_waits_total" on page 346, "pool_write_time" on page 346, "pool_read_time" on page 347, "audit_file_write_time" on page 347, "audit_file_writes_total" on page 347, "audit_subsystem_wait_time" on page 347, "audit_subsystem_waits_total" on page 348, "diaglog_write_wait_time" on page 348, "diaglog_writes_total" on page 348, "fcm_send_wait_time" on page 348, "fcm_rcv_wait_time" on page 349,

"total_act_wait_time" on page 349, "total_section_sort_proc_time" on page 349,
 "total_section_sort_time" on page 349, "total_section_sorts" on page 349,
 "total_act_time" on page 350, "rows_read" on page 350, "rows_modified" on page
 350, "pool_data_l_reads" on page 350, "pool_index_l_reads" on page 351,
 "pool_temp_data_l_reads" on page 351, "pool_temp_index_l_reads" on page 351,
 "pool_xda_l_reads" on page 351, "pool_temp_xda_l_reads" on page 352,
 "total_cpu_time" on page 352, "pool_data_p_reads" on page 352,
 "pool_temp_data_p_reads" on page 352, "pool_xda_p_reads" on page 352,
 "pool_temp_xda_p_reads" on page 353, "pool_index_p_reads" on page 353,
 "pool_temp_index_p_reads" on page 353, "pool_data_writes" on page 353,
 "pool_xda_writes" on page 354, "pool_index_writes" on page 354, "direct_reads"
 on page 354, "direct_writes" on page 354, "rows_returned" on page 355,
 "deadlocks" on page 355, "lock_timeouts" on page 355, "lock_escals" on page 355,
 "fcm_sends_total" on page 355, "fcm_recvs_total" on page 356,
 "fcm_send_volume" on page 356, "fcm_rcv_volume" on page 356,
 "fcm_message_sends_total" on page 356, "fcm_message_recvs_total" on page 357,
 "fcm_message_send_volume" on page 357, "fcm_message_rcv_volume" on page
 357, "fcm_tq_sends_total" on page 357, "fcm_tq_recvs_total" on page 358,
 "fcm_tq_send_volume" on page 358, "fcm_tq_rcv_volume" on page 358,
 "tq_tot_send_spills" on page 358, "post_threshold_sorts" on page 358,
 "post_shrthreshold_sorts" on page 359, "sort_overflows" on page 359,
 "audit_events_total" on page 359, "total_sorts" on page 359, "stmt_exec_time" on
 page 360, "coord_stmt_exec_time" on page 360 {zero or one times (?)},
 "total_routine_non_sect_proc_time" on page 360, "total_routine_non_sect_time" on
 page 360, "total_section_proc_time" on page 361, "total_section_time" on page 361,
 "total_app_section_executions" on page 361, "total_routine_user_code_proc_time"
 on page 361, "total_routine_user_code_time" on page 361, "total_routine_time" on
 page 362, "thresh_violations" on page 362, "num_lw_thresh_exceeded" on page
 362, "total_routine_invocations" on page 362, "lock_wait_time_global" on page 363,
 "lock_waits_global" on page 363, "reclaim_wait_time" on page 363,
 "spacemappage_reclaim_wait_time" on page 363, "lock_timeouts_global" on page
 364, "lock_escals_maxlocks" on page 364, "lock_escals_locklist" on page 364,
 "lock_escals_global" on page 364, "cf_wait_time" on page 364, "cf_waits" on page
 365, "pool_data_gbp_l_reads" on page 365, "pool_data_gbp_p_reads" on page 365,
 "pool_data_lbp_pages_found" on page 365, "pool_data_gbp_invalid_pages" on
 page 366, "pool_index_gbp_l_reads" on page 366, "pool_index_gbp_p_reads" on
 page 366, "pool_index_lbp_pages_found" on page 366,
 "pool_index_gbp_invalid_pages" on page 367, "pool_xda_gbp_l_reads" on page
 367, "pool_xda_gbp_p_reads" on page 367, "pool_xda_lbp_pages_found" on page
 367, "pool_xda_gbp_invalid_pages" on page 367, "evmon_wait_time" on page 368,
 "evmon_waits_total" on page 368, "total_extended_latch_wait_time" on page 368,
 "total_extended_latch_waits" on page 368, "total_disp_run_queue_time" on page
 369, "pool_queued_async_data_reqs" on page 369,
 "pool_queued_async_index_reqs" on page 369, "pool_queued_async_xda_reqs" on
 page 369, "pool_queued_async_temp_data_reqs" on page 370,
 "pool_queued_async_temp_index_reqs" on page 370,
 "pool_queued_async_temp_xda_reqs" on page 370,
 "pool_queued_async_other_reqs" on page 370, "pool_queued_async_data_pages"
 on page 371, "pool_queued_async_index_pages" on page 371,
 "pool_queued_async_xda_pages" on page 371,
 "pool_queued_async_temp_data_pages" on page 371,
 "pool_queued_async_temp_index_pages" on page 372,
 "pool_queued_async_temp_xda_pages" on page 372,
 "pool_failed_async_data_reqs" on page 372, "pool_failed_async_index_reqs" on
 page 372, "pool_failed_async_xda_reqs" on page 373,
 "pool_failed_async_temp_data_reqs" on page 373,

"pool_failed_async_temp_index_reqs" on page 373,
 "pool_failed_async_temp_xda_reqs" on page 373, "pool_failed_async_other_reqs"
 on page 374, "total_peds" on page 374, "disabled_peds" on page 374,
 "post_threshold_peds" on page 374, "total_peas" on page 374,
 "post_threshold_peas" on page 375, "tq_sort_heap_requests" on page 375,
 "tq_sort_heap_rejections" on page 375, "prefetch_wait_time" on page 375,
 "prefetch_waits" on page 376, "pool_data_gbp_indep_pages_found_in_lbp" on
 page 376, "pool_index_gbp_indep_pages_found_in_lbp" on page 376,
 "pool_xda_gbp_indep_pages_found_in_lbp" on page 376, ANY content (skip)
 {zero or more (*))

Attributes:

QName	Type	Fixed	Default	Use	Annotation
release	xs:long			required	
ANY attribute from ANY namespace					

stmt_value_index

The element represents the position of the input parameter marker or host variable used in the SQL statement. See monitor element "stmt_value_index - Value index" on page 1362 for more details.

Contained by:

Element content:

Type	Facet
xs:int	

stmt_value_isnull

Contained by:

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_isreopt

Contained by:

Attributes:

QName	Type	Fixed	Default	Use	Annotation
id	xs:int			required	

stmt_value_type

“stmt_value_type - Value type monitor element” on page 1364

Contained by:

Element content:

Type	Facet
xs:string	Max length: 16

stmt_value_data

The element contains a string representation of a data value associated with an SQL statement. See monitor element “stmt_value_data - Value data” on page 1362 for more details.

Contained by:

Element content:

Type	Facet
xs:string	Max length: 32768

agent_wait_time

See monitor element “agent_wait_time - Agent wait time monitor element” on page 715 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

agent_waits_total

See monitor element “agent_waits_total - Total agent waits monitor element” on page 716 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

tcpip_rcv_wait_time

See monitor element “tcpip_rcv_wait_time - TCP/IP received wait time monitor element” on page 1402 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

tcpip_recvs_total

See monitor element “tcpip_recvs_total - TCP/IP receives total monitor element” on page 1403for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

client_idle_wait_time

See monitor element “client_idle_wait_time - Client idle wait time monitor element” on page 776for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

ipc_rcv_wait_time

See monitor element “ipc_rcv_wait_time - Interprocess communication received wait time monitor element” on page 971for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

ipc_recvs_total

See monitor element “ipc_recvs_total - Interprocess communication receives total monitor element” on page 972for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

ipc_send_wait_time

See monitor element “ipc_send_wait_time - Interprocess communication send wait time monitor element” on page 974for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

ipc_sends_total

See monitor element “ipc_sends_total - Interprocess communication send total monitor element” on page 975for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

tcpip_send_wait_time

See monitor element “tcpip_send_wait_time - TCP/IP send wait time monitor element” on page 1405for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

tcpip_sends_total

See monitor element “tcpip_sends_total - TCP/IP sends total monitor element” on page 1406for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_wait_time

See monitor element “total_wait_time - Total wait time monitor element” on page 1501 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_rqst_time

See monitor element “total_rqst_time - Total request time monitor element” on page 1474 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

rqsts_completed_total

See monitor element “rqsts_completed_total - Total requests completed monitor element” on page 1298 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_app_rqst_time

See monitor element “total_app_rqst_time - Total application request time monitor element” on page 1420 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

app_rqsts_completed_total

See monitor element “app_rqsts_completed_total - Total application requests completed monitor element” on page 726 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

act_completed_total

See monitor element "act_completed_total - Total completed activities monitor element" on page 698 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

tcpip_send_volume

See monitor element "tcpip_send_volume - TCP/IP send volume monitor element" on page 1404 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

tcpip_rcv_volume

See monitor element "tcpip_rcv_volume - TCP/IP received volume monitor element" on page 1401 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

ipc_send_volume

See monitor element "ipc_send_volume - Interprocess communication send volume monitor element" on page 973 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

ipc_rcv_volume

See monitor element “ipc_rcv_volume - Interprocess communication received volume monitor element” on page 970 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_rqst_mapped_in

See monitor element “total_rqst_mapped_in - Total request mapped-in monitor element” on page 1473 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_rqst_mapped_out

See monitor element “total_rqst_mapped_out - Total request mapped-out monitor element” on page 1473 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

act_rejected_total

See monitor element “act_rejected_total - Total rejected activities monitor element” on page 700 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

act_aborted_total

See monitor element “act_aborted_total - Total aborted activities monitor element” on page 696for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_compile_proc_time

See monitor element “total_compile_proc_time - Total compile processing time monitor element” on page 1428for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_compile_time

See monitor element “total_compile_time - Total compile time monitor element” on page 1429for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_compilations

See monitor element “total_compilations - Total compilations monitor element” on page 1427for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_implicit_compile_proc_time

See monitor element “total_implicit_compile_proc_time - Total implicit compile processing time monitor element” on page 1448for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

total_implicit_compile_time

See monitor element "total_implicit_compile_time - Total implicit compile time monitor element" on page 1449 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

total_implicit_compilations

See monitor element "total_implicit_compilations - Total implicit complications monitor element" on page 1446 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

total_runstats_proc_time

See monitor element "total_runstats_proc_time - Total runtime statistics processing time monitor element" on page 1476 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

total_runstats_time

See monitor element "total_runstats_time - Total runtime statistics time monitor element" on page 1477 for more details.

Contained by: "system_metrics" on page 322

Element content:

Type	Facet
xs:long	

total_runstats

See monitor element “total_runstats - Total runtime statistics monitor element” on page 1475 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_reorg_proc_time

See monitor element “total_reorg_proc_time - Total reorganization processing time monitor element” on page 1460 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_reorg_time

See monitor element “total_reorg_time - Total reorganization time monitor element” on page 1461 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_reorgs

See monitor element “total_reorgs - Total reorganizations monitor element” on page 1462 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_load_proc_time

See monitor element “total_load_proc_time - Total load processing time monitor element” on page 1450for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_load_time

See monitor element “total_load_time - Total load time monitor element” on page 1451for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_loads

See monitor element “total_loads - Total loads monitor element” on page 1452for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_commit_proc_time

See monitor element “total_commit_proc_time - Total commits processing time monitor element” on page 1424for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_commit_time

See monitor element “total_commit_time - Total commit time monitor element” on page 1426for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_app_commits

See monitor element “total_app_commits - Total application commits monitor elements” on page 1418for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_rollback_proc_time

See monitor element “total_rollback_proc_time - Total rollback processing time monitor element” on page 1463for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_rollback_time

See monitor element “total_rollback_time - Total rollback time monitor element” on page 1464for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_app_rollbacks

See monitor element “total_app_rollbacks - Total application rollbacks monitor element” on page 1419for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

int_commits

See monitor element “int_commits - Internal commits monitor element” on page 962 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

int_rollbacks

See monitor element “int_rollbacks - Internal rollbacks monitor element” on page 965 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

cat_cache_inserts

See monitor element “cat_cache_inserts - Catalog cache inserts monitor element” on page 761 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

cat_cache_lookups

See monitor element “cat_cache_lookups - Catalog cache lookups monitor element” on page 763 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

pkg_cache_inserts

See monitor element “pkg_cache_inserts - Package cache inserts monitor element” on page 1109 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

pkg_cache_lookups

See monitor element “pkg_cache_lookups - Package cache lookups monitor element” on page 1111 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

act_rqsts_total

See monitor element “act_rqsts_total - Total activity requests monitor elements” on page 702 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_stats_fabrication_proc_time

See monitor element “total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element” on page 1490 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_stats_fabrication_time

See monitor element “total_stats_fabrication_time - Total statistics fabrication time monitor element” on page 1491 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_stats_fabrications

See monitor element “total_stats_fabrications - Total statistics fabrications monitor elements” on page 1492for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_sync_runstats_proc_time

See monitor element “total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element” on page 1495for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_sync_runstats_time

See monitor element “total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements” on page 1494for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_sync_runstats

See monitor element “total_sync_runstats - Total synchronous RUNSTATS activities monitor element” on page 1496for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

app_act_completed_total

See monitor element “app_act_completed_total - Total successful external coordinator activities monitor element” on page 723 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

app_act_aborted_total

See monitor element “app_act_aborted_total - Total failed external coordinator activities monitor element” on page 722 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

app_act_rejected_total

See monitor element “app_act_rejected_total - Total rejected external coordinator activities monitor element” on page 724 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_request_proc_time

See monitor element “total_connect_request_proc_time - Total connection or switch user request processing time monitor element” on page 1434 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_request_time

See monitor element “total_connect_request_time - Total connection or switch user request time monitor element” on page 1436 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_requests

See monitor element “total_connect_requests - Connection or switch user requests monitor element” on page 1435 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_authentication_proc_time

See monitor element “total_connect_authentication_proc_time - Total connection authentication processing time monitor element” on page 1431 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_authentication_time

See monitor element “total_connect_authentication_time - Total connection or switch user authentication request time monitor element” on page 1433 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

total_connect_authentications

See monitor element “total_connect_authentications - Connections or switch user authentications performed monitor element” on page 1432 for more details.

Contained by: “system_metrics” on page 322

Element content:

Type	Facet
xs:long	

wlm_queue_time_total

See monitor element “wlm_queue_time_total - Workload manager total queue time monitor element” on page 1538 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

wlm_queue_assignments_total

See monitor element “wlm_queue_assignments_total - Workload manager total queue assignments monitor element” on page 1537 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_recv_wait_time

See monitor element “fcm_tq_recv_wait_time - FCM table queue received wait time monitor element” on page 913 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_message_recv_wait_time

See monitor element “fcm_message_recv_wait_time - FCM message received wait time monitor element” on page 894 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_send_wait_time

See monitor element "fcm_tq_send_wait_time - FCM table queue send wait time monitor element" on page 917 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_message_send_wait_time

See monitor element "fcm_message_send_wait_time - FCM message send wait time monitor element" on page 899 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

lock_wait_time

See monitor element "lock_wait_time - Time waited on locks monitor element" on page 1009 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

lock_waits

See monitor element "lock_waits - Lock waits monitor element" on page 1014 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

direct_read_time

See monitor element “direct_read_time - Direct read time monitor element” on page 860 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

direct_read_reqs

See monitor element “direct_read_reqs - Direct read requests monitor element” on page 858 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

direct_write_time

See monitor element “direct_write_time - Direct write time monitor element” on page 866 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

direct_write_reqs

See monitor element “direct_write_reqs - Direct write requests monitor element” on page 864 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

log_buffer_wait_time

See monitor element “log_buffer_wait_time - Log buffer wait time monitor element” on page 1019for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

num_log_buffer_full

See monitor element “num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element” on page 1063for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

log_disk_wait_time

See monitor element “log_disk_wait_time - Log disk wait time monitor element” on page 1021for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

log_disk_waits_total

See monitor element “log_disk_waits_total - Total log disk waits monitor element” on page 1022for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_write_time

See monitor element “pool_write_time - Total buffer pool physical write time monitor element” on page 1223for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_read_time

See monitor element “pool_read_time - Total buffer pool physical read time monitor element” on page 1207for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

audit_file_write_wait_time

See monitor element “audit_file_write_wait_time - Audit file write wait time monitor element” on page 741for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

audit_file_writes_total

See monitor element “audit_file_writes_total - Total audit files written monitor element” on page 743for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

audit_subsystem_wait_time

See monitor element “audit_subsystem_wait_time - Audit subsystem wait time monitor element” on page 745for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

audit_subsystem_waits_total

See monitor element “audit_subsystem_waits_total - Total audit subsystem waits monitor element” on page 747for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

diaglog_write_wait_time

See monitor element “diaglog_write_wait_time - Diagnostic log file write wait time monitor element” on page 854for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

diaglog_writes_total

See monitor element “diaglog_writes_total - Total diagnostic log file writes monitor element” on page 856for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_send_wait_time

See monitor element “fcm_send_wait_time - FCM send wait time monitor element” on page 908for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_rcv_wait_time

See monitor element “fcm_rcv_wait_time - FCM received wait time monitor element” on page 904for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_act_wait_time

See monitor element “total_act_wait_time - Total activity wait time monitor element” on page 1417for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_section_sort_proc_time

See monitor element “total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_section_sort_time

See monitor element “total_section_sort_time - Total section sort time monitor element” on page 1482for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_section_sorts

See monitor element “total_section_sorts - Total section sorts monitor element” on page 1484for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_act_time

See monitor element "total_act_time - Total activity time monitor element" on page 1415 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

rows_read

See monitor element "rows_read - Rows read monitor element" on page 1292 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

rows_modified

See monitor element "rows_modified - Rows modified monitor element" on page 1290 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_data_l_reads

See monitor element "pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_index_l_reads

See monitor element “pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_data_l_reads

See monitor element “pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element” on page 1210 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_index_l_reads

See monitor element “pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element” on page 1214 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_l_reads

See monitor element “pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_xda_l_reads

See monitor element “pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_cpu_time

See monitor element “total_cpu_time - Total CPU time monitor element” on page 1436 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_data_p_reads

See monitor element “pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_data_p_reads

See monitor element “pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element” on page 1212 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_p_reads

See monitor element “pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_xda_p_reads

See monitor element “pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_p_reads

See monitor element “pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_temp_index_p_reads

See monitor element “pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element” on page 1216for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_data_writes

See monitor element “pool_data_writes - Buffer pool data writes monitor element” on page 1144for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_writes

See monitor element “pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_writes

See monitor element “pool_index_writes - Buffer pool index writes monitor element” on page 1177for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

direct_reads

See monitor element “direct_reads - Direct reads from database monitor element” on page 862for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

direct_writes

See monitor element “direct_writes - Direct writes to database monitor element” on page 868for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

rows_returned

See monitor element “rows_returned - Rows returned monitor element” on page 1294for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

deadlocks

See monitor element “deadlocks - Deadlocks detected monitor element” on page 849for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_timeouts

See monitor element “lock_timeouts - Number of lock timeouts monitor element” on page 1005for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_escals

See monitor element “lock_escals - Number of lock escalations monitor element” on page 989for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_sends_total

See monitor element “fcm_sends_total - FCM sends total monitor element” on page 910for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_recvs_total

See monitor element "fcm_recvs_total - FCM receives total monitor element" on page 905for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_send_volume

See monitor element "fcm_send_volume - FCM send volume monitor element" on page 907for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_recv_volume

See monitor element "fcm_recv_volume - FCM received volume monitor element" on page 902for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_message_sends_total

See monitor element "fcm_message_sends_total - Total FCM message sends monitor element" on page 901for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

fcm_message_recvs_total

See monitor element “fcm_message_recvs_total - Total FCM message receives monitor element” on page 896for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_message_send_volume

See monitor element “fcm_message_send_volume - FCM message send volume monitor element” on page 898for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_message_rcv_volume

See monitor element “fcm_message_rcv_volume - FCM message received volume monitor element” on page 893for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_sends_total

See monitor element “fcm_tq_sends_total - FCM table queue send total monitor element” on page 919for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_recvs_total

See monitor element “fcm_tq_recvs_total - FCM table queue receives total monitor element” on page 914 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_send_volume

See monitor element “fcm_tq_send_volume - FCM table queue send volume monitor element” on page 916 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

fcm_tq_recv_volume

See monitor element “fcm_tq_recv_volume - FCM table queue received volume monitor element” on page 911 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

tq_tot_send_spills

See monitor element “tq_tot_send_spills - Total number of table queue buffers overflowed monitor element” on page 1511 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

post_threshold_sorts

See monitor element “post_threshold_sorts - Post threshold sorts monitor element” on page 1248 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

post_shrthreshold_sorts

See monitor element “post_shrthreshold_sorts - Post shared threshold sorts monitor element” on page 1241for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

sort_overflows

See monitor element “sort_overflows - Sort overflows monitor element” on page 1326for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

audit_events_total

See monitor element “audit_events_total - Total audit events monitor element” on page 740for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_sorts

See monitor element “total_sorts - Total sorts monitor element” on page 1488for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

stmt_exec_time

See monitor element “stmt_exec_time - Statement execution time monitor element” on page 1348 for more details.

Contained by: “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

coord_stmt_exec_time

See monitor element “coord_stmt_exec_time - Execution time for statement by coordinator agent monitor element” on page 816 for more details.

Contained by: “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_routine_non_sect_proc_time

See monitor element “total_routine_non_sect_proc_time - Non-section processing time monitor element” on page 1467 for more details.

Contained by: “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_routine_non_sect_time

See monitor element “total_routine_non_sect_time - Non-section routine execution time monitor elements” on page 1467 for more details.

Contained by: “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_section_proc_time

See monitor element “total_section_proc_time - Total section processing time monitor element” on page 1479 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_section_time

See monitor element “total_section_time - Total section time monitor element” on page 1485 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_app_section_executions

See monitor element “total_app_section_executions - Total application section executions monitor element” on page 1422 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_routine_user_code_proc_time

See monitor element “total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_routine_user_code_time

See monitor element “total_routine_user_code_time - Total routine user code time monitor element” on page 1471 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_routine_time

See monitor element "total_routine_time - Total routine time monitor element" on page 1468for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

thresh_violations

See monitor element "thresh_violations - Number of threshold violations monitor element" on page 1408for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

num_lw_thresh_exceeded

See monitor element "num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element" on page 1067for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_routine_invocations

See monitor element "total_routine_invocations - Total routine invocations monitor elements" on page 1465for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

lock_wait_time_global

See monitor element “lock_wait_time_global - Lock wait time global monitor element” on page 1011for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_waits_global

See monitor element “lock_waits_global - Lock waits global monitor element” on page 1016for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

reclaim_wait_time

See monitor element “reclaim_wait_time - Reclaim wait time monitor element” on page 1269for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

spacemappage_reclaim_wait_time

See monitor element “spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element” on page 1339for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_timeouts_global

See monitor element “lock_timeouts_global - Lock timeouts global monitor element” on page 1006for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_escals_maxlocks

See monitor element “lock_escals_maxlocks - Number of maxlocks lock escalations monitor element” on page 994for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_escals_locklist

See monitor element “lock_escals_locklist - Number of locklist lock escalations monitor element” on page 993for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

lock_escals_global

See monitor element “lock_escals_global - Number of global lock escalations monitor element” on page 991for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

cf_wait_time

See monitor element “cf_wait_time - cluster caching facility wait time monitor element” on page 767for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

cf_waits

See monitor element "cf_waits - Number of cluster caching facility waits monitor element" on page 767 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_data_gbp_l_reads

See monitor element "pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element" on page 1134 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_data_gbp_p_reads

See monitor element "pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element" on page 1136 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_data_lbp_pages_found

See monitor element "pool_data_lbp_pages_found - Local buffer pool found data pages monitor element" on page 1138 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

pool_data_gbp_invalid_pages

See monitor element “pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element” on page 1133for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_gbp_l_reads

See monitor element “pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element” on page 1168for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_gbp_p_reads

See monitor element “pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements” on page 1169for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_lbp_pages_found

See monitor element “pool_index_lbp_pages_found - Local buffer pool index pages found monitor element” on page 1171for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_gbp_invalid_pages

See monitor element “pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element” on page 1166 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_gbp_l_reads

See monitor element “pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element” on page 1228 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_gbp_p_reads

See monitor element “pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element” on page 1230 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_lbp_pages_found

See monitor element “pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element” on page 1234 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_gbp_invalid_pages

See monitor element “pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element” on page 1226 for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

evmon_wait_time

See monitor element "evmon_wait_time - Event monitor wait time monitor element" on page 883for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

evmon_waits_total

See monitor element "evmon_waits_total - Event monitor total waits monitor element" on page 885for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_extended_latch_wait_time

See monitor element "total_extended_latch_wait_time - Total extended latch wait time monitor element" on page 1441for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_extended_latch_waits

See monitor element "total_extended_latch_waits - Total extended latch waits monitor element" on page 1443for more details.

Contained by: "system_metrics" on page 322 "activity_metrics" on page 324

Element content:

Type	Facet
xs:long	

total_disp_run_queue_time

See monitor element “total_disp_run_queue_time - Total dispatcher run queue time monitor element” on page 1439 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_data_reqs

See monitor element “pool_queued_async_data_reqs - Data prefetch requests monitor element” on page 1183 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_index_reqs

See monitor element “pool_queued_async_index_reqs - Index prefetch requests monitor element” on page 1187 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_xda_reqs

See monitor element “pool_queued_async_xda_reqs - XDA prefetch requests monitor element” on page 1205 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_data_reqs

See monitor element “pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces monitor element” on page 1193 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_index_reqs

See monitor element “pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces monitor element” on page 1197 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_xda_reqs

See monitor element “pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces monitor element” on page 1201 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_other_reqs

See monitor element “pool_queued_async_other_reqs - Other requests handled by prefetchers monitor element” on page 1189 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_data_pages

See monitor element “pool_queued_async_data_pages - Data pages prefetch requests monitor element” on page 1181 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_index_pages

See monitor element “pool_queued_async_index_pages - Index pages prefetch requests monitor element” on page 1185 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_xda_pages

See monitor element “pool_queued_async_xda_pages - XDA pages prefetch requests monitor element” on page 1203 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_data_pages

See monitor element “pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces monitor element” on page 1191 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_index_pages

See monitor element “pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element” on page 1195 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_queued_async_temp_xda_pages

See monitor element “pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces monitor element” on page 1199 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_data_reqs

See monitor element “pool_failed_async_data_reqs - Failed data prefetch requests monitor element” on page 1148 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_index_reqs

See monitor element “pool_failed_async_index_reqs - Failed index prefetch requests monitor element” on page 1150 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_xda_reqs

See monitor element “pool_failed_async_xda_reqs - Failed XDA prefetch requests monitor element” on page 1161 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_temp_data_reqs

See monitor element “pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces monitor element” on page 1154 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_temp_index_reqs

See monitor element “pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces monitor element” on page 1157 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_temp_xda_reqs

See monitor element “pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces monitor element” on page 1159 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_failed_async_other_reqs

See monitor element “pool_failed_async_other_reqs - Failed non-prefetch requests monitor element” on page 1153for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_peds

See monitor element “total_peds - Total partial early distincts monitor element” on page 1458for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

disabled_peds

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

post_threshold_peds

See monitor element “post_threshold_peds - Partial early distincts threshold monitor element” on page 1246for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

total_peas

See monitor element “total_peas - Total partial early aggregations monitor element” on page 1455for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

post_threshold_peas

See monitor element “post_threshold_peas - Partial early aggregation threshold monitor element” on page 1243for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

tq_sort_heap_requests

See monitor element “tq_sort_heap_requests - Table queue sort heap requests monitor element” on page 1509for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

tq_sort_heap_rejections

See monitor element “tq_sort_heap_rejections - Table queue sort heap rejections monitor element” on page 1507for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

prefetch_wait_time

See monitor element “prefetch_wait_time - Time waited for prefetch monitor element” on page 1249for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

prefetch_waits

See monitor element “prefetch_waits - Prefetcher wait count monitor element” on page 1251 for more details.

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_data_gbp_indep_pages_found_in_lbp

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_index_gbp_indep_pages_found_in_lbp

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

pool_xda_gbp_indep_pages_found_in_lbp

Contained by: “system_metrics” on page 322 “activity_metrics” on page 324

Element content:

Type	Facet
xs:long	

Database event monitoring

Data generated by database event monitors

Database event monitors produce data about database-level counters. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Regardless of the output format you choose, all database event data comes from one of two logical groups:

- “event_db logical data group” on page 60
- “event_dbmemuse logical data group” on page 64

In addition, if you choose to have the database event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a database event monitor:

Information written by an database event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for the database event monitor, by default, three tables are produced, each containing monitor elements from one or more logical data groups:

Table 62. Tables produced by DATABASE write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
DB_ <i>evmon-name</i>	event_db
DBMEMUSE_ <i>evmon-name</i>	event_dbmemuse
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Tables produced

*Table 63. Information returned for a database event monitor: Default table name: DB_*evmon-name**

Column name	Data type	Description
APPL_SECTION_INSERTS	BIGINT	appl_section_inserts - Section inserts
APPL_SECTION_LOOKUPS	BIGINT	appl_section_lookups - Section lookups
ASYNC_RUNSTATS	BIGINT	async_runstats - Total number of asynchronous RUNSTATS requests
BINDS_PRECOMPILES	BIGINT	binds_precompiles - Binds/precompiles attempted

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
BLOCKS_PENDING_CLEANUP	BIGINT	blocks_pending_cleanup - Pending cleanup rolled-out blocks
CAT_CACHE_HEAP_FULL	BIGINT	cat_cache_heap_full - Catalog cache heap full
CAT_CACHE_INSERTS	BIGINT	cat_cache_inserts - Catalog cache inserts
CAT_CACHE_LOOKUPS	BIGINT	cat_cache_lookups - Catalog cache lookups
CAT_CACHE_OVERFLOWS	BIGINT	cat_cache_overflows - Catalog cache overflows
CAT_CACHE_SIZE_TOP	BIGINT	cat_cache_size_top - Catalog cache high watermark
CATALOG_NODE	BIGINT	catalog_node - Catalog node number
CATALOG_NODE_NAME	VARCHAR(32)	catalog_node_name - Catalog node network name
COMMIT_SQL_STMTS	BIGINT	commit_sql_stmts - Commit statements attempted
CONNECTIONS_TOP	BIGINT	connections_top - Maximum number of concurrent connections
DB_HEAP_TOP	BIGINT	db_heap_top - Maximum database heap allocated
DDL_SQL_STMTS	BIGINT	ddl_sql_stmts - Data definition language (DDL) SQL statements
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
DISCONN_TIME	TIMESTAMP	disconn_time - Database deactivation timestamp
DYNAMIC_SQL_STMTS	BIGINT	dynamic_sql_stmts - Dynamic SQL statements attempted
ELAPSED_EXEC_TIME	BIGINT	elapsed_exec_time - Statement execution elapsed time

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of event monitor activations
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
FAILED_SQL_STMTS	BIGINT	failed_sql_stmts - Failed statement operations
FILES_CLOSED	BIGINT	files_closed - Database files closed
HASH_JOIN_OVERFLOWS	BIGINT	hash_join_overflows - Hash join overflows
HASH_JOIN_SMALL_OVERFLOWS	BIGINT	hash_join_small_overflows - Hash join small overflows
INT_AUTO_REBINDS	BIGINT	int_auto_rebinds - Internal automatic rebinds
INT_COMMITS	BIGINT	int_commits - Internal commits
INT_ROLLBACKS	BIGINT	int_rollback - Internal rollbacks
INT_ROWS_DELETED	BIGINT	int_rows_deleted - Internal rows deleted
INT_ROWS_INSERTED	BIGINT	int_rows_inserted - Internal rows inserted
INT_ROWS_UPDATED	BIGINT	int_rows_updated - Internal rows updated
LOCK_ESCALS	BIGINT	lock_escals - Number of lock escalations
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
LOG_FILE_ARCHIVE	BIGINT	
LOG_FILE_NUM_CURR	BIGINT	
LOG_FILE_NUM_FIRST	BIGINT	
LOG_FILE_NUM_LAST	BIGINT	
LOG_HELD_BY_DIRTY_PAGES	BIGINT	log_held_by_dirty_pages - Amount of log space accounted for by dirty pages
LOG_READ_TIME	BIGINT	log_read_time - Log read time
LOG_READS	BIGINT	log_reads - Number of log pages read
LOG_TO_REDO_FOR_RECOVERY	BIGINT	log_to_redo_for_recovery - Amount of log to be redone for recovery
LOG_WRITE_TIME	BIGINT	log_write_time - Log write time

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
LOG_WRITES	BIGINT	log_writes - Number of log pages written
NUM_LOG_BUFF_FULL	BIGINT	
NUM_LOG_DATA_IN_BUFF	BIGINT	
NUM_LOG_PART_PAGE_IO	BIGINT	num_log_part_page_io - Number of partial log page writes
NUM_LOG_READ_IO	BIGINT	num_log_read_io - Number of log reads
NUM_LOG_WRITE_IO	BIGINT	num_log_write_io - Number of log writes
NUM_THRESHOLD_VIOLATIONS	INTEGER	num_threshold_violations - Number of threshold violations
OLAP_FUNC_OVERFLOWS	BIGINT	olap_func_overflows - OLAP function overflows
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
PKG_CACHE_INSERTS	BIGINT	pkg_cache_inserts - Package cache inserts
PKG_CACHE_LOOKUPS	BIGINT	pkg_cache_lookups - Package cache lookups
PKG_CACHE_NUM_OVERFLOWS	BIGINT	pkg_cache_num_overflows - Package cache overflows
PKG_CACHE_SIZE_TOP	BIGINT	pkg_cache_size_top - Package cache high watermark
POOL_ASYNC_DATA_READ_REQS	BIGINT	pool_async_data_read_reqs - Buffer pool asynchronous read requests
POOL_ASYNC_DATA_READS	BIGINT	pool_async_data_reads - Buffer pool asynchronous data reads
POOL_ASYNC_DATA_WRITES	BIGINT	pool_async_data_writes - Buffer pool asynchronous data writes
POOL_ASYNC_INDEX_READ_REQS	BIGINT	pool_async_index_read_reqs - Buffer pool asynchronous index read requests
POOL_ASYNC_INDEX_READS	BIGINT	pool_async_index_reads - Buffer pool asynchronous index reads
POOL_ASYNC_INDEX_WRITES	BIGINT	pool_async_index_writes - Buffer pool asynchronous index writes
POOL_ASYNC_READ_TIME	BIGINT	pool_async_read_time - Buffer pool asynchronous read time

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
POOL_ASYNC_WRITE_TIME	BIGINT	pool_async_write_time - Buffer pool asynchronous write time
POOL_ASYNC_XDA_READ_REQS	BIGINT	pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests
POOL_ASYNC_XDA_READS	BIGINT	pool_async_xda_reads - Buffer pool asynchronous XDA data reads
POOL_ASYNC_XDA_WRITES	BIGINT	pool_async_xda_writes - Buffer pool asynchronous XDA data writes
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_DRTY_PG_STEAL_CLNS	BIGINT	pool_drty_pg_steal_clns - Buffer pool victim page cleaners triggered
POOL_DRTY_PG_THRSH_CLNS	BIGINT	pool_drty_pg_thrsh_clns - Buffer pool threshold cleaners triggered
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
POOL_LSN_GAP_CLNS	BIGINT	pool_lsn_gap_clns - Buffer pool log space cleaners triggered
POOL_NO_VICTIM_BUFFER	BIGINT	pool_no_victim_buffer - Buffer pool no victim buffers
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
POST_SHRTHRESHOLD_HASH_JOINS	BIGINT	post_shrthreshold_hash_joins - Post threshold hash joins
POST_SHRTHRESHOLD_SORTS	BIGINT	post_shrthreshold_sorts - Post shared threshold sorts
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
ROLLBACK_SQL_STMTS	BIGINT	rollback_sql_stmts - Rollback statements attempted
ROWS_DELETED	BIGINT	rows_deleted - Rows deleted
ROWS_INSERTED	BIGINT	rows_inserted - Rows inserted
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_SELECTED	BIGINT	rows_selected - Rows selected
ROWS_UPDATED	BIGINT	rows_updated - Rows updated
SEC_LOG_USED_TOP	BIGINT	sec_log_used_top - Maximum secondary log space used
SELECT_SQL_STMTS	BIGINT	select_sql_stmts - Select SQL statements executed
SERVER_PLATFORM	INTEGER	server_platform - Server operating system
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
SORT_SHRHEAP_TOP	BIGINT	sort_shrheap_top - Sort share heap high watermark
STATIC_SQL_STMTS	BIGINT	static_sql_stmts - Static SQL statements attempted
STATS_CACHE_SIZE	BIGINT	stats_cache_size - Size of statistics cache

Table 63. Information returned for a database event monitor: Default table name: DB_evmon-name (continued)

Column name	Data type	Description
STATS_FABRICATE_TIME	BIGINT	stats_fabricate_time - Total time spent on statistics fabrication activities
STATS_FABRICATIONS	BIGINT	stats_fabrications - Total number of statistics fabrications
SYNC_RUNSTATS	BIGINT	sync_runstats - Total number of synchronous RUNSTATS activities
SYNC_RUNSTATS_TIME	BIGINT	“sync_runstats_time - Total time spent on synchronous RUNSTATS activities monitor element” on page 1370
TOT_LOG_USED_TOP	BIGINT	tot_log_used_top - Maximum total log space used
TOTAL_CONS	BIGINT	total_cons - Connects since database activation
TOTAL_HASH_JOINS	BIGINT	total_hash_joins - Total hash joins
TOTAL_HASH_LOOPS	BIGINT	total_hash_loops - Total hash loops
TOTAL_OLAP_FUNCS	BIGINT	total_olap_funcs - Total OLAP functions
TOTAL_SORT_TIME	BIGINT	total_sort_time - Total sort time
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
UID_SQL_STMTS	BIGINT	uid_sql_stmts - UPDATE/INSERT/DELETE SQL statements executed
UNREAD_PREFETCH_PAGES	BIGINT	unread_prefetch_pages - Unread prefetch pages
X_LOCK_ESCALS	BIGINT	x_lock_escalations - Exclusive lock escalations
XQUERY_STMTS	BIGINT	xquery_stmts - XQuery Statements Attempted

Table 64. Information returned for a database event monitor: Default table name: DBMEMUSE_evmon-name

Column name	Data type	Description
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of event monitor activations
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
POOL_CUR_SIZE	BIGINT	pool_cur_size - Current size of memory pool
POOL_ID	BIGINT	pool_id - Memory pool identifier

Table 64. Information returned for a database event monitor: Default table name: *DBMEMUSE_evmon-name* (continued)

Column name	Data type	Description
POOL_MAX_SIZE	BIGINT	
POOL_SECONDARY_ID	CHARACTER(32)	pool_secondary_id - Memory pool secondary identifier
POOL_WATERMARK	BIGINT	pool_watermark - Memory pool watermark

Table 65. Information returned for a database event monitor: Default table name: *CONTROL_evmon-name*

Column name	Data type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Threshold violation event monitoring

Data generated by threshold violation event monitors

Threshold violation event monitors produce data about threshold violations. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Regardless of the output format you choose, all threshold violation event data comes from the `event_thresholdviolations` logical data group. In addition, if you choose to have the event data written to tables, data from an additional group (`CONTROL`) is used to generate metadata about the event monitor itself.

Information written to tables for a threshold violation event monitor:

Information written by a threshold violations event monitor when the `WRITE TO TABLE` option is specified.

The sections that follows illustrates the output of a threshold violations event monitor when the `WRITE TO TABLE` option is used on the `CREATE EVENT MONITOR` statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 66. Tables produced by *THRESHOLD* write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the `CREATE EVENT MONITOR` statement.

Default table name	Logical data groups reported
<code>THRESHOLDVIOLATIONS_evmon-name</code>	<code>event_thresholdviolations</code>

Table 66. Tables produced by THRESHOLD write-to-table event monitors (continued). The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

Table 67. Information returned for a threshold violations event monitor: Default table name: THRESHOLDVIOLATIONS_*evmon-name*

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
ACTIVATE_TIMESTAMP	TIMESTAMP	activate_timestamp - Activate timestamp
ACTIVITY_COLLECTED	CHARACTER(1)	activity_collected - Activity collected
ACTIVITY_ID	BIGINT	activity_id - Activity ID
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
COORD_PARTITION_NUM	INTEGER	coord_partition_num - Coordinator partition number
DESTINATION_SERVICE_CLASS_ID	INTEGER	"destination_service_class_id - Destination service class ID monitor element" on page 853
PARTITION_NUMBER	SMALLINT	partition_number - Partition number
SOURCE_SERVICE_CLASS_ID	INTEGER	source_service_class_id - Source service class ID
THRESHOLD_ACTION	VARCHAR(16)	threshold_action - Threshold action
THRESHOLD_MAXVALUE	BIGINT	threshold_maxvalue - Threshold maximum value
THRESHOLD_PREDICATE	VARCHAR(64)	threshold_predicate - Threshold predicate
THRESHOLD_QUEUE_SIZE	BIGINT	threshold_queuesize - Threshold queue size
THRESHOLDID	INTEGER	thresholdid - Threshold ID
TIME_OF_VIOLATION	TIMESTAMP	time_of_violation - Time of violation
UOW_ID	INTEGER	uow_id - Unit of work ID

Table 68. Information returned for a threshold violations event monitor: Table name: CONTROL_*evmon-name*

Column Name	Data Type	Description
PARTITION_KEY	INTEGER	"partition_key - Partitioning key monitor element" on page 1105
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message

Table 68. Information returned for a threshold violations event monitor: Table name: CONTROL_evmon-name (continued)

Column Name	Data Type	Description
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message
PARTITION_NUMBER	SMALLINT	partition_number - Partition number

Statement event monitoring

Data generated by statement event monitors

Statement event monitors produce data about statements that run on the system. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Regardless of the output format you choose, all statement event data comes from one of three logical groups:

- “event_stmt logical data group” on page 77
- “event_connheader logical data group” on page 59
- “event_subsection logical data group” on page 79

In addition, if you choose to have statement event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a statement event monitor:

Information written by a statement event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a statement event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 69. Tables produced by STATEMENT write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
STMT_ <i>evmon-name</i>	“event_stmt logical data group” on page 77
CONNHEADER_ <i>evmon-name</i>	“event_connheader logical data group” on page 59
CONNHEADER_ <i>evmon-name</i>	“event_connheader logical data group” on page 59
SUBSECTION_ <i>evmon-name</i>	“event_subsection logical data group” on page 79 (only generated in partitioned database environments)
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

Table 70. Information returned for a statement event monitor: Default table name: STMT_evmon-name

Column name	Data type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
AGENTS_TOP	BIGINT	agents_top - Number of agents created
APPL_ID	VARCHAR(64)	appl_id - Application ID
BLOCKING_CURSOR	SMALLINT	blocking_cursor - Blocking cursor
CONSISTENCY_TOKEN	CHARACTER	consistency_token - Package consistency token
CREATOR	VARCHAR(128)	creator - Application creator
CURSOR_NAME	VARCHAR(18)	cursor_name - Cursor name
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
FETCH_COUNT	BIGINT	fetch_count - Number of successful fetches
INT_ROWS_DELETED	BIGINT	int_rows_deleted - Internal rows deleted
INT_ROWS_INSERTED	BIGINT	int_rows_inserted - Internal rows inserted
INT_ROWS_UPDATED	BIGINT	int_rows_updated - Internal rows updated
PACKAGE_NAME	VARCHAR(128)	package_name - Package name
PACKAGE_VERSION_ID	VARCHAR(64)	package_version_id - Package version
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads

Table 70. Information returned for a statement event monitor: Default table name: STMT_evmon-name (continued)

Column name	Data type	Description
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_WRITTEN	BIGINT	rows_written - Rows written
SECTION_NUMBER	BIGINT	section_number - Section number
SEQUENCE_NO	CHARACTER	sequence_no - Sequence number
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
SQL_REQ_ID	BIGINT	sql_req_id - Request identifier for SQL statement
SQLCABC	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLCAID	CHARACTER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLCODE	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD1	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD2	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD3	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD4	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .

Table 70. Information returned for a statement event monitor: Default table name: *STMT_evmon-name* (continued)

Column name	Data type	Description
SQLERRD5	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRD6	INTEGER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRM	VARCHAR(72)	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLERRP	CHARACTER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLSTATE	CHARACTER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
SQLWARN	CHARACTER	See "SQLCA (SQL communications area)" in <i>SQL Reference Volume 1</i> .
START_TIME	TIMESTAMP	start_time - Event start time
STATS_FABRICATE_TIME	BIGINT	stats_fabricate_time - Total time spent on statistics fabrication activities
STMT_OPERATION	BIGINT	
STMT_TYPE	BIGINT	stmt_type - Statement type
STOP_TIME	TIMESTAMP	stop_time - Event stop time
SYNC_RUNSTATS_TIME	BIGINT	"sync_runstats_time - Total time spent on synchronous RUNSTATS activities monitor element" on page 1370
SYSTEM_CPU_TIME	BIGINT	system_cpu_time - System CPU time
TOTAL_SORT_TIME	BIGINT	total_sort_time - Total sort time
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
USER_CPU_TIME	BIGINT	user_cpu_time - User CPU time
STMT_TEXT	CLOB (2097152)	stmt_text - SQL statement text

Table 71. Information returned for a statement event monitor: Default table name: *CONNHEADER_evmon-name*

Column name	Data type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
APPL_NAME	VARCHAR(255)	appl_name - Application name

Table 71. Information returned for a statement event monitor: Default table name: *CONNHEADER_evmon-name* (continued)

Column name	Data type	Description
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID
CLIENT_DB_ALIAS	CHARACTER	client_db_alias - Database alias used by application
CLIENT_NNAME	VARCHAR(20)	"client_nname - Client name monitor element" on page 777
CLIENT_PID	BIGINT	client_pid - Client process ID
CLIENT_PLATFORM	INTEGER	client_platform - Client operating platform
CLIENT_PRDID	VARCHAR(20)	client_prdid - Client product and version ID
CLIENT_PROTOCOL	INTEGER	client_protocol - Client communication protocol
CODEPAGE_ID	INTEGER	codepage_id - ID of code page used by application
CONN_TIME	TIMESTAMP	conn_time - Time of database connection
CORR_TOKEN	VARCHAR(64)	corr_token - DRDA® correlation token
EXECUTION_ID	VARCHAR(128)	execution_id - User login ID
SEQUENCE_NO	CHARACTER	sequence_no - Sequence number
TERRITORY_CODE	INTEGER	territory_code - Database territory code

Table 72. Information returned for a statement event monitor: Default table name: *CONTROL_evmon-name*

Column name	Data type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Table event monitoring

Data generated by table event monitors

Table event monitors produce aggregate metrics for tables in the database. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Note: If you want more detailed usage information for a specific table object, consider creating a usage list for that object.

Regardless of the output format you choose, all table event data comes from the event_table logical data group. In addition, if you choose to have statement event

data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a table event monitor:

Information written by an table event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a table event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 73. Tables produced by TABLE write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
TABLE_ <i>evmon-name</i>	event_table
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

*Table 74. Information returned for a table event monitor: Default table name: TABLE_*evmon-name**

Column name	Data type	Description
DATA_OBJECT_PAGES	BIGINT	data_object_pages - Data object pages
DATA_PARTITION_ID	INTEGER	data_partition_id - Data partition identifier
EVENT_TIME	TIMESTAMP	event_time - Event time
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of event monitor activations
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
INDEX_OBJECT_PAGES	BIGINT	index_object_pages - Index object pages
LOB_OBJECT_PAGES	BIGINT	lob_object_pages - LOB object pages
LONG_OBJECT_PAGES	BIGINT	long_object_pages - Long object pages
OVERFLOW_ACCESSES	BIGINT	overflow_accesses - Accesses to overflowed records

Table 74. Information returned for a table event monitor: Default table name: TABLE_evmon-name (continued)

Column name	Data type	Description
PAGE_REORGS	BIGINT	page_reorgs - Page reorganizations
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_WRITTEN	BIGINT	rows_written - Rows written
TABLE_NAME	VARCHAR(128)	table_name - Default table name
TABLE_SCHEMA	VARCHAR(128)	table_schema - Table schema name
TABLE_TYPE	BIGINT	table_type - Table type
TABLESPACE_ID	BIGINT	tablespace_id - Table space identification
XDA_OBJECT_PAGES	BIGINT	xda_object_pages - XDA Object Pages

Table 75. Information returned for a table event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Buffer pool event monitoring

Data generated by buffer pool event monitors

Buffer pool event monitors produce aggregate metrics about buffer pool activity. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Regardless of the output format you choose, all buffer pool event data comes from the event_bufferpool logical data group. In addition, if you choose to have statement event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a buffer pool event monitor:

Information written by a buffer pool event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a buffer pool event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 76. Tables produced by BUFFERPOOL write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
BUFFERPOOL_ <i>evmon-name</i>	event_bufferpool
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

Table 77. Information returned for a buffer pool event monitor: Default table name: BUFFERPOOL_*evmon-name*

Column Name	Data Type	Description
BLOCK_IOS	BIGINT	block_ios - Number of block I/O requests
BP_NAME	VARCHAR(20)	bp_name - Buffer pool name
DB_NAME	CHARACTER(8)	db_name - Database name
DB_PATH	VARCHAR(215)	db_path - Database path
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
EVENT_TIME	TIMESTAMP	event_time - Event time
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of event monitor activations
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
FILES_CLOSED	BIGINT	files_closed - Database files closed
PAGES_FROM_BLOCK_IOS	BIGINT	pages_from_block_ios - Total number of pages read by block I/O
PAGES_FROM_VECTORED_IOS	BIGINT	pages_from_vectored_ios - Total pages read by vectored I/O
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
POOL_ASYNC_DATA_READ_REQS	BIGINT	pool_async_data_read_reqs - Buffer pool asynchronous read requests
POOL_ASYNC_DATA_READS	BIGINT	pool_async_data_reads - Buffer pool asynchronous data reads
POOL_ASYNC_DATA_WRITES	BIGINT	pool_async_data_writes - Buffer pool asynchronous data writes
POOL_ASYNC_INDEX_READ_REQS	BIGINT	pool_async_index_read_reqs - Buffer pool asynchronous index read requests

Table 77. Information returned for a buffer pool event monitor: Default table name: BUFFERPOOL_evmon-name (continued)

Column Name	Data Type	Description
POOL_ASYNC_INDEX_READS	BIGINT	pool_async_index_reads - Buffer pool asynchronous index reads
POOL_ASYNC_INDEX_WRITES	BIGINT	pool_async_index_writes - Buffer pool asynchronous index writes
POOL_ASYNC_READ_TIME	BIGINT	pool_async_read_time - Buffer pool asynchronous read time
POOL_ASYNC_WRITE_TIME	BIGINT	pool_async_write_time - Buffer pool asynchronous write time
POOL_ASYNC_XDA_READ_REQS	BIGINT	pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests
POOL_ASYNC_XDA_READS	BIGINT	pool_async_xda_reads - Buffer pool asynchronous XDA data reads
POOL_ASYNC_XDA_WRITES	BIGINT	pool_async_xda_writes - Buffer pool asynchronous XDA data writes
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
POOL_NO_VICTIM_BUFFER	BIGINT	pool_no_victim_buffer - Buffer pool no victim buffers
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
UNREAD_PREFETCH_PAGES	BIGINT	unread_prefetch_pages - Unread prefetch pages
VECTORED_IOS	BIGINT	vectored_ios - Number of vectored I/O requests

Table 78. Information returned for a buffer pool event monitor: Default table name: CONTROL_evmon-name

Column Name	Data Type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Table space event monitoring

Data generated by table space event monitors

Table space event monitors produce aggregate metrics for table spaces in the database. You can choose to have the output from a database event monitor to regular tables, files or pipes.

Regardless of the output format you choose, all table space event data comes from the event_tablespace logical data group. In addition, if you choose to have statement event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a table space event monitor:

Information written by a table space event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a table space event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 79. Tables produced by TABLESPACE write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
TABLESPACE_ <i>evmon-name</i>	event_tablespace
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

Tables produced

*Table 80. Information returned for a table space event monitor: Default table name: TABLESPACE_*evmon-name**

Column Name	Data Type	Description
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
EVENT_TIME	TIMESTAMP	event_time - Event time
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of event monitor activations

Table 80. Information returned for a table space event monitor: Default table name: TABLESPACE_evmon-name (continued)

Column Name	Data Type	Description
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
FILES_CLOSED	BIGINT	files_closed - Database files closed
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
POOL_ASYNC_DATA_READ_REQS	BIGINT	pool_async_data_read_reqs - Buffer pool asynchronous read requests
POOL_ASYNC_DATA_READS	BIGINT	pool_async_data_reads - Buffer pool asynchronous data reads
POOL_ASYNC_DATA_WRITES	BIGINT	pool_async_data_writes - Buffer pool asynchronous data writes
POOL_ASYNC_INDEX_READ_REQS	BIGINT	pool_async_index_read_reqs - Buffer pool asynchronous index read requests
POOL_ASYNC_INDEX_READS	BIGINT	pool_async_index_reads - Buffer pool asynchronous index reads
POOL_ASYNC_INDEX_WRITES	BIGINT	pool_async_index_writes - Buffer pool asynchronous index writes
POOL_ASYNC_READ_TIME	BIGINT	pool_async_read_time - Buffer pool asynchronous read time
POOL_ASYNC_WRITE_TIME	BIGINT	pool_async_write_time - Buffer pool asynchronous write time
POOL_ASYNC_XDA_READ_REQS	BIGINT	pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests
POOL_ASYNC_XDA_READS	BIGINT	pool_async_xda_reads - Buffer pool asynchronous XDA data reads
POOL_ASYNC_XDA_WRITES	BIGINT	pool_async_xda_writes - Buffer pool asynchronous XDA data writes
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
POOL_NO_VICTIM_BUFFER	BIGINT	pool_no_victim_buffer - Buffer pool no victim buffers
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
TABLESPACE_FS_CACHING	SMALLINT	fs_caching - File system caching

Table 80. Information returned for a table space event monitor: Default table name: TABLESPACE_evmon-name (continued)

Column Name	Data Type	Description
TABLESPACE_NAME	VARCHAR(18)	tablespace_name - Table space name
UNREAD_PREFETCH_PAGES	BIGINT	unread_prefetch_pages - Unread prefetch pages

Table 81. Information returned for a table space event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Connection event monitoring

Data generated by connections event monitors

Connections event monitors capture metrics and other monitor elements for each connection to the database by an application. You can choose to have the output written to files, named pipes or regular tables.

Regardless of the output format you choose, all connections event data comes from one of three logical groups:

- event_connheader
- event_conn
- event_connmemuse

In addition, if you choose to have the connections event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a connections event monitor:

Information written by a connections event monitor when the WRITE TO TABLE option is specified.

When you choose WRITE TO TABLE as the output type for the connections event monitor, by default, four tables are produced, each containing monitor elements from one or more logical data groups:

Table 82. Tables produced by CONNECTIONS write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
CONNHEADER_evmon-name	event_connheader
CONN_evmon-name	event_conn
CONMEMUSE_evmon-name	event_connmemuse

Table 82. Tables produced by CONNECTIONS write-to-table event monitors (continued). The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

To restrict the output of the event monitor to specific tables, specify the names of the logical groups for which you want tables produced in the CREATE EVENT MONITOR or ALTER EVENT MONITOR statements. Refer to the reference topics for those statements for details.

For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Tables produced

Table 83. Information returned for a connections event monitor: Default table name: CONNHEADER_*evmon-name*

Column name	Data type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
APPL_NAME	VARCHAR(255)	appl_name - Application name
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID
CLIENT_DB_ALIAS	CHAR(8)	client_db_alias - Database alias used by application
CLIENT_NNAME	VARCHAR(20)	“client_nname - Client name monitor element” on page 777
CLIENT_PID	BIGINT	client_pid - Client process ID
CLIENT_PLATFORM	INTEGER	client_platform - Client operating platform
CLIENT_PRDID	VARCHAR(20)	client_prdid - Client product and version ID
CLIENT_PROTOCOL	INTEGER	client_protocol - Client communication protocol
CODEPAGE_ID	INTEGER	codepage_id - ID of code page used by application
CONN_TIME	TIMESTAMP	conn_time - Time of database connection
CORR_TOKEN	VARCHAR(64)	corr_token - DRDA correlation token
EXECUTION_ID	VARCHAR(128)	execution_id - User login ID
SEQUENCE_NO	CHAR(5)	sequence_no - Sequence number
TERRITORY_CODE	INTEGER	territory_code - Database territory code

Table 84. Information returned for a connections event monitor: Table name: CONN_evmon-name

Column Name	Data Type	Description
ACC_CURS_BLK	BIGINT	acc_curs_blk - Accepted block cursor requests
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
APPL_PRIORITY	BIGINT	appl_priority - Application agent priority
APPL_PRIORITY_TYPE	BIGINT	appl_priority_type - Application priority type
APPL_SECTION_INSERTS	BIGINT	appl_section_inserts - Section inserts
APPL_SECTION_LOOKUPS	BIGINT	appl_section_lookups - Section lookups
APPL_STATUS	BIGINT	appl_status - Application status
AUTHORITY_BITMAP	CHARACTER(22)	authority_bitmap - User authorization level
AUTHORITY_LVL	BIGINT	authority_lvl - User authorization level
BINDS_PRECOMPILES	BIGINT	binds_precompiles - Binds/precompiles attempted
CAT_CACHE_HEAP_FULL	BIGINT	cat_cache_heap_full - Catalog cache heap full
CAT_CACHE_INSERTS	BIGINT	cat_cache_inserts - Catalog cache inserts
CAT_CACHE_LOOKUPS	BIGINT	cat_cache_lookups - Catalog cache lookups
CAT_CACHE_OVERFLOWS	BIGINT	cat_cache_overflows - Catalog cache overflows
CAT_CACHE_SIZE_TOP	BIGINT	cat_cache_size_top - Catalog cache high watermark
COMMIT_SQL_STMTS	BIGINT	commit_sql_stmts - Commit statements attempted
COORD_NODE	BIGINT	coord_node - Coordinating node
DDL_SQL_STMTS	BIGINT	ddl_sql_stmts - Data definition language (DDL) SQL statements
DEADLOCKS	BIGINT	deadlocks - Deadlocks detected
DIRECT_READ_REQS	BIGINT	direct_read_reqs - Direct read requests
DIRECT_READ_TIME	BIGINT	direct_read_time - Direct read time
DIRECT_READS	BIGINT	direct_reads - Direct reads from database
DIRECT_WRITE_REQS	BIGINT	direct_write_reqs - Direct write requests
DIRECT_WRITE_TIME	BIGINT	direct_write_time - Direct write time
DIRECT_WRITES	BIGINT	direct_writes - Direct writes to database
DISCONN_TIME	TIMESTAMP	disconn_time - Database deactivation timestamp

Table 84. Information returned for a connections event monitor: Table name: CONN_evmon-name (continued)

Column Name	Data Type	Description
DYNAMIC_SQL_STMTS	BIGINT	dynamic_sql_stmts - Dynamic SQL statements attempted
ELAPSED_EXEC_TIME	BIGINT	elapsed_exec_time - Statement execution elapsed time
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
FAILED_SQL_STMTS	BIGINT	failed_sql_stmts - Failed statement operations
HASH_JOIN_OVERFLOWS	BIGINT	hash_join_overflows - Hash join overflows
HASH_JOIN_SMALL_OVERFLOWS	BIGINT	hash_join_small_overflows - Hash join small overflows
INT_AUTO_REBINDS	BIGINT	int_auto_rebinds - Internal automatic rebinds
INT_COMMITS	BIGINT	int_commits - Internal commits
INT_DEADLOCK_ROLLBACKS	BIGINT	int_deadlock_rollback - Internal rollbacks due to deadlock
INT_ROLLBACKS	BIGINT	int_rollback - Internal rollbacks
INT_ROWS_DELETED	BIGINT	int_rows_deleted - Internal rows deleted
INT_ROWS_INSERTED	BIGINT	int_rows_inserted - Internal rows inserted
INT_ROWS_UPDATED	BIGINT	int_rows_updated - Internal rows updated
LOCK_ESCALS	BIGINT	lock_escalations - Number of lock escalations
LOCK_TIMEOUTS	BIGINT	lock_timeouts - Number of lock timeouts
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCK_WAITS	BIGINT	lock_waits - Lock waits
OLAP_FUNC_OVERFLOWS	BIGINT	olap_func_overflows - OLAP function overflows
PARTIAL_RECORD	SMALLINT	partial_record - Partial record
PKG_CACHE_INSERTS	BIGINT	pkg_cache_inserts - Package cache inserts
PKG_CACHE_LOOKUPS	BIGINT	pkg_cache_lookups - Package cache lookups
POOL_DATA_L_READS	BIGINT	pool_data_l_reads - Buffer pool data logical reads
POOL_DATA_P_READS	BIGINT	pool_data_p_reads - Buffer pool data physical reads
POOL_DATA_WRITES	BIGINT	pool_data_writes - Buffer pool data writes
POOL_INDEX_L_READS	BIGINT	pool_index_l_reads - Buffer pool index logical reads

Table 84. Information returned for a connections event monitor: Table name: CONN_evmon-name (continued)

Column Name	Data Type	Description
POOL_INDEX_P_READS	BIGINT	pool_index_p_reads - Buffer pool index physical reads
POOL_INDEX_WRITES	BIGINT	pool_index_writes - Buffer pool index writes
POOL_READ_TIME	BIGINT	pool_read_time - Total buffer pool physical read time
POOL_TEMP_DATA_L_READS	BIGINT	pool_temp_data_l_reads - Buffer pool temporary data logical reads
POOL_TEMP_DATA_P_READS	BIGINT	pool_temp_data_p_reads - Buffer pool temporary data physical reads
POOL_TEMP_INDEX_L_READS	BIGINT	pool_temp_index_l_reads - Buffer pool temporary index logical reads
POOL_TEMP_INDEX_P_READS	BIGINT	pool_temp_index_p_reads - Buffer pool temporary index physical reads
POOL_TEMP_XDA_L_READS	BIGINT	pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads
POOL_TEMP_XDA_P_READS	BIGINT	pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads
POOL_WRITE_TIME	BIGINT	pool_write_time - Total buffer pool physical write time
POOL_XDA_L_READS	BIGINT	pool_xda_l_reads - Buffer pool XDA data logical reads
POOL_XDA_P_READS	BIGINT	pool_xda_p_reads - Buffer pool XDA data physical reads
POOL_XDA_WRITES	BIGINT	pool_xda_writes - Buffer pool XDA data writes
PREFETCH_WAIT_TIME	BIGINT	prefetch_wait_time - Time waited for prefetch
REJ_CURS_BLK	BIGINT	rej_curs_blk - Rejected block cursor requests
ROLLBACK_SQL_STMTS	BIGINT	rollback_sql_stmts - Rollback statements attempted
ROWS_DELETED	BIGINT	rows_deleted - Rows deleted
ROWS_INSERTED	BIGINT	rows_inserted - Rows inserted
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_SELECTED	BIGINT	rows_selected - Rows selected
ROWS_UPDATED	BIGINT	rows_updated - Rows updated
ROWS_WRITTEN	BIGINT	rows_written - Rows written
SELECT_SQL_STMTS	BIGINT	select_sql_stmts - Select SQL statements executed
SEQUENCE_NO	CHARACTER(5)	sequence_no - Sequence number
SORT_OVERFLOWS	BIGINT	sort_overflows - Sort overflows
STATIC_SQL_STMTS	BIGINT	static_sql_stmts - Static SQL statements attempted
SYSTEM_CPU_TIME	BIGINT	system_cpu_time - System CPU time

Table 84. Information returned for a connections event monitor: Table name: CONN_evmon-name (continued)

Column Name	Data Type	Description
TOTAL_HASH_JOINS	BIGINT	total_hash_joins - Total hash joins
TOTAL_HASH_LOOPS	BIGINT	total_hash_loops - Total hash loops
TOTAL_OLAP_FUNCS	BIGINT	total_olap_funcs - Total OLAP functions
TOTAL_SORT_TIME	BIGINT	total_sort_time - Total sort time
TOTAL_SORTS	BIGINT	total_sorts - Total sorts
UID_SQL_STMTS	BIGINT	uid_sql_stmts - UPDATE/INSERT/DELETE SQL statements executed
UNREAD_PREFETCH_PAGES	BIGINT	unread_prefetch_pages - Unread prefetch pages
USER_CPU_TIME	BIGINT	user_cpu_time - User CPU time
X_LOCK_ESCALS	BIGINT	x_lock_escals - Exclusive lock escalations
XQUERY_STMTS	BIGINT	xquery_stmts - XQuery Statements Attempted

Table 85. Information returned for a connections event monitor: Table name: CONMEMUSE_evmon-name

Column name	Data type	Description
APPL_ID	VARCHAR(64)	appl_id - Application ID
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
POOL_CUR_SIZE	BIGINT	pool_cur_size - Current size of memory pool
POOL_ID	BIGINT	pool_id - Memory pool identifier
POOL_LIST_ID	BIGINT	
POOL_MAX_SIZE	BIGINT	
POOL_WATERMARK	BIGINT	pool_watermark - Memory pool watermark

Table 86. Information returned for a connections event monitor: Default table name: CONTROL_evmon-name

Column Name	Data Type	Description
APPL_ID	VARCHAR(64)	appl_id - Application ID
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
POOL_CUR_SIZE	BIGINT	pool_cur_size - Current size of memory pool
POOL_ID	BIGINT	pool_id - Memory pool identifier
POOL_LIST_ID	BIGINT	
POOL_MAX_SIZE	BIGINT	
POOL_WATERMARK	BIGINT	pool_watermark - Memory pool watermark

Transaction event monitoring

Data generated by transaction event monitors

Transaction event monitors record information about database transactions.

Note: This event monitor has been deprecated. Its use is no longer recommended and it might be removed in a future release. Use the unit of work event monitor to monitor units of work instead.

Regardless of the output format you choose, all transaction event data comes from two logical groups:

- “event_xact logical data group” on page 91
- “event_connheader logical data group” on page 59

In addition, if you choose to have the transaction event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a transaction event monitor:

Information written by a transaction event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a transaction event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 87. Tables produced by TRANSACTION write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
<i>XACT_evmon-name</i>	“event_xact logical data group” on page 91
<i>CONNHEADER_evmon-name</i>	“event_connheader logical data group” on page 59
<i>CONTROL_evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

Tables produced

Table 88. Information returned for a transaction event monitor: Default table name: XACT_evmon-name

Column name	Data type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
EVMON_FLUSHES	BIGINT	evmon_flushes - Number of event monitor flushes
LOCK_ESCALS	BIGINT	lock_escalations - Number of lock escalations
LOCK_WAIT_TIME	BIGINT	lock_wait_time - Time waited on locks
LOCKS_HELD_TOP	BIGINT	locks_held_top - Maximum number of locks held
PARTIAL_RECORD	SMALLINT	partial_record - Partial record

Table 88. Information returned for a transaction event monitor: Default table name: XACT_evmon-name (continued)

Column name	Data type	Description
PREV_UOW_STOP_TIME	TIMESTAMP	prev_uow_stop_time - Previous unit of work completion timestamp
ROWS_READ	BIGINT	rows_read - Rows read
ROWS_WRITTEN	BIGINT	rows_written - Rows written
SEQUENCE_NO	CHARACTER	sequence_no - Sequence number
STOP_TIME	TIMESTAMP	stop_time - Event stop time
SYSTEM_CPU_TIME	BIGINT	system_cpu_time - System CPU time
TPMON_ACC_STR	VARCHAR(200)	tpmon_acc_str - TP monitor client accounting string
TPMON_CLIENT_APP	VARCHAR(255)	tpmon_client_app - TP monitor client application name
TPMON_CLIENT_USERID	VARCHAR(255)	tpmon_client_userid - TP monitor client user ID
TPMON_CLIENT_WKSTN	VARCHAR(255)	tpmon_client_wkstn - TP monitor client workstation name
UOW_LOG_SPACE_USED	BIGINT	uow_log_space_used - Unit of work log space used
UOW_START_TIME	TIMESTAMP	uow_start_time - Unit of work start timestamp
UOW_STATUS	BIGINT	uow_status - Unit of work status
USER_CPU_TIME	BIGINT	user_cpu_time - User CPU time
X_LOCK_ESCALS	BIGINT	x_lock_escals - Exclusive lock escalations

Table 89. Information returned for a transaction event monitor: Default table name: CONNHEADER_evmon-name

Column Name	Data Type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID)
APPL_ID	VARCHAR(64)	appl_id - Application ID
APPL_NAME	VARCHAR(255)	appl_name - Application name
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID
CLIENT_DB_ALIAS	CHARACTER(8)	client_db_alias - Database alias used by application
CLIENT_NNAME	VARCHAR(20)	"client_nname - Client name monitor element" on page 777
CLIENT_PID	BIGINT	client_pid - Client process ID
CLIENT_PLATFORM	INTEGER	client_platform - Client operating platform
CLIENT_PRDID	VARCHAR(20)	client_prdid - Client product and version ID
CLIENT_PROTOCOL	INTEGER	client_protocol - Client communication protocol
CODEPAGE_ID	INTEGER	codepage_id - ID of code page used by application
CONN_TIME	TIMESTAMP	conn_time - Time of database connection
CORR_TOKEN	VARCHAR(64)	corr_token - DRDA correlation token
EXECUTION_ID	VARCHAR(128)	execution_id - User login ID
SEQUENCE_NO	CHARACTER(5)	sequence_no - Sequence number
TERRITORY_CODE	INTEGER	territory_code - Database territory code

Table 90. Information returned for a transaction event monitor: Default table name: CONTROL_evmon-name

Column name	Data type	Description
EVENT_MONITOR_NAME	VARCHAR(128)	event_monitor_name - Event monitor name
MESSAGE	VARCHAR(128)	message - Control table message
MESSAGE_TIME	TIMESTAMP	message_time - Timestamp control table message

Deadlock event monitoring

Data generated by deadlock event monitors

Deadlock event monitors record information about deadlock conditions.

Note: This event monitor has been deprecated. It is no longer recommended and might be removed in a future release. Use the locking event monitor to monitor deadlocks instead.

Regardless of the output format you choose, all deadlock event data comes from three logical groups:

- “event_connheader logical data group” on page 59
- “event_deadlock logical data group” on page 65
- “event_dlconn logical data group” on page 66

In addition, if you choose to have the transaction event data written to tables, data from an additional group (CONTROL) is used to generate metadata about the event monitor itself.

Information written to tables for a deadlock event monitor:

Information written by a deadlock event monitor when the WRITE TO TABLE option is specified.

The sections that follows illustrates the output of a deadlock event monitor when the WRITE TO TABLE option is used on the CREATE EVENT MONITOR statement. For information about the output returned when the event monitor writes to a file or named pipe, see “Event monitor self-describing data stream” on page 130.

Table 91. Tables produced by DEADLOCK write-to-table event monitors. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
CONNHEADER_evmon-name	“event_connheader logical data group” on page 59
DEADLOCK_evmon-name	“event_deadlock logical data group” on page 65
DLCONN_evmon-name	“event_dlconn logical data group” on page 66

Table 91. Tables produced by DEADLOCK write-to-table event monitors (continued). The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor (as represented by *evmon-name* in the table names shown in the following table) in the CREATE EVENT MONITOR statement.

Default table name	Logical data groups reported
CONTROL_ <i>evmon-name</i>	The CONTROL logical group consists of selected elements from one or more of the event_dbheader, event_start and event_overflow logical data groups.

Tables produced

Table 92. Information returned for a deadlock event monitor: Default table name: CONNHEADER_*evmon-name*

Column Name	Data Type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID) monitor element
APPL_ID	VARCHAR(64)	appl_id - Application ID monitor element
APPL_NAME	VARCHAR(255)	appl_name - Application name monitor element
AUTH_ID	VARCHAR(128)	auth_id - Authorization ID monitor element
CLIENT_DB_ALIAS	CHARACTER(8)	client_db_alias - Database Alias Used by Application monitor element
CLIENT_NNAME	VARCHAR(20)	"client_nname - Client name monitor element" on page 777
CLIENT_PID	BIGINT	client_pid - Client process ID monitor element
CLIENT_PLATFORM	INTEGER	client_platform - Client operating platform monitor element
CLIENT_PRDID	VARCHAR(20)	client_prdid - Client product and version ID monitor element
CLIENT_PROTOCOL	INTEGER	client_protocol - Client communication protocol monitor element
CODEPAGE_ID	INTEGER	codepage_id - ID of Code Page Used by Application monitor element
CONN_TIME	TIMESTAMP	conn_time - Time of database connection monitor element
CORR_TOKEN	VARCHAR(64)	corr_token - DRDA Correlation Token monitor element
EXECUTION_ID	VARCHAR(128)	execution_id - User Login ID monitor element
SEQUENCE_NO	CHARACTER(5)	sequence_no - Sequence number monitor element
TERRITORY_CODE	INTEGER	territory_code - Database Territory Code monitor element

Table 93. Information returned for a deadlock event monitor: Default table name: DEADLOCK_*evmon-name*

Column Name	Data Type	Description
DEADLOCK_ID	BIGINT	deadlock_id - Deadlock Event Identifier monitor element
DL_CONNS	BIGINT	dl_conns - Connections involved in deadlock monitor element

Table 93. Information returned for a deadlock event monitor: Default table name: DEADLOCK_evmon-name (continued)

Column Name	Data Type	Description
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of Event Monitor Activations monitor element
ROLLED_BACK_AGENT_ID	BIGINT	rolled_back_agent_id - Rolled Back Agent monitor element
ROLLED_BACK_APPL_ID	VARCHAR(64)	rolled_back_appl_id - Rolled Back Application monitor element
ROLLED_BACK_PARTICIPANT_NO	SMALLINT	rolled_back_participant_no - Rolled back application participant monitor element
ROLLED_BACK_SEQUENCE_NO	CHARACTER(5)	rolled_back_sequence_no - Rolled Back Sequence Number monitor element
START_TIME	TIMESTAMP	start_time - Event Start Time monitor element

Table 94. Information returned for a deadlock event monitor: Default table name: DLCONN_evmon-name

Column Name	Data Type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID) monitor element
APPL_ID	VARCHAR(64)	appl_id - Application ID monitor element
APPL_ID_HOLDING_LK	VARCHAR(64)	appl_id_holding_lk - Application ID Holding Lock monitor element
DATA_PARTITION_ID	INTEGER	data_partition_id - Data partition identifier monitor element
DEADLOCK_ID	BIGINT	deadlock_id - Deadlock Event Identifier monitor element
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of Event Monitor Activations monitor element
LOCK_ATTRIBUTES	BIGINT	lock_attributes - Lock attributes monitor element
LOCK_COUNT	BIGINT	lock_count - Lock count monitor element
LOCK_CURRENT_MODE	BIGINT	lock_current_mode - Original lock mode before conversion monitor element
LOCK_ESCALATION	SMALLINT	lock_escalation - Lock escalation monitor element
LOCK_HOLD_COUNT	BIGINT	lock_hold_count - Lock hold count monitor element
LOCK_MODE	BIGINT	lock_mode - Lock mode monitor element
LOCK_MODE_REQUESTED	BIGINT	lock_mode_requested - Lock mode requested monitor element
LOCK_NAME	CHARACTER(13)	lock_name - Lock name monitor element
LOCK_NODE	BIGINT	lock_node - Lock Node monitor element
LOCK_OBJECT_NAME	BIGINT	lock_object_name - Lock Object Name monitor element
LOCK_OBJECT_TYPE	BIGINT	lock_object_type - Lock object type waited on monitor element
LOCK_RELEASE_FLAGS	BIGINT	lock_release_flags - Lock release flags monitor element
LOCK_WAIT_START_TIME	TIMESTAMP	lock_wait_start_time - Lock wait start timestamp monitor element

Table 94. Information returned for a deadlock event monitor: Default table name: DLCONN_evmon-name (continued)

Column Name	Data Type	Description
PARTICIPANT_NO	SMALLINT	participant_no - Participant within Deadlock monitor element
PARTICIPANT_NO_HOLDING_LK	SMALLINT	participant_no_holding_lk - Participant Holding a Lock on the Object Required by Application monitor element
SEQUENCE_NO	CHARACTER(5)	sequence_no - Sequence number monitor element
SEQUENCE_NO_HOLDING_LK	CHARACTER(5)	sequence_no_holding_lk - Sequence Number Holding Lock monitor element
START_TIME	TIMESTAMP	start_time - Event Start Time monitor element
TABLE_NAME	VARCHAR(128)	table_name - Table name monitor element
TABLE_SCHEMA	VARCHAR(128)	table_schema - Table schema name monitor element
TABLESPACE_NAME	VARCHAR(18)	tablespace_name - Table space name monitor element

Table 95. Information returned for a deadlock event monitor: Default table name: CONTROL_evmon-name

Column Name	Data Type	Description
AGENT_ID	BIGINT	agent_id - Application handle (agent ID) monitor element
APPL_ID	VARCHAR(64)	appl_id - Application ID monitor element
APPL_ID_HOLDING_LK	VARCHAR(64)	appl_id_holding_lk - Application ID Holding Lock monitor element
DATA_PARTITION_ID	INTEGER	data_partition_id - Data partition identifier monitor element
DEADLOCK_ID	BIGINT	deadlock_id - Deadlock Event Identifier monitor element
EVMON_ACTIVATES	BIGINT	evmon_activates - Number of Event Monitor Activations monitor element
LOCK_ATTRIBUTES	BIGINT	lock_attributes - Lock attributes monitor element
LOCK_COUNT	BIGINT	lock_count - Lock count monitor element
LOCK_CURRENT_MODE	BIGINT	lock_current_mode - Original lock mode before conversion monitor element
LOCK_ESCALATION	SMALLINT	lock_escalation - Lock escalation monitor element
LOCK_HOLD_COUNT	BIGINT	lock_hold_count - Lock hold count monitor element
LOCK_MODE	BIGINT	lock_mode - Lock mode monitor element
LOCK_MODE_REQUESTED	BIGINT	lock_mode_requested - Lock mode requested monitor element
LOCK_NAME	CHARACTER(13)	lock_name - Lock name monitor element
LOCK_NODE	BIGINT	lock_node - Lock Node monitor element
LOCK_OBJECT_NAME	BIGINT	lock_object_name - Lock Object Name monitor element
LOCK_OBJECT_TYPE	BIGINT	lock_object_type - Lock object type waited on monitor element
LOCK_RELEASE_FLAGS	BIGINT	lock_release_flags - Lock release flags monitor element

Table 95. Information returned for a deadlock event monitor: Default table name: CONTROL_evmon-name (continued)

Column Name	Data Type	Description
LOCK_WAIT_START_TIME	TIMESTAMP	lock_wait_start_time - Lock wait start timestamp monitor element
PARTICIPANT_NO	SMALLINT	participant_no - Participant within Deadlock monitor element
PARTICIPANT_NO_HOLDING_LK	SMALLINT	participant_no_holding_lk - Participant Holding a Lock on the Object Required by Application monitor element
SEQUENCE_NO	CHARACTER(5)	sequence_no - Sequence number monitor element
SEQUENCE_NO_HOLDING_LK	CHARACTER(5)	sequence_no_holding_lk - Sequence Number Holding Lock monitor element
START_TIME	TIMESTAMP	start_time - Event Start Time monitor element
TABLE_NAME	VARCHAR(128)	table_name - Table name monitor element
TABLE_SCHEMA	VARCHAR(128)	table_schema - Table schema name monitor element
TABLESPACE_NAME	VARCHAR(18)	tablespace_name - Table space name monitor element

Change history event monitoring

The change history event monitor captures information about events on the database server that might impact the running of your regular database workload. You can use the data captured by this event monitor to understand changes in the behavior, performance, or stability of your databases and database management system.

When your regular workload experiences a degradation in performance or unexpected behavior is observed, you can correlate the change in workload behavior with events captured by the change history event monitor. The following changes can have a negative impact on your database system.

- The unexpected creation or dropping of an index
- The failure of scheduled maintenance to run
- The changing of a database configuration parameter or DB2 registry variable

Changes can be explicitly caused by a user. For example, an administrator might run a DDL statement that drops an index. Or, changes might occur implicitly or automatically without any user interaction. For example, the self-tuning memory manager (STMM) might change a configuration parameter, or automatic table reorganization might reorganize a table.

Manually tracking changes to the database server can be a difficult task. Historically, the information for different types of changes has been captured through different interfaces. For example, configuration updates are written to the diagnostic log files (for example, the db2diag log files), while utility progress is captured in the database history file. The change history event monitor provides you with a single interface that captures the events that change the behavior and performance characteristics of your database system. Using the event monitor tables, you can investigate any change events that are of interest.

The change history event monitor can capture change-related events for a number of actions and operations, including:

- Database and database manager configuration parameter changes
- Registry variable changes
- Execution of DDL statements
- Change history event monitor startup
- Execution of the following DB2 utilities and commands:
 - LOAD
 - ADMIN_MOVE_TABLE procedure invocations
 - BACKUP DATABASE (ONLINE option only)
 - RESTORE DATABASE (ONLINE option only)
 - ROLLFORWARD DATABASE (ONLINE option only)
 - REDISTRIBUTE DATABASE PARTITION GROUP
 - REORG
 - RUNSTATS

Generally, information related to events that occur while the change history event monitor is inactive or the database is offline are not captured. However, the change history event monitor can be configured to capture the registry variable values that are in effect when the an event monitor is activated. Similarly, database and database manager configuration parameter values can be captured when a change history event monitor is activated. When capturing configuration parameter values, the event monitor can detect if any configuration parameters were changed while the event monitor was inactive, and so the event monitor captures configuration parameter values only if changes occur.

Data generated by change history event monitors

Change history event monitors capture information about activities that might impact the performance, behavior, and stability of databases and database management systems. The output from a change history event monitor is written to logical data groups, where each logical data group has an associated event monitor table.

A change-related action can generate one or more events in the change history event monitor. For example, a database configuration update generates a single event, while the execution of the REORG utility generates two events that mark the beginning and end of the REORG operation. There is a one-to-many mapping between an event and a logical data group. An event can write information to more than one logical data group and can write more than one entry (row) to the table associated with a given logical data group. Each change-related event is uniquely identified by the following three key fields:

Event timestamp

The time that the event occurred.

Event ID

A numeric token that ensures uniqueness in cases where the event timestamp is common.

Member

The database manager process where the event occurred.

All logical groups contain these three fields and all records or rows corresponding to the same event contain the same values for these fields. These common values facilitate the joining of information across different logical data groups. Utility operations and configuration parameter updates on different members are captured as different events and result in different values for these key fields.

The change history event monitor only supports the TABLE target for event monitor logical data groups. The change history event monitor does not support UNFORMATTED EVENT TABLE, FILE, and PIPE targets.

The following table contains a list of the logical data groups and associated tables used by the change history event monitor. The default table name for each logical data group is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor when it was created using the CREATE EVENT MONITOR statement. The table names shown are the default table names when a name is not specified as part of the CREATE EVENT MONITOR statement.

Table 96. Logical data groups for the change history event monitor

Logical data group	Default table name	Contains
CHANGESUMMARY	CHANGESUMMARY_evmon-name (see "CHANGESUMMARY logical data group" on page 414)	Summary of all events captured by the change history event monitor
DBDBMCFG	DBDBMCFG_evmon-name (see "DBDBMCFG logical data group" on page 417)	Configuration parameter changes
REGVAR	REGVAR_evmon-name (see "REGVAR logical data group" on page 419)	Registry variable changes
DDLSTMTEEXEC	DDLSTMTEEXEC_evmon-name (see "DDLSTMTEEXEC logical data group" on page 420)	DDL execution
TXNCOMPLETION	TXNCOMPLETION_evmon-name (see "TXNCOMPLETION logical data group" on page 423)	Occurrence of a commit, rollback, or rollback to savepoint
EVMONSTART	EVMONSTART_evmon-name (see "EVMONSTART logical data group" on page 424)	Event monitor startup information
UTILSTART	UTILSTART_evmon-name (see "UTILSTART logical data group" on page 425)	Utility startup information
UTILLOCATION	UTILLOCATION_evmon-name (see "UTILLOCATION logical data group" on page 429)	Utility path or file information
UTILSTOP	UTILSTOP_evmon-name (see "UTILSTOP logical data group" on page 431)	Utility stop information
UTILPHASE	UTILPHASE_evmon-name (see "UTILPHASE logical data group" on page 433)	Utility phase information

The change history event monitor can capture a wide range of events. Not all events are of interest to all users. You can control which event types are captured by the change history event monitor by using the WHERE EVENT IN clause in the CREATE EVENT MONITOR statement when you create the event monitor.

The following table shows the actions on the database server that generate events available for capture by the change history event monitor. It also indicates which

control options specified in the WHERE EVENT IN clause results in the capture of these events and which logical data groups are populated when the event is generated.

Table 97. Events generated by actions

Action	Event type	WHERE EVENT IN clause	Logical data group	Details
Changing a database configuration parameter	DBCFCG	ALL CFGALL DBCFCG	CHANGESUMMARY DBDBMCFG	1 record written to CHANGESUMMARY 1 record written to DBDBMCFG for each changed parameter
Capturing all database configuration parameter values at event monitor startup if a database configuration parameter was changed while the event monitor was inactive	DBCFCGVALUES	ALL CFGALL DBCFCGVALUES	CHANGESUMMARY DBDBMCFG	1 record written to CHANGESUMMARY 1 record written to DBDBMCFG for each parameter
Changing a database manager configuration parameter	DBMCFG	ALL CFGALL DBMCFG	CHANGESUMMARY DBDBMCFG	1 record written to CHANGESUMMARY 1 record written to DBDBMCFG for each changed parameter
Capturing all database manager configuration parameter values at event monitor startup if a database manager configuration parameter was changed while the event monitor was inactive	DBMCFGVALUES	ALL CFGALL DBMCFGVALUES	CHANGESUMMARY DBDBMCFG	1 record written to CHANGESUMMARY 1 record written to DBDBMCFG for each parameter
Changing a registry variable. Only immediate updates (registry variable changes that use the -immediate flag on the db2set command) generate events.	REGVAR	ALL CFGALL REGVAR	CHANGESUMMARY REGVAR	1 record written to CHANGESUMMARY 1 record written to REGVAR for each changed variable. Only registry variables that are set explicitly are captured. No records are written for variables that are implicitly set through an aggregate registry variable.

Table 97. Events generated by actions (continued)

Action	Event type	WHERE EVENT IN clause	Logical data group	Details
Capturing registry variable values at event monitor startup	REGVARVALUES	ALL CFGALL REGVARVALUES	CHANGESUMMARY REGVAR	1 record written to CHANGESUMMARY 1 record written to REGVAR for each explicitly set variable
Executing a DDL statement successfully	DDLSTMTEEXEC	ALL DDLALL DDLDATA DDLFEDERATED DDLMONITOR DDLSECURITY DDLSQL DDLSTORAGE DDLWLM DDLXML	CHANGESUMMARY DDLSTMTEEXEC	1 record written to CHANGESUMMARY 1 record written to DDLSTMTEEXEC
Commit or rollback of a transaction containing a successfully executed DDL statement or the rollback to a savepoint containing a successfully executed DDL statement	TXNCOMPLETION	ALL DDLALL DDLDATA DDLFEDERATED DDLMONITOR DDLSECURITY DDLSQL DDLSTORAGE DDLWLM DDLXML	CHANGESUMMARY TXNCOMPLETION	1 record written to CHANGESUMMARY 1 record written to TXNCOMPLETION
Starting or stopping the event monitor	EVMONSTART	not applicable	CHANGESUMMARY EVMONSTART	1 record written to CHANGESUMMARY 1 record written to EVMONSTART
Starting utility execution or resuming execution after being paused. This event is only generated on the coordinator member	UTILSTART	ALL BACKUP LOAD MOVETABLE REDISTRIBUTE REORG RESTORE ROLLFORWARD RUNSTATS UTILALL	CHANGESUMMARY UTILSTART UTILLOCATION	1 record written to CHANGESUMMARY 1 record written to UTILSTART 0 or more records written to UTILLOCATION; 1 record for each file associated with a utility start.
Completing utility execution or pausing execution. This event is only generated on the coordinator member	UTILSTOP	ALL BACKUP LOAD MOVETABLE REDISTRIBUTE REORG RESTORE ROLLFORWARD RUNSTATS UTILALL	CHANGESUMMARY UTILSTOP	1 record written to CHANGESUMMARY 1 record written to UTILSTOP

Table 97. Events generated by actions (continued)

Action	Event type	WHERE EVENT IN clause	Logical data group	Details
Processing of a utility starts on a member. This event is only generated in a multi-member environment	UTILSTARTPROC	ALL BACKUP LOAD MOVETABLE REDISTRIBUTE REORG RESTORE ROLLFORWARD RUNSTATS UTILALL	CHANGESUMMARY UTILSTART	1 record written to CHANGESUMMARY 1 record written to UTILSTART
Processing of a utility stops on a member. This event is only generated in a multi-member environment	UTILSTOPPROC	ALL BACKUP LOAD MOVETABLE REDISTRIBUTE REORG RESTORE ROLLFORWARD RUNSTATS UTILALL	CHANGESUMMARY UTILSTOP	1 record written to CHANGESUMMARY 1 record written to UTILSTOP
Starting the execution of a specific processing phase of a utility on a member	UTILPHASESTART	ALL BACKUP UTILALL	CHANGESUMMARY UTILPHASE	1 record written to CHANGESUMMARY 1 record written to UTILPHASE
Stopping the execution of a specific processing phase of a utility on a member	UTILPHASESTOP	ALL BACKUP UTILALL	CHANGESUMMARY UTILPHASE	1 record written to CHANGESUMMARY 1 record written to UTILPHASE

CHANGESUMMARY logical data group:

The table for the CHANGESUMMARY logical data group is produced by the change history event monitor, where each row represents a unique change history event that occurred.

This table provides you with a quick method of determining whether any changes were captured by the change history event monitor and which other logical data groups contain the details of those changes.

The following table provides a summary of the change event information collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 98. Information returned by a change history event monitor for the CHANGESUMMARY logical data group. The default table name is CHANGESUMMARY_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.

Table 98. Information returned by a change history event monitor for the CHANGESUMMARY logical data group. The default table name is CHANGESUMMARY_evmon-name. (continued)

Column name	Data type	Description
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> • DBCFG • DBCFGVALUES • DBMCFG • DBMCFGVALUES • REGVAR • REGVARVALUES • DDLSTMTEXEC • TXNCOMPLETION • EVMONSTART • UTILSTART • UTILSTOP • UTILSTARTPROC • UTILSTOPPROC • UTILPHASESTART • UTILPHASESTOP
COORD_MEMBER	SMALLINT	The coordinating member for the given unit of work or workload.
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	A unique identifier corresponding to the utility invocation that is captured for EVENT_TYPES: <ul style="list-style-type: none"> • UTILSTART • UTILSTOP • UTILSTARTPROC • UTILSTOPPROC • UTILPHASESTART • UTILPHASESTOP <p>Other EVENT_TYPES result in an empty string.</p>

Table 98. Information returned by a change history event monitor for the CHANGESUMMARY logical data group. The default table name is CHANGESUMMARY_evmon-name. (continued)

Column name	Data type	Description
UTILITY_TYPE	VARCHAR(16)	If the UTILITY_INVOCATION_ID is not empty, then the type is one of: <ul style="list-style-type: none"> • BACKUP • LOAD • MOVETABLE • REDISTRIBUTE • REORG • RESTORE • ROLLFORWARD • RUNSTATS otherwise an empty string.
APPL_ID	VARCHAR(64)	The identifier generated when the application connects to the database.
APPL_NAME	VARCHAR(255)	The name of the application running at the client, as known to the database.
APPLICATION_HANDLE	BIGINT	A system-wide unique ID for the application
SYSTEM_AUTHID	VARCHAR(128)	The system authorization ID for the connection. This is a synonym for the system_auth_id monitor element.
SESSION_AUTHID	VARCHAR(128)	The current authorization ID for the session being used by the application. This is a synonym for the session_auth_id monitor element.
CLIENT_PLATFORM	VARCHAR(12)	The operating system on which the client application is running.
CLIENT_PROTOCOL	VARCHAR(10)	The communication protocol that the client application is using to communicate with the server.
CLIENT_PORT_NUMBER	INTEGER	The port number on the client machine that the application is using to communicate with the database server.
CLIENT_PID	BIGINT	The process ID of the client application that made the connection to the database.

Table 98. Information returned by a change history event monitor for the CHANGESUMMARY logical data group. The default table name is CHANGESUMMARY_evmon-name. (continued)

Column name	Data type	Description
CLIENT_HOSTNAME	VARCHAR(255)	The hostname of the machine the client application is connecting from.
CLIENT_WRKSTNNAME	VARCHAR(255)	The name identifying the client system or workstation.
CLIENT_ACCTNG	VARCHAR(200)	The data passed to the target database for logging and diagnostic purposes.
CLIENT_USERID	VARCHAR(255)	The client user ID provided to the server.
CLIENT_APPLNAME	VARCHAR(255)	The name identifying the server transaction program that is performing the transaction.
BACKUP_TIMESTAMP	VARCHAR(14)	<p>If UTILITY_TYPE is BACKUP and EVENT_TYPE is UTILSTART, the BACKUP_TIMESTAMP value is the timestamp of the backup image.</p> <p>If UTILITY_TYPE is RESTORE and EVENT_TYPE is UTILSTOP, the BACKUP_TIMESTAMP value is the timestamp of the backup image.</p> <p>For all other cases, the BACKUP_TIMESTAMP is an empty string.</p> <p>A BACKUP_TIMESTAMP can be correlated with information stored in the database history file (for example, Lookup sequence information) using the SYSIBMADM.DB_HISTORY administration view.</p>

DBDBMCFG logical data group:

The table for the DBDBMCFG logical data group is produced by the change history event monitor, where each row represents a configuration parameter that was updated as part of a DBCFG or DBMCFG event, or captured at event monitor startup as part of a DBCFGVALUES or DBMCFGVALUES event.

The CFG_COLLECTION_TYPE monitor element identifies whether the record describes a configuration parameter update, or an initial value recorded at event monitor startup.

The following table shows the configuration parameter changes collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 99. Information returned by a change history event monitor for the DBDBMCFG logical data group. The default table name is DBDBMCFG_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> • DBCFG • DBCFGVALUES • DBMCFG • DBMCFGVALUES
CFG_NAME	VARCHAR(128)	The name of the configuration parameter.
CFG_VALUE	VARCHAR(255)	If the EVENT_TYPE is DBCFG or DBMCFG, this is the new value for the configuration parameter. If the EVENT_TYPE is DBCFGVALUES or DBMCFGVALUES, this is the on-disk configuration parameter value. The on-disk configuration parameter value is the most current value and might not be in effect yet.
CFG_VALUE_FLAGS	VARCHAR(32)	This flag indicates how the new configuration parameter value was determined: <ul style="list-style-type: none"> • AUTOMATIC • COMPUTED • NONE If the EVENT_TYPE is DBCFGVALUES or DBMCFGVALUES, the flags represent the current on-disk value for the configuration parameter.

Table 99. Information returned by a change history event monitor for the DBDBMCFG logical data group. The default table name is DBDBMCFG_evmon-name. (continued)

Column name	Data type	Description
CFG_OLD_VALUE	VARCHAR(255)	If the EVENT_TYPE is DBCFG or DBMCFG, this is the old configuration parameter value. If the EVENT_TYPE is DBCFGVALUES or DBMCFGVALUES, this is the current in-memory configuration parameter value. This is the configuration parameter value currently in use.
CFG_OLD_VALUE_FLAGS	VARCHAR(32)	This flag indicates how the old configuration parameter value was determined: <ul style="list-style-type: none"> • AUTOMATIC • COMPUTED • NONE If the EVENT_TYPE is DBCFGVALUES or DBMCFGVALUES, the flags represent the current in-memory value for the configuration parameter.
CFG_COLLECTION_TYPE	CHAR(1)	Indicates when the configuration parameter value was collected: <p>I The initial value that was captured when the event monitor was activated.</p> <p>U Updated value</p>
DEFERRED	CHAR(1)	Indicates if a change to a configuration parameter value is deferred: <p>Y Change deferred until next database activation</p> <p>N Change takes effect immediately</p>

REGVAR logical data group:

The table for the REGVAR logical data group is produced by the change history event monitor, where each row represents a registry variable that was updated as part of a REGVAR event, or captured at event monitor startup as part of a RERVARVALUES event.

The REGVAR_COLLECTION_TYPE monitor element identifies whether the record describes an immediate registry variable update (*U*) or an initial value recorded at event monitor startup (*I*).

The following table shows registry variable changes collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 100. Information returned by a change history event monitor for the REGVAR logical data group. The default table name is REGVAR_evmon-name.I

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> • REGVAR • REGVARVALUES
REGVAR_NAME	VARCHAR(256)	The name of the registry variable.
REGVAR_VALUE	CLOB(2k)	This is the value for the registry variable. If not set, the value is an empty string.
REGVAR_OLD_VALUE	CLOB(2k)	This is the old value for the registry variable. If the value was not set, this value is an empty string.
REGVAR_LEVEL	CHAR(1)	Indicates the level of the registry variable: <ul style="list-style-type: none"> E Environment G Global I Instance-level P Database partition
REGVAR_COLLECTION_TYPE	CHAR(1)	Indicates when the registry variable value was collected: <ul style="list-style-type: none"> I The initial value that was captured when the event monitor was activated. U Updated value

DDLSTMTEEXEC logical data group:

The table for the DDLSTMTEEXEC logical data group is produced by the change history event monitor, where each row represents an executed DDL statement event. In a partitioned database environment, rows are captured on the coordinator partition for the DDL execution.

Whenever a row is written to the DDLSTMTEEXEC_evmon-name table, a row is written to the TXNCOMPLETION_evmon-name table for each associated transaction state change (commit, rollback, or rollback to savepoint) performed in the same unit of work following the DDL statement. You can then use the GLOBAL_TRANSACTION_ID, LOCAL_TRANSACTION_ID, and SAVEPOINT_ID columns in the DDLSTMTEEXEC_evmon-name table to locate the corresponding state change operation in the TXNCOMPLETION_evmon-name table and determine whether the DDL was committed or not.

The following table shows the DDL statement execution information collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 101. Information returned by a change history event monitor for the DDLSTMTEEXEC logical data group. The default table name is DDLSTMTEEXEC_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is DDLSTMTEEXEC.
GLOBAL_TRANSACTION_ID	VARCHAR(40)	The global transaction ID in use at the time the event occurred. This is the data field in the SQLP_GXID structure that is part of the transaction logs.
LOCAL_TRANSACTION_ID	VARCHAR(16)	The local transaction ID in use at the time the event occurred. This is the SQLU_TID structure that is part of the transaction logs.
SAVEPOINT_ID	BIGINT	The name of the savepoint set within a unit of work.
UOW_ID	INTEGER	The unique identifier for a unit of work ID within an application handle.

Table 101. Information returned by a change history event monitor for the DDLSTMTEEXEC logical data group. The default table name is DDLSTMTEEXEC_evmon-name. (continued)

Column name	Data type	Description
DDL_CLASSIFICATION	VARCHAR(30)	<p>The classification of the captured DDL:</p> <p>DDLSTORAGE The execution of alter database, buffer pool, partition group, storage group, and table space DDL.</p> <p>DDLWLM The execution of histogram, service class, threshold, work action set, work class set, and workload DDL.</p> <p>DDLMONITOR The execution of event monitor, and usage list DDL.</p> <p>DDLSECURITY The execution of audit policy, grant, mask, permission role, revoke, security label, security label component, security policy, and trusted context DDL.</p> <p>DDLSQL The execution of alias, function, method, module, package, procedure, schema, synonym, transform, trigger, type, variable, and view DDL.</p> <p>DDLDATA The execution of index, sequence, table, and temporary table DDL.</p>

Table 101. Information returned by a change history event monitor for the DDLSTMTEEXEC logical data group. The default table name is DDLSTMTEEXEC_evmon-name. (continued)

Column name	Data type	Description
DDL_CLASSIFICATION (continued)	VARCHAR(30)	<p>DDLXML The execution of XSROBJECT DDL.</p> <p>DDLFEDERATED The execution of nickname/server, type/user mapping, and wrapper DDL.</p>
STMT_TEXT	CLOB(2MB)	The text of the SQL statement.

TXNCOMPLETION logical data group:

The table for the TXNCOMPLETION logical data group is produced by the change history event monitor, where each row represents a completed transaction event. Rows are written whenever a commit, rollback, or rollback to savepoint occurs in the same unit of work as a corresponding DDLSTMTEEXEC_evmon-name table event.

Use the information in TXNCOMPLETION_evmon-name table to determine whether the DDL statements in the transaction were committed. You can then use the GLOBAL_TRANSACTION_ID, LOCAL_TRANSACTION_ID, and SAVEPOINT_ID columns in the TXNCOMPLETION_evmon-name table to find the DDL statements in the DDLSTMTEEXEC_evmon-name table that were affected by a transaction completion event.

The following table shows the transaction completion information collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 102. Information returned by a change history event monitor for the TXNCOMPLETION logical data group. The default table name is TXNCOMPLETION_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is TXNCOMPLETION.

Table 102. Information returned by a change history event monitor for the TXNCOMPLETION logical data group. The default table name is TXNCOMPLETION_evmon-name. (continued)

Column name	Data type	Description
GLOBAL_TRANSACTION_ID	VARCHAR(40)	The global transaction ID in use at the time the event occurred. This is the data field in the SQLP_GXID structure that is part of the transaction logs.
LOCAL_TRANSACTION_ID	VARCHAR(16)	The local transaction ID in use at the time the event occurred. This is the SQLU_TID structure that is part of the transaction logs.
SAVEPOINT_ID	BIGINT	The ID of the savepoint set within a unit of work.
UOW_ID	INTEGER	The unique identifier for a unit of work ID within an application handle.
TXN_COMPLETION_STATUS	CHAR(1)	Indicates the status of the transaction: C Commit R Rollback S Rollback to savepoint

EVMONSTART logical data group:

The table for the EVMONSTART logical data group is produced by the change history event monitor, where each row represents a starting of the change history event monitor. Though event monitor startup is not directly related to system performance, this information provides context for other information captured by the monitor.

Event monitor startup events can help you understand when changes started to take effect. For example, activation timestamps help you track when any deferred database or database manager configuration parameter updates took effect. Knowing when the event monitor was activated also helps you understand the completeness of the information captured in the event monitor tables. Any events that occurred while the event monitor is deactivated, either explicitly or implicitly, are not captured. If the database is not activated, then the event monitor is implicitly inactive.

The following table shows the event monitor startup information collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 103. Information returned by a change history event monitor for the *EVMONSTART* logical data group. The default table name is *EVMONSTART_evmon-name*.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is <i>EVMONSTART</i>
DB2START_TIME	TIMESTAMP	The database member activation timestamp which can be used to track when deferred database manager configuration parameter updates took effect.
DB_CONN_TIME	TIMESTAMP	The database activation timestamp which can be used to track when deferred database configuration parameter updates took effect.

UTILSTART logical data group:

The table for the *UTILSTART* logical data group is produced by the change history event monitor, where each row represents a utility that was started.

The following table shows the utility details collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the *CREATE EVENT MONITOR* statement.

Table 104. Information returned by a change history event monitor for the *UTILSTART* logical data group. The default table name is *UTILSTART_evmon-name*.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.

Table 104. Information returned by a change history event monitor for the UTILSTART logical data group. The default table name is UTILSTART_evmon-name. (continued)

Column name	Data type	Description
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> • UTILSTART • UTILSTARTPROC
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	A unique identifier corresponding to the utility invocation.
UTILITY_TYPE	VARCHAR(16)	The utility type is one of: <ul style="list-style-type: none"> • BACKUP • LOAD • MOVETABLE • REDISTRIBUTE • REORG • RESTORE • ROLLFORWARD • RUNSTATS

Table 104. Information returned by a change history event monitor for the UTILSTART logical data group. The default table name is UTILSTART_evmon-name. (continued)

Column name	Data type	Description
UTILITY_OPERATION_TYPE	CHAR(1)	<p>If UTILITY_TYPE is BACKUP, one of:</p> <p>D Delta</p> <p>I Incremental</p> <p>F Full</p> <p>If UTILITY_TYPE is LOAD, one of:</p> <p>I Insert</p> <p>R Replace</p> <p>S Restart</p> <p>T Terminate</p> <p>If UTILITY_TYPE is MOVETABLE, one of:</p> <p>A Cancel</p> <p>C Copy</p> <p>I Init</p> <p>L Cleanup</p> <p>M Move</p> <p>R Replay</p> <p>S Swap</p> <p>V Verify</p> <p>If UTILITY_TYPE is REDISTRIBUTE, one of:</p> <p>A Abort</p> <p>C Continue</p> <p>D Default</p> <p>T Target Map</p> <p>If UTILITY_TYPE is REORG, one of:</p> <p>A Reorganize all table indexes</p> <p>I Index reorganization</p> <p>N Inplace table reorganization</p> <p>R Reorganize table reclaim extents</p> <p>T Classic table reorganization</p>

Table 104. Information returned by a change history event monitor for the UTILSTART logical data group. The default table name is UTILSTART_evmon-name. (continued)

Column name	Data type	Description
UTILITY_OPERATION_TYPE (continued)	CHAR(1)	<p>If UTILITY_TYPE is RESTORE, one of:</p> <p>A Incremental automatic</p> <p>B Incremental abort</p> <p>F Full</p> <p>M Incremental manual</p> <p>If UTILITY_TYPE is ROLLFORWARD, one of:</p> <p>E End of logs</p> <p>P Point in time</p> <p>If UTILITY_TYPE is RUNSTATS, one of:</p> <p>A All indexes on a table</p> <p>I Index</p> <p>T Table</p>
UTILITY_INVOKER_TYPE	VARCHAR(4)	<p>Indicates how a utility was invoked. One of:</p> <ul style="list-style-type: none"> • AUTO • USER
UTILITY_PRIORITY	INTEGER	<p>Specifies the amount of relative importance of a throttled utility with respect to its throttled peers. Priority values range 0 - 100, where 0 implies that a utility is executing unthrottled.</p>
UTILITY_START_TYPE	VARCHAR(8)	<p>Indicates how a utility was started. One of:</p> <ul style="list-style-type: none"> • RESUME • START
OBJECT_TYPE	VARCHAR(16)	<p>Type of object the utility acts on. One of:</p> <ul style="list-style-type: none"> • DATABASE • INDEX • PARTITIONGROUP • TABLE • TABLESPACE <p>This is a synonym for the objtype monitor element.</p>

Table 104. Information returned by a change history event monitor for the UTILSTART logical data group. The default table name is UTILSTART_evmon-name. (continued)

Column name	Data type	Description
OBJECT_SCHEMA	VARCHAR(128)	If the OBJECT_TYPE is INDEX or TABLE, then the schema of the index or table, otherwise an empty string.
OBJECT_NAME	VARCHAR(128)	If the OBJECT_TYPE is INDEX, PARTIONGROUP, or TABLE, then the name of the index, partition group, or table.
NUM_TBSPS	INTEGER	If the OBJECT_TYPE is DATABASE or TABLESPACE, then the number of table spaces.
TBSP_NAMES	CLOB(5M)	If the OBJECT_TYPE is DATABASE or TABLESPACE, a comma delimited list of table space names that the utility acts on.
UTILITY_DETAIL	CLOB(2M)	A brief description of the work a utility is performing, including some options specified for the utility. For example, a record for the invocation of REORG includes a partially reconstructed command string including some of the different options used by the utility such as access mode . The format of this field is dependent on the type of utility and might change between releases.

UTILLOCATION logical data group:

The table for the UTILLOCATION logical data group is produced by the change history event monitor, where each row represents each file or path associated with the start of a utility.

The following table shows the utility details collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 105. Information returned by a change history event monitor for the UTILLOCATION logical data group. The default table name is UTILLOCATION_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.

Table 105. Information returned by a change history event monitor for the UTILLOCATION logical data group. The default table name is UTILLOCATION_evmon-name. (continued)

Column name	Data type	Description
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is UTILSTART.
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	A unique identifier corresponding to the utility invocation.
UTILITY_TYPE	VARCHAR(16)	The utility type is one of: <ul style="list-style-type: none"> • BACKUP • LOAD • RESTORE • ROLLFORWARD
DEVICE_TYPE	CHAR(1)	Identifier for the device type associated with a UTILSTART event. This field determines the interpretation for the LOCATION field. One of: <ul style="list-style-type: none"> A TSM C Client D Disk F Snapshot backup L Local N Internally generated by DB2 O Other vendor device support P Pipe Q Cursor R Remove fetch data S Server T Tape U User exit X X/Open XBSA interface

Table 105. Information returned by a change history event monitor for the UTILLOCATION logical data group. The default table name is UTILLOCATION_evmon-name. (continued)

Column name	Data type	Description
LOCATION_TYPE	CHAR(1)	<p>Description of what the location is used for.</p> <p>If UTILITY_TYPE is LOAD, one of:</p> <p>C Copy target</p> <p>D Input data</p> <p>L LOB path</p> <p>X XML path</p> <p>If UTILITY_TYPE is BACKUP, one of:</p> <p>B Backup target location</p> <p>If UTILITY_TYPE is RESTORE, one of:</p> <p>S Restore source location</p> <p>If UTILITY_TYPE is ROLLFORWARD, one of:</p> <p>O Alternate overflow log path captured as part of the ROLLFORWARD DATABASE command. Note that if the default overflow log path is used, no location record will be captured.</p> <p>otherwise a blank character.</p>
LOCATION	VARCHAR(1024)	Location associated with the event. Locations depend on the UTILITY_TYPE. For example, load input files or backup target path name.

UTILSTOP logical data group:

The table for the UTILSTOP logical data group is produced by the change history event monitor, where each row represents a utility that has been stopped.

The following table shows the utility details collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 106. Information returned by a change history event monitor for the UTILSTOP logical data group. The default table name is UTILSTOP_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> UTILSTOP UTILSTOPPROC
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	A unique identifier corresponding to the utility invocation.
UTILITY_TYPE	VARCHAR(16)	The utility type is one of: <ul style="list-style-type: none"> BACKUP LOAD MOVETABLE REDISTRIBUTE REORG RESTORE ROLLFORWARD RUNSTATS
UTIL_STOP_TYPE	VARCHAR(8)	Indicates how a utility was stopped. One of: <ul style="list-style-type: none"> PAUSE STOP
START_EVENT_ID	BIGINT	Unique identifier of the corresponding UTILSTART or UTILSTARTPROC event. Use with the START_EVENT_TIMESTAMP and member elements to associate the stop record with the corresponding start record.
START_EVENT_TIMESTAMP	TIMESTAMP	Time of the corresponding UTILSTART or UTILSTARTPROC event. Use with the START_EVENT_ID and member elements to associate the stop record with the corresponding start record.
SQLCA (SQL communications area) (see <i>SQL Reference Volume 1</i>)	VARCHAR(8)	A string that identifies the beginning of the SQL communications area (SQLCA).
SQLABC	INTEGER	Length of the SQL communications area (SQLCA).
SQLCODE	INTEGER	In the SQLCA structure, the SQL return code of the most recently executed SQL statement.

Table 106. Information returned by a change history event monitor for the UTILSTOP logical data group. The default table name is UTILSTOP_evmon-name. (continued)

Column name	Data type	Description
SQLERRM	VARCHAR(72)	In the SQLCA structure, one or more tokens, separated by 'X'FF', that are substituted for variables in error messages providing specific information about an error condition.
SQLERRP	VARCHAR(8)	In the SQLCA structure, a three-letter identifier indicating the product, followed by five alphanumeric characters indicating the version, release, and modification level of the product.
SQLERRD1	INTEGER	See SQLCA (SQL communications area).
SQLERRD2	INTEGER	See SQLCA (SQL communications area).
SQLERRD3	INTEGER	See SQLCA (SQL communications area).
SQLERRD4	INTEGER	See SQLCA (SQL communications area).
SQLERRD5	INTEGER	See SQLCA (SQL communications area).
SQLERRD6	INTEGER	See SQLCA (SQL communications area).
SQLWARN	VARCHAR(11)	In the SQLCA structure, a set of warning indicators, each containing a blank or W.
SQLSTATE	VARCHAR(5)	In the SQLCA structure, a return code that indicates the outcome of the most recently executed SQL statement.

UTILPHASE logical data group:

The table for the UTILPHASE logical data group is produced by the change history event monitor, where each row contains information about the phase of the utility being started or stopped.

Utility execution is divided into phases or processing stages. Currently the change history event monitor only captures the starting and stopping phases of table space backups.

The following table shows the utility phase details collected by the change history event monitor. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor in the CREATE EVENT MONITOR statement.

Table 107. Information returned by a change history event monitor for the UTILPHASE logical data group. The default table name is UTILPHASE_evmon-name.

Column name	Data type	Description
PARTITION_KEY	INTEGER	Partitioning key for the event monitor tables.
EVENT_ID	BIGINT	A unique token associated with the event.
EVENT_TIMESTAMP	TIMESTAMP	The time the event was generated.
MEMBER	SMALLINT	The member where the event occurred.
EVENT_TYPE	VARCHAR(32)	The type of event that occurred. For this logical data group, the type is one of: <ul style="list-style-type: none"> UTILPHASESTART UTILPHASESTOP
UTILITY_INVOCATION_ID	VARCHAR(32) FOR BIT DATA	A unique identifier corresponding to the utility invocation.
UTILITY_TYPE	VARCHAR(16)	The type of utility that is being started or stopped. For this logical data group, the type is BACKUP.
UTILITY_PHASE_TYPE	VARCHAR(16)	If UTILITY_TYPE is BACKUP, the phase type is: BACKUPTS Backup table space
PHASE_START_EVENT_ID	BIGINT	If EVENT_TYPE is UTILPHASESTOP, this is the EVENT_ID of corresponding UTILPHASESTART, otherwise -1. Use with the PHASE_START_EVENT_TIMESTAMP and member elements to associate the phase stop record with the corresponding start record.
PHASE_START_EVENT_TIMESTAMP	TIMESTAMP	If EVENT_TYPE is UTILPHASESTOP, this is the time of the corresponding UTILPHASESTART, otherwise empty. Use with the PHASE_START_EVENT_ID and member elements to associate the phase stop record with the corresponding start record.
OBJECT_TYPE	VARCHAR(16)	Type of object the utility acts on. The type is TABLESPACE. This is a synonym for the objtype monitor element.
OBJECT_SCHEMA	VARCHAR(128)	Reserved for future use
OBJECT_NAME	VARCHAR(128)	If the OBJECT_TYPE is TABLESPACE, then the name of the table.
UTILITY_PHASE_DETAIL	CLOB(2M)	Reserved for future use

Monitoring utility history using the change history event monitor

The change history event monitor can capture a number of events related to the execution of utilities. These events can be used to monitor the history of utility execution on the database server.

This event history is written to logical data groups, where each logical data group has an associated event monitor table.

The execution of a utility can generate one or more events in the change history event monitor. For example, the execution of the REORG utility generates two events that mark the beginning and end of the REORG operation. There is a one-to-many mapping between an event and a logical data group. An event can write information to more than one logical data group and can write more than one entry (row) to the table associated with a given logical data group. Each event corresponding to a particular invocation of a utility is identified by the *utility_invocation_id* element. The *utility_invocation_id* is a binary token that uniquely identifies a given invocation of a utility. The *utility_invocation_id* is the same on each member where the utility is executing. The *utility_invocation_id* will retain its uniqueness across database deactivation, reactivation, and member shutdown, allowing quick identification of all event monitor records corresponding to a given invocation of a utility. There is no need to join with other fields or worry about duplicate identifiers.

Using the *utility_invocation_id* you can identify all events describing a particular invocation of a utility. For example, when the REORG command is issued on a table, a UTILSTART event is generated when the utility starts execution and a UTILSTOP event is generated when the utility completes execution. Both the UTILSTART and UTILSTOP events will have the same *utility_invocation_id*, because they describe the same invocation of the REORG command. The *utility_invocation_id* can be used to join these events to compute the elapsed time for the utility.

The change history event monitor can monitor the execution of the following utility types:

- BACKUP
- LOAD
- MOVETABLE
- REDISTRIBUTE
- REORG
- RESTORE
- ROLLFORWARD
- RUNSTATS

The change history event monitor will not capture the execution of an offline backup, restore, or rollforward. Note that utility events are only be captured if the change history event monitor is active during the execution of the utility. If the event monitor is deactivated before the utility executes, no events are captured for the execution of that utility. For example, if the utility needs exclusive access to the table space where the event monitor target tables reside.

The following table lists the change history event monitor logical data groups and associated tables are associated with utility execution events. The table name is derived by concatenating the name of the logical data group used to populate the table with the name given to the event monitor when it was created using the

CREATE EVENT MONITOR statement. The table names shown are the default table names when a name is not specified as part of the CREATE EVENT MONITOR statement.

Table 108. Logical data groups populated during utility executions

Logical data group	Default table name	Contains
CHANGESUMMARY	CHANGESUMMARY_evmon-name (see "CHANGESUMMARY logical data group" on page 414)	Summary of all events captured by the change history event monitor
UTILSTART	UTILSTART_evmon-name (see "UTILSTART logical data group" on page 425)	Utility startup information
UTILLOCATION	UTILLOCATION_evmon-name (see "UTILLOCATION logical data group" on page 429)	Utility path or file information
UTILSTOP	UTILSTOP_evmon-name (see "UTILSTOP logical data group" on page 431)	Utility stop information
UTILPHASE	UTILPHASE_evmon-name (see "UTILPHASE logical data group" on page 433)	Utility phase information

The WHERE EVENT IN clause of the CREATE EVENT MONITOR (change history) statement controls which utilities are monitored by the change history event monitor. The following list indicates which controls enable the capture of which utilities:

UTILALL

Capture execution of the load, move table, online backup, online restore, online rollforward, redistribute, reorg and runstats utilities.

BACKUP

Capture execution of the online backup utility.

LOAD

Capture execution of the load utility.

MOVETABLE

Capture execution of the table move utility (invocations of the ADMIN_MOVE_TABLE stored procedure).

REDISTRIBUTE

Capture execution of the redistribute partition group utility.

REORG

Capture execution of the reorg utility.

RESTORE

Capture execution of the online restore utility.

ROLLFORWARD

Capture execution of the online rollforward utility.

RUNSTATS

Capture execution of the runstats utility.

Collecting change history event data

You can use the change history event monitor to collect information about activities that might impact the performance, behavior, and stability of your databases and database management systems.

Before you begin

To create a change history event monitor and collect change history event monitor data, you must have DBADM, or SQLADM authority.

About this task

The change history event monitor captures changes that might impact the running of your regular database workload. When your regular workload experiences a degradation in performance or you observe unexpected behavior, you must determine what changes occurred that might be causing the problem. Each change-related event is uniquely identified by the following three key fields:

Event timestamp

The time that the event occurred.

Event ID

A numeric token that ensures uniqueness in cases where the event timestamp is common.

Member

The database manager process where the event occurred. Member ensures global uniqueness because event timestamp and event ID are only unique per member.

All logical groups contain these three fields and all records or rows corresponding to the same event contain the same values for these fields. These common values facilitate the joining of information across different logical data groups. Utility operations and configuration parameter updates on different members are captured as different events and result in different values for these key fields.

Restrictions

Change history event monitor data can be written only to tables associated with logical data groups. The change history event monitor does not write to unformatted event tables, files, or named pipes.

Procedure

To collect detailed information about activities that might be impacting database performance, behavior, or stability, perform the following steps:

1. Decide which change history events are of interest. The change history event monitor is capable of capturing events describing the following:
 - Configuration parameter changes
 - Registry variable changes
 - DDL execution
 - Occurrence of a commit, rollback, or rollback to savepoint
 - Event monitor startup information
 - Utility startup information
 - Utility path or file information

- Utility stop information
 - Utility phase information
2. Create a change history event monitor called `whats_changed` by using the `CREATE EVENT MONITOR FOR CHANGE HISTORY` statement. Use the `WHERE EVENT IN` clause to specify the change history events that should be captured. The following example shows how to create a change history event monitor that captures all event types:


```
CREATE EVENT MONITOR whats_changed
  FOR CHANGE HISTORY WHERE EVENT IN (ALL)
  WRITE TO TABLE
```
 3. Activate the change history event monitor called `whats_changed` by running the following statement:


```
SET EVENT MONITOR whats_changed STATE 1
```

Results

Whenever a change history event takes place while the change history event monitor is active (for example a database configuration update), information about the event will be captured in the change history event monitor tables. Only events identified in the `WHERE EVENT IN` clause of the event monitor will be captured by the change history event monitor.

Example

Example: Investigating an increase in lock escalations using the change history event monitor:

You can use the change history event monitor to detect what changes might have led to a database performance degradation.

Scenario

In this example, users are reporting a decline in database performance. The database administrator (DBA) notices an abnormally high number of lock escalations occurred in the last 24 hours. The DBA also notices a corresponding increase in application lock wait times over the same period.

The DBA has been monitoring configuration changes, index changes, and `LOAD` operations with a change history event monitor. The event monitor was created with the following statement:

```
CREATE EVENT MONITOR CFGHIST
  FOR CHANGE HISTORY WHERE EVENT IN (DBCFCG, DBMCFG, DBCFCGVALUES,
  DBMCFGVALUES,REGVAR,REGVARVALUES, DDLDATA, LOAD)
  WRITE TO TABLE
```

The event monitor was activated with the following statement:

```
SET EVENT MONITOR CFGHIST STATE=1
```

The following table shows some sample event monitor data that the `CFGHIST` change history event monitor might write to the `CHANGESUMMARY_CFGHIST` table. All change history event monitors write to the `CHANGESUMMARY` logical data group. As described in “`CHANGESUMMARY` logical data group”, the `CHANGESUMMARY` logical data group returns a number of event monitor elements that summarize the events captured, only a subset of those elements are shown in the following output. The table name is derived by concatenating the

name of the logical data group used to populate the table (CHANGESUMMARY) with the name given to the event monitor in the CREATE EVENT MONITOR statement (CFGHIST).

```

APPL_ID          APPL_NAME .... EVENT_ID EVENT_TIMESTAMP
-----
*LOCAL.tripathy.111028110756 db2bp      .... 1          28/10/2011 07:12:02

EVENT_TYPE MEMBER ....
-----
EVMONSTART 0      ....

```

Since performance was not previously a problem, the DBA suspects that some recent change might be causing the problem and performs the following steps:

1. Check the CHANGESUMMARY logical data group for any changes made in the last 24 hours. For this example, assume that the current time is 31/10/2011 06:00:00.

```

SELECT EVENT_TYPE FROM CHANGESUMMARY_CFGHIST
WHERE EVENT_TIMESTAMP > CURRENT_TIMESTAMP - 24 HOURS

```

The query returns the following result:

```

EVENT_TYPE
-----
DBCFCG
DBCFCG

```

The output indicates that there were two database configuration updates in the last 24 hours.

2. Query the DBDBMCFG logical data group to get the details of the configuration changes.
3. **SELECT** EVENT_TIMESTAMP, CFG_NAME, CFG_VALUE, CFG_OLD_VALUE, DB_DEFERRED **FROM** DBDBMCFG_CHGHIST

The query returns the following result:

```

EVENT_TIMESTAMP      CFG_NAME      CFG_VALUE      CFG_OLD_VALUE      DB_DEFERRED
-----
30/10/2011 08:41:39  LOCKLIST      1024              2048              N
30/10/2011 08:42:35  LOCKTIMEOUT    0                 -1                Y

```

The output indicates that locking changes were made during the time period when performance declined.

The DBA notices that the LOCKTIMEOUT change was deferred and issues a query to check whether the database was activated after this configuration change. This check determines whether the configuration change was picked up by the database. If the change was not picked up, then it is unlikely that it is causing the performance problem. The database activation time is recorded in the EVMONSTART logical data group. All change history event monitors write to the EVMONSTART logical data group by default.

```

SELECT COUNT (*)as POST_CFG_ACTIVATIONS FROM EVMONSTART_CHGHIST
WHERE DB_CONN_TIME > TIMESTAMP(2011-10-30-08:42:35)

```

The query returns a nonzero value.

```

POST_CFG_ACTIVATIONS
-----
1

```

This nonzero value confirms that the database was activated after the LOCKTIMEOUT configuration parameter was changed, meaning that the new value is in effect. The DBA now understands what changed on the system and can try adjusting the lock-related configuration parameters back to their original values to see whether this resolves the issue.

Note: If the change history event monitor was inactive when the configuration parameters were changed, then the event monitor would not capture the DBCFG events. Instead the change history event monitor would capture a DBCFGVALUES event when the event monitor was started. In the DBDBMCFG logical data group each row represents a configuration parameter that was updated as part of a DBCFG or DBMCFG event, or captured at event monitor startup as part of a DBCFGVALUES or DBMCFGVALUES event. The CFG_COLLECTION_TYPE monitor element identifies whether the record describes a configuration parameter update, or an initial value recorded at event monitor startup. The DBA would need to compare the values captured at the start of the current change history event monitor with the values of the previous capture to look for changed values that might be causing the problem. Examining the diagnostic log would also be helpful.

Example: Identifying configuration changes and utility executions using the change history event monitor:

You can use the change history event monitor to determine if there have been any recent configuration changes or the recent execution of utilities.

Scenario

In this example, the database administrator (DBA) notices a change in database performance over the last 24 hours. The DBA previously created a change history event monitor called HIST, that he has been using to understand changes in the behavior, performance, or stability of the databases and database management system.

The DBA issues the following query against the CHANGESUMMARY logical data group in order to summarize any change events or utility executions that occurred in the last 24 hours.

```

SELECT EVENT_TIMESTAMP,
       EVENT_TYPE,
       UTILITY_TYPE,
       COORD_MEMBER,
       MEMBER
FROM CHANGESUMMARY_HIST
WHERE EVENT_TIMESTAMP > CURRENT_TIMESTAMP - 24 HOURS
ORDER BY BY_EVENT_TIMESTAMP ASC

```

The query might return output similar to the following:

EVENT_TIMESTAMP	EVENT_TYPE	UTILITY_TYPE	COORD_MEMBER	MEMBER
2010-10-31-17.29.04.545210	DBCFG			0 0
2010-10-31-18.29.04.545210	UTILSTART	LOAD		0 0
2010-10-31-18.40.04.545210	UTILSTARTPROC	LOAD		0 0
2010-10-31-18.50.04.545210	UTILSTOPPROC	LOAD		0 0
2010-10-31-18.40.04.545210	UTILSTARTPROC	LOAD		0 1
2010-10-31-18.50.04.545210	UTILSTOPPROC	LOAD		0 1
2010-10-31-19.29.04.545210	UTILSTOP	LOAD		0 0
2010-10-31-19.56.04.545210	UTILSTART	BACKUP		0 0
2010-10-31-20.09.04.545210	UTILPHASESTART	BACKUP		0 0

2010-10-31-20.29.04.545210	UTILPHASESTOP	BACKUP	0	0
2010-10-31-21.29.04.545210	UTILSTOP	BACKUP	0	0

9 record(s) selected.

From this output, the DBA determines that there have been configuration changes and utility executions in the last 24 hours. He can now query the other change history event monitor logical data groups and obtain more information about the events returned in the CHANGESUMMARY logical data group. For example, for more information about the UTILSTART events, the DBA can query the UTILSTART logical data group to understand which objects are being acted on by the utilities and what options were used when the utilities were started.

Example: Listing LOAD operations using the change history event monitor:

You can use the change history event monitor to track all LOAD operations performed on a database.

Scenario

In this example, the database administrator (DBA) wants to capture and list the history of all load utility executions on a database. To track LOAD utility events.

1. Create a change history event monitor that tracks LOAD events. For example:

```
CREATE EVENT MONITOR MON_LOAD
FOR CHANGE HISTORY WHERE EVENT IN (LOAD)
WRITE TO TABLE
CHANGESUMMARY (TABLE UTIL_COMMON),
UTILSTART (TABLE LOAD_START),
UTILSTOP (TABLE LOAD_STOP)
UTILLOCATION (TABLE LOAD_INPUT_FILES)
UTILPHASE (TABLE LOAD_PHASES);
```

2. Activate the event monitor.

```
SET EVENT MONITOR MON_LOAD STATE=1
```

3. Query the logical data groups for information about LOAD operations executed on the database. For example, the following query lists the start and stop time of all executed load utilities. The query shows only the coordinator start and stop times. It ignores pause and resume records in order to show the full elapsed time of utility execution.

```
SELECT A.APPL_ID,
A.COORD_MEMBER,
A.EVENT_TIMESTAMP AS START_TIME,
B.EVENT_TIMESTAMP AS STOP_TIME,
A.TABLE_SCHEMA,
A.TABLE_NAME,
SQLCODE,
VARCHAR(A.UTILITY_DETAIL, 200) AS DETAIL
FROM LOAD_START AS A
LOAD_STOP AS B
UTIL_COMMON AS C
WHERE A.UTILITY_INVOCATION_ID = B.UTILITY_INVOCATION_ID AND
A.UTILITY_START_TYPE = 'START' AND
B.UTILITY_STOP_TYPE = 'STOP' AND
A.MEMBER = B.MEMBER AND
A.MEMBER = A.COORD_MEMBER
ORDER BY A.EVENT_TIMESTAMP ASC
```

The result of the query shows that two load utilities were executed and provides details on their start and stop times, the target (table name) of the load, and details about the loads that were executed.

APPL_ID	START_TIME	STOP_TIME
*LOCAL.test.110131213809	2010-10-31-17.29.04.545210	2010-10-31-17.29.04.545210
*LOCAL.test.110131213809	2010-10-31-17.29.04.545210	2010-10-31-17.29.04.545210

TABLES_SCHEMA	TABLE_NAME	SQLCODE	DETAIL
TEST	T1	0	LOAD CURSOR..
TEST	T3	0	LOAD DEL...

2 record(s) selected.

Example: Reporting the history of utility execution using the change history event monitor:

You can use the change history event monitor to track utility operations performed on a database.

Scenario

In this example, the database administrator (DBA) wants to capture and list the utility event executions on a database. To report utility events:

1. Create a change history event monitor that tracks utility events. For example:

```
CREATE EVENT MONITOR MON_UTIL
FOR CHANGE HISTORY WHERE EVENT IN (UTILALL)
WRITE TO TABLE
  CHANGESUMMARY (TABLE UTIL_COMMON),
  UTILSTART (TABLE UTIL_START),
  UTILSTOP (TABLE UTIL_STOP)
  UTILLOCATION (TABLE UTIL_LOCATION)
  UTILPHASE (TABLE UTIL_PHASES) AUTOSTART;
```

2. Enable the event monitor.

```
SET EVENT MONITOR MON_UTIL STATE=1
```

3. Query the logical data groups for information about utility operations executed on the database. For example, the following query lists the history of each utility invocation per member.

```
WITH UTIL_HIST(TIMESTAMP, UTIL_TYPE, ACTION, PHASE_TYPE, UTILITY_INVOCATION_ID,
MEMBER, SQLCODE) AS
(SELECT A.EVENT_TIMESTAMP,
A.UTILITY_TYPE,
CAST('START' AS VARCHAR(32)),
CAST(NULL AS VARCHAR(16)),
A.UTILITY_INVOCATION_ID,
A.MEMBER,
CAST(NULL as INTEGER)
FROM UTIL_START AS A
UNION ALL
SELECT A.EVENT_TIMESTAMP,
A.UTILITY_TYPE,
CASE WHEN EVENT_TYPE IN ('UTILPHASESTART') THEN
CAST('PHASE START' AS VARCHAR(32))
ELSE
CAST('PHASE STOP' AS VARCHAR(32))
END CASE,
CAST(UTILITY_PHASE_TYPE AS VARCHAR(16)),
A.UTILITY_INVOCATION_ID,
A.MEMBER,
CAST(NULL as INTEGER)
FROM UTIL_PHASE AS B
UNION ALL
SELECT A.EVENT_TIMESTAMP,
A.UTILITY_TYPE,
```



```

        CAST('STOP' AS VARCHAR(32))
        CAST(NULL AS VARCHAR(16)),
        A.UTILITY_INVOCATION_ID,
        A.MEMBER,
        A.SQLCODE
    FROM UTIL_STOP AS C)
SELECT * FROM UTIL_HIST
ORDER BY UTILITY_INVOCATION_ID, MEMBER, TIMESTAMP ASC

```

The resulting report of utility events can be used to:

- Identify any utilities that are overlapping. For example, a utility starts on a partition before another utility has stopped on that same partition.
- Determine where a utility is spending its time. For example, how much time was spent in each phase. Note: In Version 10.1 this is only available for the table space backup phase of online backups.

TIMESTAMP	UTIL_TYPE	ACTION	PHASE_TYPE	UTILITY_INVOCATION_ID	MEMBER	SQLCODE
2010-10-31-17.29.04.545210	LOAD	START	-	x'18A901F...621'	0	-
2010-10-31-17.50.04.344230	LOAD	STOP	-	x'18A901F...621'	0	0
2010-10-31-17.29.04.545211	LOAD	START	-	x'18A901F...633'	1	-
2010-10-31-17.50.04.344229	LOAD	STOP	-	x'18A901F...633'	1	0
2010-10-31-17.29.04.344210	BACKUP	START	-	x'18A901F...645'	0	-
2010-10-31-17.50.04.344211	BACKUP	PHASE START	BACKUPTS	x'18A901F...645'	0	0
2010-10-31-17.51.04.545214	BACKUP	PHASE STOP	BACKUPTS	x'18A901F...645'	0	-
2010-10-31-17.52.04.344218	BACKUP	STOP	-	x'18A901F...645'	0	0

8 record(s) selected.

Example: Listing all committed DDL statements using the change history event monitor:

You can use the change history event monitor to quickly list all committed DDL statements executed to determine if any changes made might be impacting your workload.

Scenario

In this example, the database administrator (DBA) notices a degradation in the performance of a number of queries has occurred in the last 24 hours. The DBA uses the change history event monitor to quickly examine the DDL executed during that time period, in order to determine if any changes were made that might be having a significant impact on the workload (for example, indexes that were dropped). The DBA previously created a change history event monitor called CHGHIST, that is being used to track DDL statements. The DBA issues the following statement to list all committed DDL statements captured by the change history event monitor in the last 24 hours. The issued statement excludes statements that were rolled back, either via a ROLLBACK statement or ROLLBACK TO SAVEPOINT statement.

Note that the change history event monitor records DDL events when the DDL is executed. Whether the DDL causes any change in the database depends on the DDL being committed.

```

WITH savepoint_rollback (global_tran_id, local_tran_id, savepoint_id) AS
(SELECT DISTINCT T.global_transaction_id, T.local_transaction_id, T.savepoint_id
 FROM DDLSTMTEXEC_CHGHIST as D, TXNCOMPLETION_CHGHIST as T
 WHERE T.txn_completion_status='S' AND
        D.savepoint_id >= T.savepoint_id AND
        D.event_timestamp <= T.event_timestamp)
SELECT VARCHAR(D.STMT_TEXT, 70) AS STMT_TEXT FROM DDLSTMTEXEC_CHGHIST as D,
        TXNCOMPLETION_CHGHIST as T
 WHERE D.global_transaction_id = T.global_transaction_id AND
        D.local_transaction_id = T.local_transaction_id AND
        T.txn_completion_status = 'C' AND

```

```

(D.global_transaction_id, D.local_transaction_id, D.savepoint_id)
NOT IN (SELECT * FROM savepoint_rollback) AND
D.EVENT_TIMESTAMP > CURRENT_TIMESTAMP - 24 HOURS;

```

STMT_TEXT

CREATE INDEX I1 ON T1 (ONE)

1 record(s) selected.

Example: Listing changes performed by the STMM using the change history event monitor:

You can use the change history event monitor to list changes performed by the self tuning memory manager (STMM).

Scenario

In this example, the database administrator (DBA) wants to monitor any changes performed by the STMM. Since the STMM can modify configuration parameters and buffer pool sizes, the DBA has created an event monitor called HIST to capture configuration and DDL changes.

Changes initiated by the STMM can be found by querying the event monitor for records containing one of the following information:

- The application name (appl_name) is db2stmm.
- The DDL statement text (stmt_text) contains a comment with the keyword db2stmm. Note that some DDL changes are performed on behalf of the STMM by other applications.

```

SELECT A.EVENT_TIMESTAMP,
       VARCHAR(A.EVENT_TYPE, 20) AS EVENT_TYPE, A.MEMBER
FROM CHANGESUMMARY_HIST A LEFT OUTER JOIN
DDLSTMTEXC_HIST B
ON A.EVENT_TIMESTAMP = B.EVENT_TIMESTAMP AND
A.MEMBER = B.MEMBER AND
A.EVENT_ID = B.EVENT_ID
WHERE (A.APPL_NAME = 'db2stmm' OR
B.STMT_TEXT LIKE '%db2stmm%');

```

The query might return output similar to the following example:

EVENT_TIMESTAMP	EVENT_TYPE	MEMBER
2011-04-22-12.12.17.832316	DBCFCG	0
2011-04-22-12.22.35.227550	DBCFCG	0
2011-04-22-12.12.17.530274	DBCFCG	0
2011-04-22-12.12.17.721403	DBCFCG	0
2011-04-22-12.12.17.776889	DBCFCG	0
2011-04-22-12.22.35.172119	DBCFCG	0
2011-04-22-12.12.17.665098	DBCFCG	0
2011-04-22-12.22.35.116343	DBCFCG	0
2011-04-22-12.29.47.092822	DBCFCG	0
2011-04-22-12.29.47.037709	DBCFCG	0
2011-04-22-12.12.17.600511	DBCFCG	0
2011-04-22-12.22.35.283320	DBCFCG	0
2011-04-22-12.29.46.752477	DBCFCG	0
2011-04-22-12.29.47.148562	DBCFCG	0

14 record(s) selected.

Event monitor data retention from release to release

Beginning in DB2 Version 10.1, you can upgrade event monitor output tables after you upgrade the DB2 product. This capability lets you retain any data that might exist in event monitor tables that you had before you upgraded.

As event monitors are enhanced in the DB2 product, the tables they produce might change. For example, new columns might be added to a table for reporting new monitor elements. Before Version 10.1, if you had existing event monitors that wrote to tables that contained data that you wanted to retain, and you wanted to collect the data in the newly-added columns, you were required to manually alter them after upgrading to the new release. This alteration involved adding any of the new columns that you might want to use. If you did not add the new columns, the event monitor would work as it had in the previous release, capturing only the data supported by that the event monitor in that release.

Unformatted event tables that had changed could not be upgraded at all; you were required to drop them and then re-create them.

The `EVMON_UPGRADE_TABLES` stored procedure upgrades the definitions of existing event monitor tables to match those produced by the current level of the DB2 product. This feature lets you keep any existing tables that you might have, along with all the data they contain, eliminating the need to manually alter, or to drop and re-create tables.

Note: Starting in Version 10.1, you can also use the `ALTER EVENT MONITOR` statement to add new logical groups to an event monitor. You can use this approach as an alternative to `EVMON_UPGRADE_TABLES` to add logical data groups added in a new release. However, you cannot use `ALTER EVENT MONITOR` to modify logical groups that are already associated with the event monitor; if a logical data group already associated with the event monitor has changed, the only way to modify the event monitor is using the `EVMON_UPGRADE_TABLES` procedure.

The `EVMON_UPGRADE_TABLES` procedure works with both regular and UE tables. For regular tables, the procedure adds any new columns needed, drops old columns that are no longer required, and alters any columns as needed. For UE tables, the procedure adds new columns and modifies existing columns as needed to allow the UE table to be processed by the `db2evmonfmt` tool, or the `EVMON_FORMAT_UE_TO_TABLES` or `EVMON_FORMAT_UE_TO_XML` routines.

Important: Any active event monitors must be deactivated for the upgrade process to work properly. The `EVMON_UPGRADE_TABLES` procedure automatically deactivates any active event monitors before it begins upgrading tables. Do not reactivate any event monitors with tables being processed by `EVMON_UPGRADE_TABLES`, or the upgrade process will fail. Any event monitors that were active before the upgrade are activated again after the upgrade has completed.

Implications of not upgrading event monitor tables

As in past releases, you can choose to not upgrade your event monitor tables. However, any new columns that have been added to the event monitor in the new release will not be populated with data, and will not be available for queries. Also, the values for any monitor elements that previously existed in the old release and that increased in size in the new release might be truncated. For example, if a

monitor element increases in size from VARCHAR(20) to VARCHAR(128) in the new release, and you do not upgrade the previously-existing tables, the column that contains the monitor element values will continue to store only 20 characters of data, even though the system may be sending 128-bytes of data for that monitor element to the event monitor.

Upgrading tables produced by EVMON_FORMAT_UE_TO_TABLES

When used with UE tables, the EVMON_UPGRADE_TABLES procedure upgrades the UE table itself; it has no effect on any regular tables that you might have created using the EVMON_FORMAT_UE_TO_TABLES procedure. After you use EVMON_UPGRADE_TABLES to upgrade a UE table, you can also upgrade the output tables produced by EVMON_FORMAT_UE_TO_TABLES. As of DB2 Version 10.1 EVMON_FORMAT_UE_TO_TABLES procedure supports a new option: UPGRADE_TABLES. When you run the EVMON_FORMAT_UE_TO_TABLES procedure with this option, any existing tables produced by the procedure are altered so that the table columns match the output produced by the new version of EVMON_FORMAT_UE_TO_TABLES procedure.

For more information, refer to the reference information for EVMON_FORMAT_UE_TO_TABLES.

Chapter 4. Other monitoring interfaces

Reports generated using the MONREPORT module

The MONREPORT module generates text reports of monitoring data that you can use to troubleshoot SQL performance problems.

You can generate the following reports using the MONREPORT module:

Table 109. List of reports generated using the MONREPORT module

Report Name	Procedure to create report	Main data source / table functions
Summary report	MONREPORT.DBSSUMMARY	MON_GET_SERVICE_SUBCLASS and selected details from MON_GET_CONNECTION and MON_GET_WORKLOAD
Connection report	MONREPORT.CONNECTION	MON_GET_CONNECTION
Current Applications report	MONREPORT.CURRENTAPPS	Includes fields from MON_GET_CONNECTION, MON_GET_UNIT_OF_WORK, WLM_GET_SERVICE_CLASS_AGENTS, WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES
Current SQL report	MONREPORT.CURRENTSQL	MON_GET_PKG_CACHE_STMT (For the <code>executable_id</code> obtained from the WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function.)
Package Cache report	MONREPORT.PKGCACHE	MON_GET_PKG_CACHE_STMT
Current Lock Wait report	MONREPORT.LOCKWAIT	Most data from MON_GET_APPL_LOCKWAIT; additional data from MON_GET_CONNECTION, WLM_GET_SERVICE_CLASS_AGENTS, WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES, MON_GET_PKG_CACHE_STMT, MON_GET_TABLE

Most reports start with a summary section that provides one line of key information for each item in the report. For example, the Connection report contains a one-line summary of each connection. The main body of the report consists of a detailed section for each item in the summary.

Each metric in the report is labeled with the underlying monitor element name (for example: CLIENT_IDLE_WAIT_TIME = 44). To determine what the metric represents, search the Information Center for the monitor element name.

You can customize the reports generated by the MONREPORT module. The MONREPORT module is implemented entirely using SQL and you can obtain the module code from the database catalog and create a customized version.

Reports for initial diagnosis

An important use of these reports is to troubleshoot SQL performance slowdowns. Each report is designed to answer certain diagnosis questions. Some reports support initial diagnosis, while others support subsequent detailed diagnosis of particular types of problems.

Initial diagnosis involves:

- Determining the problem category, by narrowing the problem down to the aspect or stage of processing that has slowed down.
- Identifying the SQL statements involved in the problem and collecting information about the SQL statements for further analysis.

Table 110. MONREPORT module reports suitable for initial diagnosis

Procedure name	Information provided and usage
<p>MONREPORT.DBSUMMARY</p> <p>Part 1: System Performance</p>	<p>Part 1 of the Summary report provides monitor data for most aspects of processing aggregated across the entire database.</p> <p>This information is useful for answering questions about the aspect or stage of processing that has slowed down. For example:</p> <ul style="list-style-type: none"> • Is the problem inside or outside the data server? • Is there a computing resource bottleneck? • Are requests in a wait state? If so, for what resource? • Is the slowdown located in a particular data server processing component?
<p>MONREPORT.DBSUMMARY</p> <p>Part 2: Application Performance</p>	<p>Part 2 of the Summary report provides key performance indicators for each connection, workload, and service class.</p> <p>This information is useful for answering questions about the scope of application requests involved in the slowdown. For example:</p> <ul style="list-style-type: none"> • Is this slowdown a general system slowdown that affects much or all the workload? • Is this slowdown limited to SQL statements issued from a particular source such as particular connections, DB2 workloads or DB2 service classes?
<p>MONREPORT.DBSUMMARY</p> <p>Part 3: Member level information</p>	<p>Part 3 of the Summary report provides key performance indicators for each member.</p> <p>This information is useful for determining whether the slowdown is isolated to one or a few members.</p>
<p>MONREPORT.CURRENTSQL</p>	<p>The current SQL report provides information about statements that are currently running, in the form of several lists of the top <i>N</i> activities. The statements are ranked by different metrics: processing resource, rows processed, direct reads and direct writes.</p> <p>This information is useful for determining whether the slowdown is isolated to one or a few SQL statements. If the slowdown is isolated to one or a few SQL statements, those statements are likely to appear in this report of top statements.</p>

Table 110. MONREPORT module reports suitable for initial diagnosis (continued)

Procedure name	Information provided and usage
MONREPORT.PKGCACHE	<p>The package cache report provides information about statements that have run recently and are stored in the package cache. This report shows several summaries, each listing the top <i>N</i> activities. The activities are ranked by the following monitor elements:</p> <ul style="list-style-type: none"> • CPU • wait time • rows processed • num_coord_exec_with_metrics - Number of executions by coordinator agent with metrics monitor element (if no member was specified) or num_exec_with_metrics - Number of executions with metrics collected monitor element (if a member was specified) • I/O wait time <p>This report contains a summary for each of these metrics as well as a report for each execution.</p> <p>This information is useful for determining whether the slowdown is isolated to one or a few SQL statements. If so, those statements are likely to appear at the top in this report. The information per execution can help identify the most costly statements while the information summed across executions can help identify statements with the most impact on the system cumulatively considering both the statement cost and frequency of execution.</p>
MONREPORT.CURRENTAPPS	<p>The current applications report show the current processing state for units of work, agents, and activities. The report starts with a summary section showing the number of current connections and activities, as well as a series of summaries, such as the summary of current units of work by workload occurrence state. The body of the report consists of one section for each connection that provides the details of the connection.</p> <p>This information is useful for viewing all the work currently running on the system. This allows you to check for patterns that might identify the problem category.</p>

Reports for detailed diagnosis

After completing the initial diagnosis, you might need to pursue a specialized or detailed set of troubleshooting analyses for the problem category you identified during the initial diagnosis phase.

Table 111. MONREPORT module reports suitable for detailed diagnosis

Procedure name	Information provided and usage
MONREPORT.CONNECTION	<p>If the MONREPORT.DBSUMMARY report showed that the slowdown is limited to SQL statements issued from a particular connection, then you can view detailed information about the affected connection.</p> <p>This report contains the same metrics as Part 1 of the MONREPORT.DBSUMMARY report, but it presents this information for each connection.</p>
MONREPORT.LOCKWAIT	<p>If the reports viewed during the initial diagnosis suggest there is a lock wait problem, then you can view detailed information about each lock wait currently in progress.</p> <p>This information includes lock holder and lock requester details, as well as characteristics of the lock held and the lock requested.</p>

Customizing the MONREPORT module reports

You can customize the existing reports generated by the MONREPORT module or create new reports based on an existing report.

About this task

You can change the wording or organization of a report; or add, remove, or modify monitor elements included in a report. In addition, you can create a new report based on an existing report.

The MONREPORT module is implemented using SQL statements, including stored procedures and data types. To create a customized version of the MONREPORT module, obtain the module code from the database catalog, then modify and deploy it. The MONREPORT module is available in the SYSIBMADM schema.

Each procedure in the MONREPORT module is used to generate one report. For example, the CONNECTION procedure is used to generate the Connection report. When you invoke a procedure, such as the CONNECTION procedure, to generate a report, the procedure invokes other internal routines to perform the final assembly and formatting of the report. The internal routines perform the following functions:

- Call the DB2 monitoring table functions to obtain monitoring data. For many reports, the routines will call the table functions, wait an interval, then call the table functions again.
- Generate delta values, to record the difference between monitor values at the beginning and end of the monitoring interval.
- Perform calculations to obtain percentages, ratios, sums and aggregations.

You can customize the following internal routines:

Table 112. Routines you can customize

Name	Description	Used by report
CONNDELTA	This stored procedure returns a result set of delta values from connection metrics.	This routine is used in conjunction with the Connection report.

Table 112. Routines you can customize (continued)

Name	Description	Used by report
COMMONREQMETRICS	This store procedure calculates metrics and formats the report output for metrics that are common to Connection and Summary reports.	MONREPORT.CONNECTION and MONREPORT.DBSUMMARY

The MONREPORT module contains other objects that you don't need to modify to customize this module.

Table 113. Routines that do not need to be customized

Name	Description	Used by report
INITMSGCACHE	This stored procedure retrieves translatable strings that appear in the reports.	Used in all reports.
SAVE_EXEC_INFO	A stored procedure used internally to store information about SQL statement sections that were executed.	Used by MONREPORT.PKGCACHE
db2monreport.src	This file is in binary format and is accessed by the INITMSGCACHE routine. This file contains text strings that appear in the reports.	Used in all reports.

Table 114. Data types used in the routines, which cannot be customized

Name	Description	Used by report
Data types with names such as MONMETRICS_CHAR255_TYPE and MONMETRICS_CHAR32_TYPE.	These array data types are used to store monitor elements returned by table functions.	Used in most or all reports.
REPORT_TYPE	An array data type used to store the text output that is returned and displayed when the routine terminates.	Used in most or all reports.
MONEXEC_TYPE	An array data type used to store the executable ID that uniquely identifies an SQL statement section that was executed.	Used in most or all reports.

Procedure

1. Obtain the code.
2. Customize the code to meet your needs. Rename the module to distinguish your custom version from the original and modify the code using any suitable SQL editor or stored procedure builder.
 - To add text to the report, make the additions directly to the report procedure. Do not manage text strings using the INITMSGCACHE routine.

- To remove report text obtained using the INITMSGCACHE routine, remove the associated code that uses the cached strings.

For example, to change the MONREPORT.CONNECTION report:

- To add or remove metrics, modify the SQL queries in the CONNDELTA procedure. To add a metric, specify an additional column to be selected.
 - To change the details section of the connection report output, update the COMMONREQMETRICS routine to add calculations and ensure the new metrics show up in the output.
 - To change the summary section of the connection report, update the CONNECTION routine to ensure the new metrics show up in the output.
3. Deploy the customized version of the MONREPORT module. Write a set of CREATE or ALTER statements for the module and its routines. If you are using a graphical SQL editor, the editor will automate some of the deployment steps.

Snapshot monitor

You can use the snapshot monitor to capture information about the database and any connected applications at a specific time. Snapshots are useful for determining the status of a database system.

Taken at regular intervals, they are also useful for observing trends and foreseeing potential problems. Some of the data from the snapshot monitor is obtained from the system monitor. The data available from the system monitor is determined by system monitor switches.

The system monitor accumulates information for a database only while it is active. If all applications disconnect from a database and the database deactivates, then the system monitor data for that database is no longer available. You can keep the database active until your final snapshot has been taken, either by starting the database with the ACTIVATE DATABASE command, or by maintaining a permanent connection to the database.

Snapshot monitoring requires an instance attachment. If there is not an attachment to an instance, then a default instance attachment is created. An instance attachment is usually done implicitly to the instance specified by the DB2INSTANCE environment variable when the first database system monitor API is invoked by the application. It can also be done explicitly, using the ATTACH TO command. Once an application is attached, all system monitor requests that it invokes are directed to that instance. This allows a client to monitor a remote server by simply attaching to the instance on it.

In partitioned database environments, snapshots can be taken at any partition of the instance, or globally using a single instance connection. A global snapshot aggregates the data collected at each partition and returns a single set of values.

In DB2 pureScale environments, snapshots can be taken at any member or globally. A global snapshot aggregates the data collected at each member and returns a single set of values.

You can capture a snapshot from the CLP, from SQL table functions, or by using the snapshot monitor APIs in a C or C++ application. A number of different snapshot request types are available, each returning a specific type of monitoring data. For example, you can capture a snapshot that returns only buffer pool information, or a snapshot that returns database manager information. Before capturing a snapshot, consider if you need information from monitor elements that

are under monitor switch control. If a particular monitor switch is off, the monitor elements under its control will not be collected.

Access to system monitor data: SYSMON authority

Users that are part of the SYSMON database manager level group have the authority to gain access to database system monitor data. System monitor data is accessed using the snapshot monitor APIs, CLP commands, or SQL table functions.

The SYSMON authority group provides the means to enable users without system administration or system control authorities to access database system monitor data.

Aside from SYSMON authority, the only way to access system monitor data using the snapshot monitor is with system administration or system control authority.

Any user that is part of the SYSMON group or has system administration or system control authority can perform the following snapshot monitor functions:

- CLP Commands:
 - GET DATABASE MANAGER MONITOR SWITCHES
 - GET MONITOR SWITCHES
 - GET SNAPSHOT
 - LIST ACTIVE DATABASES
 - LIST APPLICATIONS
 - LIST DCS APPLICATIONS
 - LIST UTILITIES
 - RESET MONITOR
 - UPDATE MONITOR SWITCHES
- APIs:
 - db2GetSnapshot - Get Snapshot
 - db2GetSnapshotSize - Estimate Size Required for db2GetSnapshot() Output Buffer
 - db2MonitorSwitches - Get/Update Monitor Switches
 - db2ResetMonitor - Reset Monitor
- Snapshot SQL table functions without previously running SYSPROC.SNAP_WRITE_FILE

Capturing database system snapshots by using snapshot administrative views and table functions

Authorized users can capture snapshots of monitor information for a DB2 instance by using snapshot administrative views or snapshot table functions. The snapshot administrative views provide a simple means of accessing data for all database partitions of the connected database.

The snapshot table functions allow you to request data for a specific database partition, globally aggregated data, or data from all database partitions. Some snapshot table functions allow you to request data from all active databases.

Before you begin

You must have SYSADM, SYSCTRL, SYSMANT, or SYSMON authority to capture a database snapshot. To obtain a snapshot of a remote instance, you must first

connect to a local database belonging to that instance.

About this task

While new snapshot table functions might be required in future releases if new monitor data is available, the set of snapshot administrative views will remain the same with new columns added to the view, making the administrative views a good choice for application maintenance over time.

Each snapshot view returns a table with one row per monitored object per database partition with each column representing a monitor element. Each table function returns a table with one row per monitored object for the specified partition. The column names of the returned table correlate with the monitor element names.

For example, a snapshot of general application information for the SAMPLE database is captured as follows by using the SNAPAPPL administrative view:

```
SELECT * FROM SYSIBMADM.SNAPAPPL
```

You can also select individual monitor elements from the returned table. For example, the following statement returns only the **agent_id** and **db_name** monitor elements:

```
SELECT agent_id, db_name FROM SYSIBMADM.SNAPAPPL
```

Restrictions

Snapshot administrative views and table functions cannot be used with either of the following:

- Monitor switches commands or APIs
- Monitor reset commands or APIs

This restriction includes:

- **GET MONITOR SWITCHES**
- **UPDATE MONITOR SWITCHES**
- **RESET MONITOR**

This limitation is because such commands use an ATTACH command, while snapshot table functions use CONNECT statement..

Procedure

- To capture a snapshot using a snapshot administrative view:
 1. Connect to a database. This can be any database in the instance you need to monitor. To be able to issue an SQL query with a snapshot administrative view, you must be connected to a database.
 2. Determine the type of snapshot you need to capture. If you want to capture a snapshot for a database other than the currently connected database, or if you want to retrieve data from a single database partition, or global aggregate data, you need to use a snapshot table function instead.
 3. Issue a query with the appropriate snapshot administrative view. For example, here is a query that captures a snapshot of lock information for the currently connected database:

```
SELECT * FROM SYSIBMADM.SNAPLOCK
```

- To capture a snapshot using a snapshot table function:

1. Connect to a database. This can be any database in the instance you need to monitor. To be able to issue an SQL query with a snapshot table function, you must be connected to a database.
2. Determine the type of snapshot you need to capture.
3. Issue a query with the appropriate snapshot table function. For example, here is a query that captures a snapshot of lock information about the SAMPLE database for the current connected database partition:

```
SELECT * FROM TABLE(SNAP_GET_LOCK('SAMPLE',-1)) AS SNAPLOCK
```

The SQL table functions have two input parameters:

database name

VARCHAR(255). If you enter NULL, the name of the currently connected database is used.

partition number

SMALLINT. For the database partition number parameter, enter the integer (a value between 0 and 999) corresponding to the database partition number you need to monitor. To capture a snapshot for the currently connected database partition, enter a value of -1. To capture a global aggregate snapshot, enter a value of -2. To capture a snapshot from all database partitions, do not specify a value for this parameter.

Note:

- a. For the following list of snapshot table functions, if you enter a NULL for the currently connected database, you will get snapshot information for all databases in the instance:
 - SNAP_GET_DB
 - SNAP_GET_DB_MEMORY_POOL
 - SNAP_GET_DETAILLOG
 - SNAP_GET_HADR
 - SNAP_GET_STORAGE_PATHS
 - SNAP_GET_APPL
 - SNAP_GET_APPL_INFO
 - SNAP_GET_AGENT
 - SNAP_GET_AGENT_MEMORY_POOL
 - SNAP_GET_STMT
 - SNAP_GET_SUBSECTION
 - SNAP_GET_BP
 - SNAP_GET_BP_PART
- b. The database name parameter does not apply to the database manager level snapshot table functions; they have only a parameter for database partition number. The database partition number parameter is optional.

Capturing database system snapshot information to a file using the SNAP_WRITE_FILE stored procedure

With the SNAP_WRITE_FILE stored procedure you can capture snapshots of monitor data and save this information to files on the database server and allow access to the data by users who do not have SYSADM, SYSCTRL, SYSMOINT, or SYSMON authority.

Any user can then issue a query with a snapshot table function to access the snapshot information in these files. In providing open access to snapshot monitor data, sensitive information (such as the list of connected users and the SQL statements they have submitted to the database) is available to all users who have the execution privilege for the snapshot table functions. The privilege to execute the snapshot table functions is granted to PUBLIC by default. (Note, however, that no actual data from tables or user passwords can be exposed using the snapshot monitor table functions.)

Before you begin

You must have SYSADM, SYSCTRL, SYSMAINT, or SYSMON authority to capture a database snapshot with the SNAP_WRITE_FILE stored procedure.

About this task

When issuing a call to the SNAP_WRITE_FILE stored procedure, in addition to identifying the database and partition to be monitored, you need to specify a *snapshot request type*. Each snapshot request type determines the scope of monitor data that is collected. Choose the snapshot request types based on the snapshot table functions users will need to run. The following table lists the snapshot table functions and their corresponding request types.

Table 115. Snapshot request types

Snapshot table function	Snapshot request type
SNAP_GET_AGENT	APPL_ALL
SNAP_GET_AGENT_MEMORY_POOL	APPL_ALL
SNAP_GET_APPL	APPL_ALL
SNAP_GET_APPL_INFO	APPL_ALL
SNAP_GET_STMT	APPL_ALL
SNAP_GET_SUBSECTION	APPL_ALL
SNAP_GET_BP_PART	BUFFERPOOLS_ALL
SNAP_GET_BP	BUFFERPOOLS_ALL
SNAP_GET_DB	DBASE_ALL
SNAP_GET_DETAILLOG	DBASE_ALL
SNAP_GET_DB_MEMORY_POOL	DBASE_ALL
SNAP_GET_HADR	DBASE_ALL
SNAP_GET_STORAGE_PATHS	DBASE_ALL
SNAP_GET_DBM	DB2
SNAP_GET_DBM_MEMORY_POOL	DB2
SNAP_GET_FCM	DB2
SNAP_GET_FCM_PART	DB2
SNAP_GET_SWITCHES	DB2
SNAP_GET_DYN_SQL	DYNAMIC_SQL
SNAP_GET_LOCK	DBASE_LOCKS
SNAP_GET_LOCKWAIT	APPL_ALL
SNAP_GET_TAB	DBASE_TABLES
SNAP_GET_TAB_REORG	DBASE_TABLES

Table 115. Snapshot request types (continued)

Snapshot table function	Snapshot request type
SNAP_GET_TBSP	DBASE_TABLESPACES
SNAP_GET_TBSP_PART	DBASE_TABLESPACES
SNAP_GET_CONTAINER	DBASE_TABLESPACES
SNAP_GET_TBSP QUIESCER	DBASE_TABLESPACES
SNAP_GET_TBSP_RANGE	DBASE_TABLESPACES
SNAP_GET_UTIL	DB2
SNAP_GET_UTIL_PROGRESS	DB2

Procedure

1. Connect to a database. This can be any database in the instance you need to monitor. To be able to call a stored procedure, you must be connected to a database.
2. Determine the snapshot request type, and the database and partition you need to monitor.
3. Call the SNAP_WRITE_FILE stored procedure with the appropriate parameter settings for the snapshot request type, database, and partition. For example, here is a call that will capture a snapshot of application information about the SAMPLE database for the current connected partition:

```
CALL SNAP_WRITE_FILE('APPL_ALL', 'SAMPLE', -1)
```

The SNAP_WRITE_FILE stored procedure has three input parameters:

- a snapshot request type (see Table 115 on page 456, which provides a cross-reference of the snapshot table functions and their corresponding request types)
- a VARCHAR (128) for the database name. If you enter NULL, the name of the currently connected database is used.

Note: This parameter does not apply to the database manager level snapshot table functions; they only have parameters for request type and partition number.

- a SMALLINT for the partition number (a value between 0 and 999). For the partition number parameter, enter the integer corresponding to partition number you want to monitor. To capture a snapshot for the currently connected partition, enter a value of -1 or a NULL. To capture a global snapshot, enter a value of -2.

Results

Once the snapshot data has been saved to a file, all users can issue queries with the corresponding snapshot table functions, specifying (NULL, NULL) as input values for database-level table functions, and (NULL) for database manager level table functions. The monitor data they receive is pulled from the files generated by the SNAP_WRITE_FILE stored procedure.

Note: While this provides a means to limit user access to sensitive monitor data, this approach does have some limitations:

- The snapshot monitor data available from the SNAP_WRITE_FILE files is only as recent as the last time the SNAP_WRITE_FILE stored procedure was called.

You can ensure that recent snapshot monitor data is available by making calls to the SNAP_WRITE_FILE stored procedure at regular intervals. For instance, on UNIX systems you can set a cron job to do this.

- Users issuing queries with the snapshot table functions cannot identify a database or partition to monitor. The database name and partition number identified by the user issuing the SNAP_WRITE_FILE calls determine the contents of the files accessible by the snapshot table functions.
- If a user issues an SQL query containing a snapshot table function for which a corresponding SNAP_WRITE_FILE request type has not been run, a direct snapshot is attempted for the currently connected database and partition. This operation is successful only if the user has SYSADM, SYSCTRL, SYSMOINT, or SYSMON authority.

Accessing database system snapshots using snapshot table functions in SQL queries (with file access)

For every request type that authorized users have called the SNAP_WRITE_FILE stored procedure, any user can issue queries with the corresponding snapshot table functions. The monitor data they receive will be retrieved from the files generated by the SNAP_WRITE_FILE stored procedure.

Before you begin

For every snapshot table function with which you intend to access SNAP_WRITE_FILE files, an authorized user must have issued a SNAP_WRITE_FILE stored procedure call with the corresponding snapshot request types. If you issue an SQL query containing a snapshot table function for which a corresponding SNAP_WRITE_FILE request type has not been run, a direct snapshot is attempted for the currently connected database and partition. This operation is successful only if the user has SYSADM, SYSCTRL, SYSMOINT, or SYSMON authority.

About this task

Users who access snapshot data from SNAP_WRITE_FILE files with snapshot table functions cannot identify a database or partition to monitor. The database name and partition number identified by the user issuing the SNAP_WRITE_FILE calls determine the contents of the SNAP_WRITE_FILE files. The snapshot monitor data available from the SNAP_WRITE_FILE files is only as recent as the last time the SNAP_WRITE_FILE stored procedure captured snapshots.

Procedure

1. Connect to a database. This can be any database in the instance you need to monitor. To issue an SQL query with a snapshot table function, you must be connected to a database.
2. Determine the type of snapshot you need to capture.
3. Issue a query with the appropriate snapshot table function. For example, here is a query that will capture a snapshot of table space information:

```
SELECT * FROM TABLE(SNAP_GET_TBSP(CAST(NULL AS VARCHAR(1)),
                                   CAST(NULL AS INTEGER))) AS SNAP_GET_TBSP
```

Note: You must enter NULL values for the database name and partition number parameters. The database name and partition for the snapshot are determined in the call of the SNAP_WRITE_FILE stored procedure. Also, the database name parameter does not apply to the database manager level

snapshot table functions; they only have a parameter for partition number. Each snapshot table function returns a table with one or more rows, with each column representing a monitor element. Accordingly, the monitor element column names correlate to the monitor element names.

4. You can also select individual monitor elements from the returned table. For example, the following statement will return only the **agent_id** monitor element:

```
SELECT agent_id FROM TABLE(
    SNAP_GET_APPL(CAST(NULL AS VARCHAR(1)),
                  CAST(NULL AS INTEGER))
    as SNAP_GET_APPL
```

Snapshot monitor SQL Administrative Views

There are a number of different snapshot monitor SQL administrative views available, each returning monitor data about a specific area of the database system.

For example, the SYSIBMADM.SNAPBP SQL administrative view captures a snapshot of buffer pool information. The following table lists each available snapshot monitor administrative view.

Table 116. Snapshot Monitor SQL Administrative Views

Monitor level	SQL Administrative Views	Information returned
Database manager	SYSIBMADM.SNAPDBM	Database manager level information.
Database manager	SYSIBMADM.SNAPFCM	Database manager level information regarding the fast communication manager (FCM).
Database manager	SYSIBMADM.SNAPFCM_PART	Database manager level information for a partition regarding the fast communication manager (FCM).
Database manager	SYSIBMADM.SNAPSWITCHES	Database manager monitor switch settings.
Database manager	SYSIBMADM.SNAPDBM_MEMORY_POOL	Database manager level information about memory usage.
Database	SYSIBMADM.SNAPDB	Database level information and counters for a database. Information is returned only if there is at least one application connected to the database.
Database	SYSIBMADM.SNAPDB_MEMORY_POOL	Database level information about memory usage for UNIX platforms only.
Application	SYSIBMADM.SNAPAPPL	General application level information for each application that is connected to the database. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SYSIBMADM.SNAPAPPL_INFO	General application level identification information for each application that is connected to the database.
Application	SYSIBMADM.SNAPLOCKWAIT	Application level information regarding lock waits for the applications connected to the database.
Application	SYSIBMADM.SNAPSTMT	Application level information regarding statements for the applications connected to the database. This includes the most recent SQL statement executed (if the statement switch is set).

Table 116. Snapshot Monitor SQL Administrative Views (continued)

Monitor level	SQL Administrative Views	Information returned
Application	SYSIBMADM.SNAPAGENT	Application level information regarding the agents associated with applications connected to the database.
Application	SYSIBMADM.SNAPSUBSECTION	Application level information regarding the subsections of access plans for the applications connected to the database.
Application	SYSIBMADM.SNAPAGENT_MEMORY_POOL	Information about memory usage at the agent level.
Table	SYSIBMADM.SNAPTAB	Table activity information at the database and application level for each application connected to the database. Table activity information at the table level for each table that <i>was accessed</i> by an application connected to the database. Requires the table switch.
Table	SYSIBMADM.SNAPTAB_REORG	Table reorganization information at the table level for each table in the database undergoing reorganization.
Lock	SYSIBMADM.SNAPLOCK	Lock information at the database level, and application level for each application connected to the database. Requires the lock switch.
Table space	SYSIBMADM.SNAPTbsp	Information about table space activity at the database level, the application level for each application connected to the database, and the table space level for each table space that has been accessed by an application connected to the database. Requires the buffer pool switch.
Table space	SYSIBMADM.SNAPTbsp_PART	Information about table space configuration.
Table space	SYSIBMADM.SNAPTbsp_QUIESCER	Information about quiescers at the table space level.
Table space	SYSIBMADM.SNAPCONTAINER	Information about table space container configuration at the table space level.
Table space	SYSIBMADM.SNAPTbsp_RANGE	Information about ranges for a table space map.
Buffer pool	SYSIBMADM.SNAPBP	Buffer pool activity counters for the specified database. Requires the buffer pool switch.
Buffer pool	SYSIBMADM.SNAPBP_PART	Information on buffer size and usage, calculated per partition.
Dynamic SQL	SYSIBMADM.SNAPDYN_SQL	Point-in-time statement information from the SQL statement cache for the database.
Database	SYSIBMADM.SNAPUTIL	Information about utilities.
Database	SYSIBMADM.SNAPUTIL_PROGRESS	Information about the progress of utilities.
Database	SYSIBMADM.SNAPDETAILLOG	Database level information about log files.
Database	SYSPROC.ADMIN_GET_STORAGE_PATHS	Returns a list of automatic storage paths for the database that includes file system information for each storage path.

Before capturing a snapshot, consider if you need information from monitor elements that are under monitor switch control. If a particular monitor switch is off, the monitor elements under its control will not be collected. See the individual monitor elements to determine if an element you need is under switch control.

All snapshot monitoring administrative views and associated table functions use a separate instance connection, which is different from the connection the current session uses. Therefore, an implicit instance attachment might be established, and only default database manager monitor switches are effective. Ineffective monitor switches include any that are turned on or off dynamically from the current session or application.

Also, there is a set of administrative views that do not only return values of individual monitor elements, but also return computed values that are commonly required in monitoring tasks. For example, the SYSIBMADM.BP_HITRATIO administrative view returns calculated values for buffer pool hit ratios, which combine a number of individual monitor elements.

Table 117. Snapshot Monitor SQL Administrative Convenience Views

SQL Administrative Convenience Views	Information returned
SYSIBMADM.APPLICATIONS	Information about connected database applications.
SYSIBMADM.APPL_PERFORMANCE	Information about the rate of rows selected versus the number of rows read by an application.
SYSIBMADM.BP_HITRATIO	Buffer pool hit ratios, including total, data, and index, in the database.
SYSIBMADM.BP_READ_IO	Information about buffer pool read performance.
SYSIBMADM.BP_WRITE_IO	Information about buffer pool write performance.
SYSIBMADM.CONTAINER_UTILIZATION	Information about table space containers and utilization rates.
SYSIBMADM.LOCKS_HELD	Information on current locks held.
SYSIBMADM.LOCKWAITS	Information about DB2 agents working on behalf of applications that are waiting to obtain locks.
SYSIBMADM.LOG_UTILIZATION	Information about log utilization for the currently connected database.
SYSIBMADM.LONG_RUNNING_SQL	Information about the longest running SQL in the currently connected database.
SYSIBMADM.QUERY_PREP_COST	Information about the time required to prepare different SQL statements.
SYSIBMADM.TBSP_UTILIZATION	Table space configuration and utilization information.
SYSIBMADM.TOP_DYNAMIC_SQL	The top dynamic SQL statements sortable by number of executions, average execution time, number of sorts, or sorts per statement.

SQL access to database system snapshots

There are two ways to access snapshot monitor data with the snapshot monitor SQL table functions (referred to as *snapshot table functions*): direct access, and file access.

About this task

Direct access

Authorized users can issue queries with snapshot table functions and receive result sets containing monitor data. With this approach, access to snapshot monitor data is only available to users that have SYSADM, SYSCTRL, SYSMANT, or SYSMON authority.

To capture snapshot information using direct access:

1. Optional: Set and check the status of the monitor switches. Refer to “Setting system monitor switches from the CLP” on page 482.
2. Capture database system snapshots using SQL. Refer to “Capturing database system snapshots by using snapshot administrative views and table functions” on page 453.

File access

Authorized users call the SNAPSHOT_FILEW stored procedure, identifying the snapshot request type, and the affected partition and database. The SNAPSHOT_FILEW stored procedure then saves the monitor data into a file on the database server.

Every request type for which authorized users can call the SNAPSHOT_FILEW stored procedure,

While this is a safe means of providing all users with access to snapshot monitor data, there are limitations to this approach:

- The snapshot monitor data available from the SNAPSHOT_FILEW files is only as recent as the last time the SNAPSHOT_FILEW stored procedure was called. You can ensure that recent snapshot monitor data is available by making calls to the SNAPSHOT_FILEW stored procedure at regular intervals. For instance, on UNIX operating systems you can set a cron job to do this.
- Users issuing queries with the snapshot table functions cannot identify a database or partition to monitor. The database name and partition number identified by the user issuing the SNAPSHOT_FILEW calls determine the contents of the files accessible by the snapshot table functions.
- If a user issues an SQL query containing a snapshot table function for which a corresponding SNAPSHOT_FILEW request type has not been run, a direct snapshot is attempted for the currently connected database and partition. This operation is successful only if the user has SYSADM, SYSCTRL, SYSMANT, or SYSMON authority.

The following tasks are performed by the SYSADM, SYSCTRL, SYSMANT, or SYSMON user who captures database system snapshot information to a file.

Procedure

1. Find out the needs of users who will issue snapshot requests. Specifically, determine the monitor data they need, the database it is to be collected from, and if the collection needs to be limited to a particular partition.
2. Optional: Set and check the status of the monitor switches. Refer to “Setting system monitor switches from the CLP” on page 482.
3. Capture database system snapshot information to a file. Refer to “Capturing database system snapshot information to a file using the SNAP_WRITE_FILE stored procedure” on page 455.

What to do next

Once the SYSADM, SYSCTRL, SYSMOINT, or SYSMON user has completed the preceding steps, all users can access database system snapshot information using snapshot table functions in SQL queries.

Capturing a database snapshot from the CLP

You can capture database snapshots from the CLP using the GET SNAPSHOT command. A number of different snapshot request types are available, which can be accessed by specifying certain parameters for the GET SNAPSHOT command.

Before you begin

You must have SYSADM, SYSCTRL, SYSMOINT, or SYSMON authority to capture a database snapshot.

You must have an instance attachment to capture a database snapshot. If there is not an attachment to an instance, then a default instance attachment is created. To obtain a snapshot of a remote instance, you must first attach to that instance.

Procedure

- Optional: Set and check the status of the monitor switches.
- From the CLP, issue the GET SNAPSHOT command with the required parameters. In the following example, the snapshot captures information for all databases:

```
db2 get snapshot for all databases
```

To capture a database snapshot for a specific database, use the following command:

```
db2 get snapshot for database on db-name
```

where *db-name* is the name of the database you are interested in.

- The following example captures database manager level information:

```
db2 get snapshot for dbm
```
- For partitioned database systems, you can capture a database snapshot specifically for a certain partition, or globally for all partitions. To capture a database snapshot for all applications on a specific partition (for example, partition number 2), issue the following command:

```
db2 get snapshot for all applications at dbpartitionnum 2
```
- To capture a database snapshot for all applications on all partitions, issue the following command:

```
db2 get snapshot for all applications global
```

For global snapshots on partitioned databases, the monitor data from all the partitions is aggregated.

Snapshot monitor CLP commands

You can control the snapshot monitor through the command line prompt. For certain request types, some information is returned only if the associated monitor switch is set ON. See the individual monitor elements to determine if a required element is under switch control.

The following table lists all the supported snapshot request types.

Table 118. Snapshot Monitor CLP Commands

Monitor level	CLP command	Information returned
Connections list	<code>list applications [show detail]</code>	Application identification information for all applications currently connected to a database that is managed by the DB2 instance on the partition where snapshot is taken.
Connections list	<code>list applications for database <i>dbname</i> [show detail]</code>	Application identification information for each application currently connected to the specified database.
Connections list	<code>list dcs applications</code>	Application identification information for all DCS applications currently connected to a database that is managed by the DB2 instance on the partition where snapshot is taken.
Database manager	<code>get snapshot for dbm</code>	Database manager level information, including instance-level monitor switch settings.
Database manager	<code>get dbm monitor switches</code>	Instance-level monitor switch settings.
Database	<code>get snapshot for database on <i>dbname</i></code>	Database level information and counters for a database. Information is returned only if there is at least one application connected to the database.
Database	<code>get snapshot for all databases</code>	Database level information and counters for each database active on the partition. Information is returned only if there is at least one application connected to the database.
Database	<code>list active databases</code>	The number of connections to each active database. Includes databases that were started using the <code>ACTIVATE DATABASE</code> command, but have no connections.
Database	<code>get snapshot for dcs database on <i>dbname</i></code>	Database level information and counters for a specific DCS database. Information is returned only if there is at least one application connected to the database.
Database	<code>get snapshot for remote database on <i>dbname</i></code>	Database level information and counters for a specific federated system database. Information is returned only if there is at least one application connected to the database.
Database	<code>get snapshot for all remote databases</code>	Database level information and counters for each active federated system database on the partition. Information is returned only if there is at least one application connected to the database.
Application	<code>get snapshot for application applid <i>appl-id</i></code>	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	<code>get snapshot for application agentid <i>appl-handle</i></code>	Application level information, includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	<code>get snapshot for applications on <i>dbname</i></code>	Application level information for each application that is connected to the database on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	<code>get snapshot for all applications</code>	Application level information for each application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).

Table 118. Snapshot Monitor CLP Commands (continued)

Monitor level	CLP command	Information returned
Application	get snapshot for dcs application applid <i>appl-id</i>	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	get snapshot for all dcs applications	Application level information for each DCS application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	get snapshot for dcs application agentid <i>appl-handle</i>	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	get snapshot for dcs applications on <i>dbname</i>	Application level information for each DCS application that is connected to the database on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	get snapshot for remote applications on <i>dbname</i>	Application level information, includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	get snapshot for all remote applications	Application level information for each federated system application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Table	get snapshot for tables on <i>dbname</i>	Table activity information at the database and application level for each application connected to the database. Table activity information at the table level for each table that was accessed by an application connected to the database. Requires the table switch.
Lock	get snapshot for locks for application applid <i>appl-id</i>	List of locks held by the application. Lock wait information requires the lock switch.
Lock	get snapshot for locks for application agentid <i>appl-handle</i>	List of locks held by the application. Lock wait information requires the lock switch.
Lock	get snapshot for locks on <i>dbname</i>	Lock information at the database level, and application level for each application connected to the database. Requires the lock switch.
Table space	get snapshot for tablespaces on <i>dbname</i>	Information about table space activity for a database. Requires the buffer pool switch. Also included is information about containers, quiescers, and ranges. This information is not under switch control.
Buffer pool	get snapshot for all bufferpools	Buffer pool activity counters. Requires the buffer pool switch.
Buffer pool	get snapshot for bufferpools on <i>dbname</i>	Buffer pool activity counters for the specified database. Requires the buffer pool switch.
Dynamic SQL	get snapshot for dynamic sql on <i>dbname</i>	Point-in-time statement information from the SQL statement cache for the database. The information can also be from a remote data source.

Capturing a database snapshot from a client application

You can capture database snapshots using the snapshot monitor API in a C, C++, or a COBOL application. In C and C++ a number of different snapshot request types can be accessed by specifying certain parameters in `db2GetSnapshot()`.

Before you begin

You must have `SYSADM`, `SYSCTRL`, `SYSMAINT`, or `SYSMON` authority to use the `db2MonitorSwitches` API.

You must have an instance attachment to capture a database snapshot. If there is not an attachment to an instance, then a default instance attachment is created. To obtain a snapshot of a remote instance, you must first attach to that instance.

Procedure

1. Optional: Set and check the status of the monitor switches.
2. Include the following DB2 libraries: `sqlmon.h` and `db2ApiDf.h`. These are found in the `include` subdirectory under `sqllib`.

```
#include <db2ApiDf.h>
#include <sqlmon.h>
```

3. Set snapshot buffer unit size to 100 KB.
4. Declare the `sqlca`, `sqlma`, `db2GetSnapshotData`, and `sqlm_collected` structures. Also, initialize a pointer to contain the snapshot buffer, and establish the buffer's size.

```
struct sqlma *pRequestedDataGroups;
struct sqlca sqlca;
memset (&sqlca, '\0', sizeof(struct sqlca));
struct sqlm_collected collectedData;
memset (&collectedData, '\0', sizeof(collectedData));
db2GetSnapshotData getSnapshotParam;
memset (&getSnapshotParam, '\0', sizeof(getSnapshotParam));

static sqluint32 snapshotBufferSize = SNAPSHOT_BUFFER_UNIT_SZ;
sqluint32 outputFormat;
char *snapshotBuffer;
```

5. Initialize the `sqlma` structure and specify that the snapshot to be captured is of database manager level information.

```
pRequestedDataGroups = (struct sqlma *)malloc(SQLMASIZE(1));
memset(pRequestedDataGroups, '\0', SQLMASIZE(1));
pRequestedDataGroups->obj_num = 1;
pRequestedDataGroups->obj_var[0].obj_type = SQLMA_DB2;
```

6. Initialize the buffer which is to hold the snapshot output.

```
snapshotBuffer = (char *)malloc(snapshotBufferSize);
memset (snapshotBuffer, '\0', snapshotBufferSize);
```

7. Populate the `db2GetSnapshotData` structure with the snapshot request type (from the `sqlma` structure), buffer information, and other information required to capture a snapshot.

```
getSnapshotParam.piSqlmaData = pRequestedDataGroups;
getSnapshotParam.poCollectedData = &collectedData;
getSnapshotParam.poBuffer = snapshotBuffer;
getSnapshotParam.iVersion = SQLM_DBMON_VERSION9_5;
getSnapshotParam.iBufferSize = snapshotBufferSize;
getSnapshotParam.iStoreResult = 0;
getSnapshotParam.iNodeNumber = SQLM_CURRENT_NODE;
getSnapshotParam.poOutputFormat = &outputFormat;
getSnapshotParam.iSnapshotClass = SQLM_CLASS_DEFAULT;
```


- Capture the snapshot. Pass the `db2GetSnapshotData` structure, which contains the information necessary to capture a snapshot, as well as a reference to the buffer, where snapshot output is to be directed.

```
db2GetSnapshot(db2Version810, &getSnapshotParam, &sqlca);
```

- Include logic to handle buffer overflow. After a snapshot is taken, the `sqlcode` is checked for a buffer overflow. If a buffer overflow occurred the buffer is cleared and reinitialized, and the snapshot is taken again.

```
while (sqlca.sqlcode == 1606)
{
    free(snapshotBuffer);
    snapshotBufferSize = snapshotBufferSize +
    SNAPSHOT_BUFFER_UNIT_SZ;
    snapshotBuffer = (char *)malloc(snapshotBufferSize);
    if (snapshotBuffer == NULL)
    {
        printf("\nMemory allocation error.\n");
        return 1;
    }
    getSnapshotParam.iBufferSize = snapshotBufferSize;
    getSnapshotParam.poBuffer = snapshotBuffer;
    db2GetSnapshot(db2Version810, &getSnapshotParam, &sqlca);
}
```

- Process the snapshot monitor data stream.

- Clear the buffer.

```
free(snapshotBuffer);
free(pRequestedDataGroups);
```

Snapshot monitor API request types

For certain request types, some information is returned only if the associated monitor switch is set ON. See the individual monitor elements to determine if a required element is under switch control.

The following table lists all the supported snapshot request types.

Table 119. Snapshot Monitor API Request Types

Monitor level	API request type	Information returned
Connections list	SQLMA_APPLINFO_ALL	Application identification information for all applications currently connected to a database that is managed by the DB2 instance on the partition where snapshot is taken.
Connections list	SQLMA_DBASE_APPLINFO	Application identification information for each application currently connected to the specified database.
Connections list	SQLMA_DCS_APPLINFO_ALL	Application identification information for all DCS applications currently connected to a database that is managed by the DB2 instance on the partition where snapshot is taken.
Database manager	SQLMA_DB2	Database manager level information, including instance-level monitor switch settings.
Database	SQLMA_DBASE	Database level information and counters for a database. Information is returned only if there is at least one application connected to the database.

Table 119. Snapshot Monitor API Request Types (continued)

Monitor level	API request type	Information returned
Database	SQLMA_DBASE_ALL	Database level information and counters for each database active on the partition. The number of connections to each active database. Includes databases that were started using the ACTIVATE DATABASE command, but have no connections. Information is returned only if there is at least one application connected to the database.
Database	SQLMA_DCS_DBASE	Database level information and counters for a specific DCS database. Information is returned only if there is at least one application connected to the database.
Database	SQLMA_DCS_DBASE_ALL	Database level information and counters for each DCS database active on the partition. Information is returned only if there is at least one application connected to the database.
Database	SQLMA_DBASE_REMOTE	Database level information and counters for a specific federated system database. Information is returned only if there is at least one application connected to the database.
Database	SQLMA_DBASE_REMOTE_ALL	Database level information and counters for each active federated system database on the partition. Information is returned only if there is at least one application connected to the database.
Application	SQLMA_APPL	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_AGENT_ID	Application level information, includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_DBASE_APPLS	Application level information for each application that is connected to the database on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_APPL_ALL	Application level information for each application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_DCS_APPL	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_DCS_APPL_ALL	Application level information for each DCS application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).

Table 119. Snapshot Monitor API Request Types (continued)

Monitor level	API request type	Information returned
Application	SQLMA_DCS_APPL_HANDLE	Application level information, including cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_DCS_DBASE_APPLS	Application level information for each DCS application that is connected to the database on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_DBASE_APPLS_REMOTE	Application level information, includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Application	SQLMA_APPL_REMOTE_ALL	Application level information for each federated system application that is active on the partition. This includes cumulative counters, status information, and most recent SQL statement executed (if statement switch is set).
Table	SQLMA_DBASE_TABLES	Table activity information at the database and application level for each application connected to the database. Table activity information at the table level for each table that was accessed by an application connected to the database. Requires the table switch.
Lock	SQLMA_APPL_LOCKS	List of locks held by the application. Lock wait information requires the lock switch.
Lock	SQLMA_APPL_LOCKS_AGENT_ID	List of locks held by the application. Lock wait information requires the lock switch.
Lock	SQLMA_DBASE_LOCKS	Lock information at the database level, and application level for each application connected to the database. Requires the lock switch.
Table space	SQLMA_DBASE_TABLESPACES	Information about table space activity at the database level, the application level for each application connected to the database, and the table space level for each table space that has been accessed by an application connected to the database. Requires the buffer pool switch.
Buffer pool	SQLMA_BUFFERPOOLS_ALL	Buffer pool activity counters. Requires the buffer pool switch.
Buffer pool	SQLMA_DBASE_BUFFERPOOLS	Buffer pool activity counters for the specified database. Requires the buffer pool switch.
Dynamic SQL	SQLMA_DYNAMIC_SQL	Point-in-time statement information from the SQL statement cache for the database.

Snapshot monitor sample output

You might find it helpful to review some sample output while you are working with the snapshot monitor.

To illustrate the nature of the snapshot monitor, here is an example of a snapshot being taken using the CLP, along with its corresponding output. The objective in

this example is to obtain a list of the locks held by applications connected to the SAMPLE database. The steps taken are as follows:

1. Connect to the sample database:
db2 connect to sample
2. Turn on the LOCK switch with the UPDATE MONITOR SWITCHES command, so that the time spent waiting for locks is collected:
db2 update monitor switches using LOCK on
3. Issue a command or statement that will require locks on the database catalogs. In this case, we will declare, open, and fetch a cursor:
db2 -c- declare c1 cursor for
 select * from staff where job='Sales' for update

db2 -c- open c1
db2 -c- fetch c1
4. Take the database lock snapshot, using the GET SNAPSHOT command:
db2 get snapshot for locks on sample

After the GET SNAPSHOT command is issued from the CLP, the snapshot output is directed to the screen.

Database Lock Snapshot

```
Database name           = SAMPLE
Database path          = C:\DB2\NODE0000\SQL00001\
Input database alias   = SAMPLE
Locks held              = 5
Applications currently connected = 1
Agents currently waiting on locks = 0
Snapshot timestamp     = 06-05-2002 17:08:25.048027
```

```
Application handle     = 8
Application ID         = *LOCAL.DB2.0098C5210749
Sequence number        = 0001
Application name        = db2bp.exe
CONNECT Authorization ID = DB2ADMIN
Application status      = UOW Waiting
Status change time     = Not Collected
Application code page   = 1252
Locks held              = 5
Total wait time (ms)   = 0
```

List Of Locks

```
Lock Name              = 0x020003000500000000000000052
Lock Attributes        = 0x00000000
Release Flags          = 0x00000001
Lock Count             = 1
Hold Count             = 0
Lock Object Name       = 5
Object Type            = Row
Tablespace Name        = USERSPACE1
Table Schema           = DB2ADMIN
Table Name             = STAFF
Mode                   = U
```

```
Lock Name              = 0x020003000000000000000000054
Lock Attributes        = 0x00000000
Release Flags          = 0x00000001
Lock Count             = 1
Hold Count             = 0
Lock Object Name       = 3
Object Type            = Table
Tablespace Name        = USERSPACE1
Table Schema           = DB2ADMIN
Table Name             = STAFF
```

```

Mode = IX

Lock Name = 0x01000000010000000100810056
Lock Attributes = 0x00000000
Release Flags = 0x40000000
Lock Count = 1
Hold Count = 0
Lock Object Name = 0
Object Type = Internal Variation Lock
Mode = S

Lock Name = 0x41414141414A48520000000041
Lock Attributes = 0x00000000
Release Flags = 0x40000000
Lock Count = 1
Hold Count = 0
Lock Object Name = 0
Object Type = Internal Plan Lock
Mode = S

Lock Name = 0x434F4E544F4B4E310000000041
Lock Attributes = 0x00000000
Release Flags = 0x40000000
Lock Count = 1
Hold Count = 0
Lock Object Name = 0
Object Type = Internal Plan Lock
Mode = S

```

From this snapshot, you can see that there is currently one application connected to the SAMPLE database, and it is holding five locks.

```

Locks held = 5
Applications currently connected = 1

```

Note that the time (Status change time) when the Application status became UOW Waiting is returned as Not Collected. This is because the UOW switch is OFF.

The lock snapshot also returns the total time spent so far in waiting for locks, by applications connected to this database.

```

Total wait time (ms) = 0

```

Subsection snapshots

On systems that use interpartition parallelism, the SQL compiler partitions the access plan for an SQL statement into subsections. Each subsection is executed by a different DB2 agent (or agents for SMP).

The access plan for an SQL statement generated by the DB2 code generator during compilation can be obtained using the db2expln command. As an example, selecting all the rows from a table that is partitioned across several partitions might result in an access plan having two subsections:

1. Subsection 0, the coordinator subsection, whose role is to collect rows fetched by the other DB2 agents (subagents) and return them to the application.
2. Subsection 1, whose role is to perform a table scan and return the rows to the coordinating agent.

In this simple example, subsection 1 would be distributed across all the database partitions. There would be a subagent executing this subsection on each physical partition of the database partition group to which this table belongs.

The database system monitor allows you to correlate runtime information with the access plan, which is compile time information. With interpartition parallelism, the monitor breaks information down to the subsection level. For example, when the statement monitor switch is ON, a GET SNAPSHOT FOR APPLICATION will return information for each subsection executing on this partition, as well as totals for the statement.

The subsection information returned for an application snapshot includes:

- the number of table rows read/written
- CPU consumption
- elapsed time
- the number of table queue rows sent and received from other agents working on this statement. This allows you to track the execution of a long running query by taking a series of snapshots.
- subsection status. If the subsection is in a WAIT state, because it is waiting for another agent to send or receive data, then the information also identifies the partition or partitions preventing the subsection from progressing in its execution. You may then take a snapshot on these partitions to investigate the situation.

The information logged by a statement event monitor for each subsection after it has finished executing includes: CPU consumption, total execution, time, and several other counters.

Global snapshots on partitioned database systems

On a partitioned database system, you can use the snapshot monitor to take a snapshot of the current partition, a specified partition, or all partitions. When taking a global snapshot across all the partitions of a partitioned database, data is aggregated before the results are returned.

Data is aggregated for the different element types as follows:

- **Counters, Time, and Gauges**
Contains the sum of all like values collected from each partition in the instance. For example, GET SNAPSHOT FOR DATABASE XYZ ON TEST GLOBAL would return the number of rows read (rows_read) from the database for all partitions in the partitioned database instance.
- **Watermarks**
Returns the highest (for high water) or lowest (for low water) value found for any partition in the partitioned database system. If the value returned is of concern, then snapshots for individual partitions can be taken to determine if a particular partition is over utilized, or if the problem is instance-wide.
- **Timestamp**
Set to the timestamp value for the partition where the snapshot monitor instance agent is attached. Note that all timestamp values are under control of the timestamp monitor switch.
- **Information**
Returns the most significant information for a partition that may be impeding work. For example, for the element appl_status, if the status on one partition was UOW Executing, and on another partition Lock Wait, Lock Wait would be returned, since it is the state that's holding up execution of the application.

You can also reset counters, set monitor switches, and retrieve monitor switch settings for individual partitions or all partitions in your partitioned database.

Note: When taking a global snapshot, if one or more partitions encounter an error, then data is collected from the partitions where the snapshot was successful and a warning (sqlcode 1629) is also returned. If a global get or update of monitor switches, or a counter reset fails on one or more partitions, then those partitions will not have their switches set, or data reset.

Snapshot monitor self-describing data stream

After you capture a snapshot with the db2GetSnapshot API, the API returns the snapshot output as a self-describing data stream.

Figure 6 shows the structure of the data stream and Table 120 on page 474 provides some examples of the logical data groups and monitor elements that might be returned.

Note: Descriptive names are used for the identifiers in the examples and tables. These names are prefixed by **SQLM_ELM_** in the actual data stream. For example, collected would appear as **SQLM_ELM_COLLECTED** in the snapshot monitor output. Types are prefixed with **SQLM_TYPE_** in the actual data stream. For example, headers appear as **SQLM_TYPE_HEADER** in the data stream.

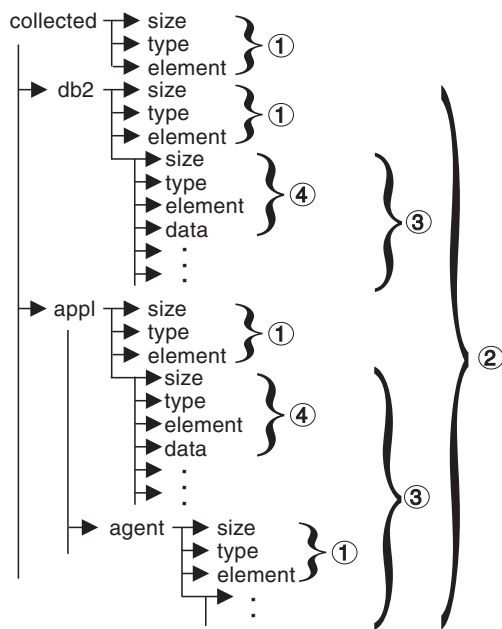


Figure 6. Snapshot Monitor Data Stream

1. Each logical data group begins with a header that indicates its size and name. This size does not include the volume of data taken up by the header itself.
2. Size in the collected header returns the total size of the snapshot.
3. The size element in other headers indicates the size of all the data in that logical data group, including any subordinate groupings.
4. Monitor element information follows its logical data group header and is also self-describing.

Table 120. Sample Snapshot Data Stream

Logical Data Group	Data Stream	Description
collected	1000	Size of snapshot data (in bytes).
	header	Indicates the start of a logical data group.
	collected	Name of the logical data group.
	4	Size of the data stored in this monitor element.
	u32bit	Monitor element type - unsigned 32 bit numeric.
	server_db2_type	The name of the monitor element collected.
	sqlf_nt_server	The collected value for this element.
	2	Size of the data stored in this monitor element.
	u16bit	Monitor element type - unsigned 16 bit numeric.
	node_number	The name of the monitor element collected.
	3	The collected value for this element.
	db2	200
header		Indicates the start of a logical data group.
db2		Name of the logical data group.
	4	Size of the data stored in this monitor element.
	u32bit	Monitor element type - unsigned 32 bit numeric.
	sort_heap_allocated	The name of the monitor element collected.
	16	The collected value for this element.
	4	Size of the data stored in this monitor element.
	u32bit	Monitor element type - unsigned 32 bit numeric.
	local_cons	The name of the monitor element collected.
	3	The collected value for this element.

appl	100	Size of the appl element data in the snapshot.
	header	Indicates the start of a logical data group.
	appl	Name of the logical data group.
	4	Size of the data stored in this monitor element.
	u32bit	Monitor element type - unsigned 32 bit numeric.
	locks_held	The name of the monitor element collected.
	3	The collected value for this element.

Table 120. Sample Snapshot Data Stream (continued)

Logical Data Group	Data Stream	Description
agent	50	Size of the agent portion of the appl structure.
	header	Indicates the start of a logical data group.
	agent	Name of the logical data group.
agent	4	Size of the data stored in this monitor element.
	u32bit	Monitor element type - 32 bit numeric.
	agent_pid	The name of the monitor element collected.
	12	The collected value for this element.
...

The `db2GetSnapshot()` routine returns the self-describing snapshot data in the user-supplied buffer. Data is returned in the logical data groupings associated with the type of snapshot being captured.

Each item returned by a snapshot request contains fields that specify its size and type. The size can be used to parse through the returned data. A field's size can also be used to skip over a logical data group. For example, to skip over the DB2 record you need to determine the number of bytes in the data stream. Use the following formula to calculate the number of bytes to skip:

size of the db2 logical data grouping + sizeof(sqlm_header_info)

Monitoring with `db2top` in interactive mode commands

The `db2top` monitoring utility quickly and efficiently monitors a complex DB2 environment. It combines DB2 snapshot information from all database partitions and provides a dynamic, real-time view of a running DB2 system using a text-based user interface.

About this task

When you run `db2top` in interactive mode, you can issue the following commands:

- A** Monitor either the primary or the secondary database in a HADR cluster.
- a** Goto application details for agent (or restrict on agent on statement screen). The `db2top` command will prompt for the agent-id.
- B** Display the main consumer of critical server resources (Bottleneck Analysis).
- c** This option allows to change the order of the columns displayed on the screen. The syntax is in the form: `1,2,3,...` where 1,2,3 correspond to the 1st, 2nd and 3rd columns displayed. These are the column numbers to use when specifying a sort criteria.

When you use the `c` switch key, a screen is shown specifying the order of the columns displayed on screen. The left part of the screen displays the default order and column numbers; the right part of the screen displays the current ordering. To change the order of the columns, enter the new column order in the text field at the bottom of the screen. Next, enter the relative column positions as displayed on the left, separated by commas. Not all columns need to be specified. This column ordering can be saved in `$DB2TOPRC` for subsequent `db2top` monitoring sessions by selecting `w`.

You can sort and select in which order the columns are displayed on the screen. Valid keywords for column ordering in the .db2toprc file are:

- sessions=
- tables=
- tablespaces=
- bufferpools=
- dynsql=
- statements=
- locks=
- utilities=
- federation=

- b** Goto buffer pool screen.
- C** Toggle snapshot data collector on/off.
- d** Goto database screen.
- D** Goto the dynamic SQL screen.
- f** Freeze screen.
- F** Monitor federated queries on the primary server.
- G** Toggle graph on/off.
- h** Go to Help screen
- H** Goto the history screen
- i** Toggle idle sessions on/off.
- k** Toggle actual vs delta values.
- l** Goto sessions screen.
- L** Allows to display the complete query text from the SQL screen. Regular DB2 explain can then be run using e or X options.
- m** Display memory pools.
- o** Display session setup.
- p** Goto the partitions screen.
- P** Select db partition on which to issue snapshot.
- q** Quit db2top.
- R** Reset snapshot data.
- s** Goto the statements screen.
- S** Run native DB2 snapshot.
- t** Goto table spaces screen.
- T** Goto tables screen
- u** Display active utilities and aggregate them across database partitions.
- U** Goto the locks screen.
- V** Set default explains schema.
- w** Write session settings to .db2toprc.
- W** Watch mode for agent_id, os_user, db_user, application or netname.

Statements returned by the session snapshot (option I) will be written to agent.sql, os_user-agent.sql, db_user-agent.sql, application-agent.sql or netname-agent.sql. When issued from the dynamic SQL screen (option D), statements will be written to db2adv.sql in a format compatible with db2advvis.

- X Toggle extended mode on/off.
- z|Z Sort on ascending or descending order.
- / Enter expression to filter data. Expression must conform to regular expression. Each function (screen) can be filtered differently. The regexp check is applied to the whole row.
- <l> Move to left or right of screen.

The following switches apply to the applications screen only:

- r Return to previous function.
- R Toggle automatic refresh.
- g Toggle graph on/off.
- X Toggle extended mode on/off.
- d Display agents.

To start **db2top in interactive mode**, issue the following command:

```
db2top -d <database name>
```

When you type

```
db2top -d sample
```

the following output is displayed:

```
[V]11:57:10,refresh=2secs(0.000) Inactive,part=[1/1],<instanceName>:sample  
[d=Y,a=N,e=N,p=ALL] [qp=off]
```

```
[/]: When rotating, it means that db2top is waiting between two snapshots, otherwise, it means db2top is waiting  
from an answer from DB2
```

```
11:57:10: current time
```

```
refresh=2secs: time interval
```

```
refresh=!secs: Exclamation mark means the time to process the snapshot by DB2 is longer than the refresh interval.
```

```
In this case, db2top will increase the interval by 50%. If this occurs too often because the system is too busy,  
you can either increase the snapshot interval (option I), monitor a single database partition (option P), or turn  
off extended display mode (option x)
```

```
0.000 : time spent inside DB2 to process the snapshot
```

```
d=Y/N : delta or cumulative snapshot indicator (command option -k or option k).
```

```
a=Y/N : Active only or all objects indicator (-a command option set or i)
```

```
e=Y/N : Extended display indicator
```

```
p=ALL : All database partitions
```

```
p=CUR: Current database partition (-P command option with no partition number specified)
```

```
p=3 : target database partition number: say 3
```

```
Inactive: : Shows inactive if DB2 is not running, otherwise displays the platform on which DB2 is running
```

```
part=[1/1] : active database partition number vs total database partition number. For example, part=[2,3] means one  
database partition out of 3 is down (2 active, 3 total)
```

```
<instanceName> : instance name
```

```
sample : database name
```

Example

The following example demonstrates running the **db2top** monitoring utility in interactive mode in a partitioned database environment:

```
db2top -d TEST -n mynode -u user -p passwd -V skm4 -B -i 1
```

The command parameters are as follows:

```
-d TEST # database name
```

```

-n mynode # node name
-u user   # user id
-p passwd # password
-V skm4   # Schema name
-B        # Bold enabled
-i 1     # Screen update interval: 1 second

```

.db2toprc configuration file

The `.db2toprc` configuration file is a user generated file used to set parameters at initialization time for the **db2top** monitoring utility.

The **db2top** utility will search for the location of the `.db2toprc` file using the user-defined variable `$db2topRC`. If the variable is not set, **db2top** will first search for the `.db2toprc` file in the current directory and then in the home directory. The `.db2toprc` file is user generated.

Environment variables

You can set the following environment variables:

- **DB2TOPRC**

A user defined environment variable that stores the location of the `.db2toprc` file. For example, on Linux, you can define **DB2TOPRC** as: `export db2topRC=~/.db2toprc`.

If the variable is not set by the user, **db2top** will first search for the `.db2toprc` file in the current directory and then in the home directory.

- **DB2DBDFT**

This variable specifies the database alias name of the database to be used for implicit connects. It is used when no database name is specified on the command line or in the `.db2toprc` configuration file.

- **EDITOR**

This system environment variable specifies the command used to start the text editor used to display the results of explain or native snapshots.

If this variable is not set, **vi** is used.

Structure

Some of the entries in the `.db2toprc` file are described here.

cpu=command

Use this entry to display the results of CPU activity on the second line at the right of the screen output. For example:

```
cpu=vmstat 2 2 | tail -1 | awk '{printf("%d(usr+sys)", $14+$15);}'
```

displays `Cpu=2(usr+sys)` on the right of the screen.

io=command

Use this entry to specify a command and display the result on the second line at the left of the screen output. For example:

```
io=vmstat 2 2 | tail -1 | awk '{printf("%d(bi+bo)", $10+$11);}'
```

displays `Disk=76(bi+bo)` on the left of the screen.

Both commands run as background processes and the fields on the screen are updated asynchronously.

shell alias=command

Use this shell entry to specify a user defined command, for example: shell M=top spawns top from a **db2top** session when entering M. It returns to the current screen upon exit.

function alias=command

Use this entry to specify a user defined command, for example: function N=netstat creates a new function called N that repeatedly displays the output of **netstat**. There can be multiple function entries. They must be placed on separate lines. For example:

```
function Q=netstat
function N=df -k
```

sort=command

Use this entry to specify a sort order, for example: sort=command creates a default sort order for this function, where command is the column number. It can be either ascending or descending. Sort is valid for sessions, tables, tablespace, bufferpool, dynsql, statements, locks, utilities and federation.

Sample .db2toprc file

There is no default .db2toprc configuration file. However, you can press "W" to create a .db2toprc for the current setup. Use the following sample **.db2toprc** file as a reference. Comments have been added to all entries.

```
# db2top configuration file
# On UNIX, should be located in $HOME/.db2toprc
# File generated by db2top-1.0a
#
node= # [-n] nodename
database=sample # [-d] databasename
user= # [-u] database user
password= # [-p] user password (crypted)
schema= # [-V] default schema for explains
interval=2 # [-i] sampling interval
active=OFF # [-a] display active sessions only (on/off)
reset=OFF # [-R] Reset snapshot at startup (on/off)
delta=ON # [-k] Toggle display of delta/cumulative values (on/off)
gauge=ON # display graph on sessions list (on/off)
colors=ON
# True if terminal supports colors. Informs GE_WRS if it can display information with colors
graphic=ON # True if terminal supports semi graphical characters (on/off).
port= # Port for network collection
streamsize=size # Max collection size per hour (eg. 1024 or 1K : K, M or G)
# Command to get cpu usage information from OS
cpu=vmstat 2 2 | tail -1 | awk '{printf("%d(usr+sys)",$14+$15);}'
# Command to get IO usage information from OS
io=vmstat 2 2 | tail -1 | awk '{printf("%d(bi+bo)",$10+$11);}'
# Ordering of information in sessions screen
# Column order for the session screen (option l)
sessions=0,1,18,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,19,20,21,22,23
# Column order for the tables screen (option T)
tables=0,1,2,4,3,5,6,7
# Column order for the tablespaces screen (option t).
# The display will be sorted in ascending order on column #22
tablespaces=0,1,18,2,3,4,5,6,7,8, sort=22a
# Column order for the bufferpool screen (option b)
bufferpools=0,1,18,2,3,4,5,6,7,8,9,10
# Column order for the Dynamic SQL screen (option D)
dynsql=0,1,18,2,3,4,5,6,7,8,9
statements=0,1
locks=0,1
utilities=0 # contains the default column and sort order for the utility screen
federation=0,2,4 # contains the default column and sort order for the federation screen

# User defined commands
shell P=top
function N=date && netstat -t tcp
```

Switch-based monitoring concepts

System monitor switches

System monitor switches control how snapshot monitors and some event monitors collect data.

Note: These system monitor switches do not affect the unit of work event monitor and locking event monitor, which were introduced in DB2 Version 9.7.

The snapshot monitor and some event monitors report data collected by the system monitor. Collecting system monitor data introduces extra processing for the database manager. For example, in order to calculate the execution time of SQL statements, the database manager must make calls to the operating system to obtain timestamps before and after the execution of every statement. These types of system calls are generally expensive. The system monitor also increases memory consumption. For every monitor element tracked by the system monitor, the database manager uses its memory to store the collected data.

In order to minimize the additional processor time involved in maintaining monitoring information, monitor switches control the collection of potentially expensive data by the database manager. Each switch has only two settings: ON or OFF. If a monitor switch is OFF, the monitor elements under that switch's control do not collect any information. There is a considerable amount of basic monitoring data that is not under switch control, and will always be collected regardless of switch settings.

Each monitoring application has its own logical view of the monitor switches (and the system monitor data). Upon startup each application inherits its monitor switch settings from the `dft_monswitches` parameters in the database manager configuration file (at the instance level). A monitoring application can alter its monitor switch settings with the `UPDATE MONITOR SWITCHES USING MONSWITCH OFF/ON` command. The `MONSWITCH` parameter holds values found in the Monitor Switch column in the Snapshot Monitor Switches table shown in the next section. Changes to the switch settings at the application level only affect the application from where the switch was changed.

Instance-level monitor switches can be changed without stopping the database management system. To do this use the `UPDATE DBM CFG USING DBMSWITCH OFF/ON` command. The `DBMSWITCH` parameter holds values from the DBM Parameter column in the Snapshot Monitor Switches table shown in the next section. This dynamic updating of switches requires that the application performing the update be explicitly attached to the instance for the updates to dynamically take effect. Other existing snapshot applications will not be affected by a dynamic update. New monitoring applications will inherit the updated instance-level monitor switch settings. For an existing monitoring application to inherit the new default monitor switch values, it must terminate and re-establish its attachment. Updating the switches in the database manager configuration file will update the switches for all partitions in a partitioned database.

The database manager keeps track of all the snapshot monitoring applications and their switch settings. If a switch is set to ON in one application's configuration, then the database manager always collects that monitor data. If the same switch is then set to OFF in the application's configuration, then the database manager will still collect data as long as there is at least one application with this switch turned ON.

The collection of time and timestamp elements is controlled by the `TIMESTAMP` switch. Turning this switch OFF (it is ON by default) instructs the database manager to skip any timestamp operating system calls when determining time or timestamp-related monitor elements. Turning this switch OFF becomes important as CPU utilization approaches 100%. When this occurs, the performance degradation caused by issuing timestamps increases dramatically. For monitor elements that can be controlled by the `TIMESTAMP` switch and another switch, if either of the switches is turned OFF, data is not collected. Therefore, if the `TIMESTAMP` switch is turned OFF, the overall cost of data under the control of other monitor switches is greatly reduced.

Event monitors are not affected by monitor switches in the same way as snapshot monitoring applications. When an event monitor is defined, it automatically turns ON the instance level monitor switches required by the specified event types. For example, a deadlock event monitor will automatically turn ON the `LOCK` monitor switch. The required monitor switches are turned ON when the event monitor is activated. When the event monitor is deactivated, the monitor switches are turned OFF.

The `TIMESTAMP` monitor switch is not set automatically by event monitors. It is the only monitor switch that controls the collection of any monitor elements belonging to event monitor logical data groupings. If the `TIMESTAMP` switch is OFF, most of the timestamp and time monitor elements collected by event monitors will not be collected. These elements are still written to the specified table, file, or pipe, but with a value of zero.

Table 121. Snapshot Monitor Switches

Monitor Switch	DBM Parameter	Information Provided
<code>BUFFERPOOL</code>	<code>DFT_MON_BUFPOOL</code>	Number of reads and writes, time taken
<code>LOCK</code>	<code>DFT_MON_LOCK</code>	Lock wait times, deadlocks
<code>SORT</code>	<code>DFT_MON_SORT</code>	Number of heaps used, sort performance
<code>STATEMENT</code>	<code>DFT_MON_STMT</code>	Start/stop time, statement identification
<code>TABLE</code>	<code>DFT_MON_TABLE</code>	Measure of activity (rows read/written)
<code>UOW</code>	<code>DFT_MON_UOW</code>	Start/end times, completion status
<code>TIMESTAMP</code>	<code>DFT_MON_TIMESTAMP</code>	Timestamps

Before capturing a snapshot or using an event monitor, you must determine what data you need the database manager to gather. If you want any of the following special types of data to be collected in a snapshot, you will need to set the appropriate monitor switches.

- Buffer pool activity information
- Lock, lock wait, and time related lock information
- Sorting information
- SQL statement information
- Table activity information
- Times and timestamp information

- Unit of work information

The switches corresponding to the previously listed information types are all OFF by default, except for the switch corresponding to times and timestamp information, which is ON by default.

Event monitors are only affected by the time and timestamp information switch. All other switch settings have no effect on the data collected by event monitors.

Setting system monitor switches from the CLP

System monitor switches control the collection of data by the system monitor. By setting certain monitor switches to ON, you can collect specific types of monitor data.

Before you begin

The application performing any monitor switch updates must have an instance attachment. You must have one of SYSADM, SYSCTRL, SYSMAINT, or SYSMON authority to use the following commands:

- UPDATE MONITOR SWITCHES
- GET MONITOR SWITCHES
- GET DATABASE MANAGER MONITOR SWITCHES

You must have SYSADM authority to use the UPDATE DBM CFG command.

About this task

Procedure

- To activate any of the local monitor switches, use the UPDATE MONITOR SWITCHES command. The switches will remain active until the application (CLP) detaches, or until they are deactivated with another UPDATE MONITOR SWITCHES command. The following example updates all of the local monitor switches to be ON:

```
db2 update monitor switches using BUFFERPOOL on LOCK on
      SORT on STATEMENT on TIMESTAMP on TABLE on UOW on
```

- To deactivate any of the local monitor switches, use the UPDATE MONITOR SWITCHES command. The following example updates all of the local monitor switches to be OFF:

```
db2 update monitor switches using BUFFERPOOL off, LOCK off,
      SORT off, STATEMENT off, TIMESTAMP off, TABLE off, UOW off
```

The following is an example of the output you would expect to see after issuing the previously shown UPDATE MONITOR SWITCH command:

Monitor Recording Switches

```
Switch list for db partition number 1
Buffer Pool Activity Information (BUFFERPOOL) = OFF
Lock Information                (LOCK) = OFF
Sorting Information              (SORT) = OFF
SQL Statement Information       (STATEMENT) = OFF
Table Activity Information       (TABLE) = OFF
Unit of Work Information        (UOW) = OFF
Get timestamp information       (TIMESTAMP) = OFF
```

- It is also possible to manipulate the monitor switches at the database manager level. This involves changing the `dft_monswitches` parameters in the database

manager configuration file, using the UPDATE DBM CFG command. In the following example, only lock switch controlled information is to be collected in addition to the basic information.

```
db2 update dbm cfg using DFT_MON_LOCK on
```

Whenever a monitoring application is started, it inherits its monitor switch settings from the database manager. Any changes to the database manager's monitor switch settings will not impact any running monitoring applications. Monitoring applications must reattach themselves to the instance to pick up any changes to monitor switch settings.

- For partitioned database systems, you can set monitor switches specifically for a certain partition, or globally for all partitions.

1. To set a monitor switch (for example, BUFFERPOOL) for a specific partition (for example, partition number 3), issue the following command:

```
db2 update monitor switches using BUFFERPOOL on
    at dbpartitionnum 3
```

2. To set a monitor switch (for example, SORT) for all partitions, issue the following command:

```
db2 update monitor switches using SORT on global
```

- To check the status of the local monitor switches use the GET MONITOR SWITCHES command.

```
db2 get monitor switches
```

- For partitioned database systems, you can view the monitor switch settings specifically for a certain partition, or globally for all partitions.

1. To view the monitor switch settings for a specific partition (for example, partition number 2), issue the following command:

```
db2 get monitor switches at dbpartitionnum 2
```

2. To view the monitor switch settings for all partitions, issue the following command:

```
db2 get monitor switches global
```

- To check the status of the monitor switches at the database manager level (or instance level) use the GET DATABASE MANAGER MONITOR SWITCHES command. This command will show the overall switch settings for the instance being monitored.

```
db2 get database manager monitor switches
```

The following is an example of the output you should expect to see after issuing the previously shown command:

```
DBM System Monitor Information Collected
```

```
Switch list for db partition number 1
Buffer Pool Activity Information (BUFFERPOOL) = OFF
Lock Information (LOCK) = ON 10-25-2001 16:04:39
Sorting Information (SORT) = OFF
SQL Statement Information (STATEMENT) = OFF
Table Activity Information (TABLE) = OFF
Unit of Work Information (UOW) = OFF
Get timestamp information (TIMESTAMP) = OFF
```

Results

Now that you have set the required monitor switches and confirmed the switch settings, you are ready to capture and collect monitor data.

Setting system monitor switches from a client application

System monitor switches control the collection of data by the system monitor. By setting certain monitor switches to ON, you can collect specific types of monitor data.

Before you begin

The application performing any monitor switch updates must have an instance attachment. You must have SYSADM, SYSCTRL, SYSMOINT, or SYSMON authority to use the db2MonitorSwitches API.

Procedure

1. Include the following DB2 libraries: sqlutil.h and db2ApiDf.h. These are found in the include subdirectory under sqllib.

```
#include <sqlutil.h>
#include <db2ApiDf.h>
#include <string.h>
#include <sqlmon.h>
```

2. Set switch lists buffer unit size to 1 KB.

```
#define SWITCHES_BUFFER_UNIT_SZ 1024
```

3. Initialize the sqlca, db2MonitorSwitches, and sqlm_recording_group structures. Also, initialize a pointer to contain the switch lists buffer, and establish the buffer's size.

```
struct sqlca sqlca;
memset (&sqlca, '\0', sizeof(struct sqlca));
db2MonitorSwitchesData switchesData;
memset (&switchesData, '\0', sizeof(switchesData));
struct sqlm_recording_group switchesList[SQLM_NUM_GROUPS];
memset(switchesList, '\0', sizeof(switchesList));
sqluint32 outputFormat;
static sqluint32 switchesBufferSize = SWITCHES_BUFFER_UNIT_SZ;
char *switchesBuffer;
```

4. Initialize the buffer, which is to hold the switch list output.

```
switchesBuffer = (char *)malloc(switchesBufferSize);
memset(switchesBuffer, '\0', switchesBufferSize);
```

5. To alter the state of the local monitor switches, alter the elements in the sqlm_recording_group structure (named switchesList as indicated in the previous step). For a monitor switch to be turned on, the parameter input_state is to be set to SQLM_ON. For a monitor switch to be turned off, the parameter input_state must be set to SQLM_OFF.

```
switchesList[SQLM_UOW_SW].input_state = SQLM_ON;
switchesList[SQLM_STATEMENT_SW].input_state = SQLM_ON;
switchesList[SQLM_TABLE_SW].input_state = SQLM_ON;
switchesList[SQLM_BUFFER_POOL_SW].input_state = SQLM_OFF;
switchesList[SQLM_LOCK_SW].input_state = SQLM_OFF;
switchesList[SQLM_SORT_SW].input_state = SQLM_OFF;
switchesList[SQLM_TIMESTAMP_SW].input_state = SQLM_OFF;
switchesData.piGroupStates = switchesList;
switchesData.poBuffer = switchesBuffer;
switchesData.iVersion = SQLM_DBMON_VERSION9_5;
switchesData.iBufferSize = switchesBufferSize;
switchesData.iReturnData = 0;
switchesData.iNodeNumber = SQLM_CURRENT_NODE;
switchesData.poOutputFormat = &outputFormat;
```

Note: SQLM_TIMESTAMP_SW is unavailable if iVersion is less than SQLM_DBMON_VERSION8.

6. To submit the changes to switch settings, call the `db2MonitorSwitches()` function. Pass the `db2MonitorSwitchesData` structure (named `switchesData` in this example) as a parameter to the `db2MonitorSwitches` API. The `switchesData` contains the `sqlm_recording_group` structure as a parameter.

```
db2MonitorSwitches(db2Version810, &switchesData, &sqlca);
```
7. Process the switch list data stream from the switch list buffer.
8. Clear the switch list buffer.

```
free(switchesBuffer);  
free(pRequestedDataGroups);
```

Results

Now that you have set the required monitor switches and confirmed the switch settings, you are ready to capture and collect monitor data.

System monitor switches self-describing data stream

After you update or view the current system monitor switch settings with the `db2MonitorSwitches` API, the API returns the switch settings as a self-describing data stream.

Figure 7 on page 486 shows the structure of the switch list information that may be returned for a partitioned database environment.

Note:

1. Descriptive names are used for the identifiers in the examples and tables. These names are prefixed by `SQLM_ELM_` in the actual data stream. For example, `db_event` would appear as `SQLM_ELM_DB_EVENT` in the event monitor output. Types are prefixed with `SQLM_TYPE_` in the actual data stream. For example, headers appear as `SQLM_TYPE_HEADER` in the data stream.
2. For global switch requests the partition order of the returned information can be different in each switch request. In this case, a partition id is included in the data stream.

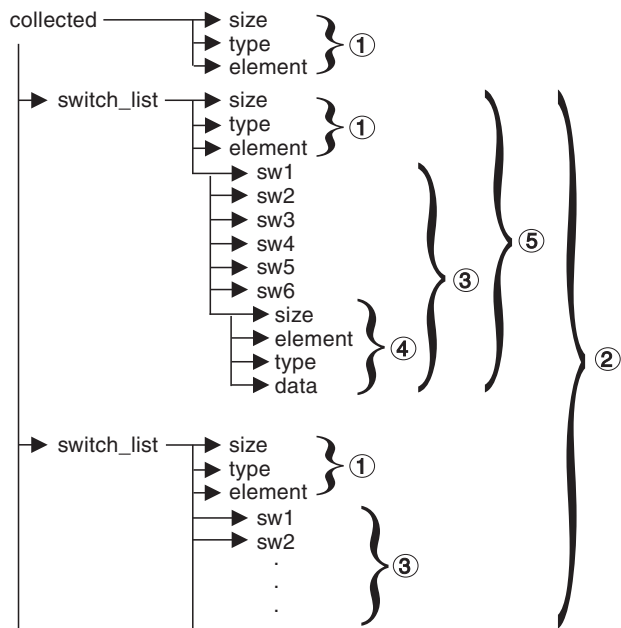


Figure 7. Switch List Monitor Data Stream

1. Each logical data group begins with a header that indicates its size and name. This size does not include the volume of data taken up by the header itself.
2. Size in the collected header returns the total size of all monitor switch lists for all partitions.
3. The size element in switch list header indicates the size of switch data for that partition.
4. Switch information is self-describing.
5. For a non-partitioned database, the switch settings for the stand alone partition are returned. That is, only one switch list is returned.

Database system monitor data organization

The system monitor collects and stores information that you can access using interfaces to the snapshot monitor and some event monitors. The database system monitor stores information it collects in entities called *monitor elements* (these were previously known as data elements).

Each monitor element stores information regarding one specific aspect of the state of the database system. In addition, monitor elements are identified by unique names and store a certain type of information.

The following element types are available for the system monitor to store data:

Counter

Counts the number of times an activity occurs. Counter values increase during monitoring. Most counter elements can be reset.

Gauge Indicates the current value for an item. Gauge values can go up and down depending on database activity (for example, the number of locks held). Gauge elements can not be reset.

Watermark

Indicates the highest (maximum) or lowest (minimum) value an element has reached since monitoring was started. Watermark elements can not be reset.

Information

Provides reference-type details of your monitoring activities. This can include items such as partition names, aliases, and path details. Information elements can not be reset.

Timestamp

Indicates the date and time that an activity took place by providing the number of seconds and microseconds that have elapsed since January 1, 1970. For the snapshot monitor and event monitors, the collection of timestamp elements is controlled by the `TIMESTAMP` monitor switch. While this switch is on by default, you should turn it off for performance reasons if CPU utilization on the database instance approaches 100%. Timestamp elements can not be reset.

A value of 0 for the timestamp element means "not available". If you attempt to import this data, such a value will generate an out of range error (SQL0181). To avoid this error, update the value to any valid timestamp value before exporting the data.

Time Returns the number of seconds and microseconds spent on an activity. For the snapshot monitor and event monitors, the collection of most time elements is controlled by the `TIMESTAMP` monitor switch. While this switch is on by default, you should turn it off for performance reasons if CPU utilization on the database instance approaches 100%. Some time elements can be reset.

Monitor elements collect data for one or more logical data groups. A logical data group is a collection of monitor elements that gather database system monitoring information for a specific scope of database activity. Monitor elements are sorted in logical data groups based on the levels of information they provide. For example, while snapshot monitoring, the Total Sort Time monitor element returns database (dbase), application (appl), and statement (stmt) information; hence, it appears in each of the logical data groups listed in parentheses.

Although many monitor elements are used by both the snapshot monitor and event monitors, they each use a distinct set of logical data groups. This is because the scopes of database activity for which you can capture a snapshot differ from those for which you can collect event data. Practically speaking, the overall set of monitor elements accessible from the snapshot monitor is different from those accessible from event monitors.

Counter status and visibility

Among the monitor elements collected by the system monitor are several accumulating counters. These counters are incremented during the operation of the database or database manager, for example, every time an application commits a transaction.

Counters are initialized when their applicable object becomes active. For instance, the number of buffer pool pages read for a database (a basic monitor element) is set to zero when the database is activated.

Some counters that can be collected by the system monitor are controlled by monitor switches. If a particular monitor switch is off, the monitor elements under its control do not collect data. When a monitor switch is turned on, all the associated counters are reset to zero.

Counters returned by event monitors are reset to zero when the event monitor is activated.

Event monitor counting represents a count since one of the following starting points:

- Event monitor startup, for database, table space, and tables.
- Event monitor startup, for existing connections.
- Application connection, for connections made after the monitor was started.
- Start of the next transaction (unit of work) or statement after the monitor was started.
- Occurrence of a deadlock after the monitor was started.

Each event monitor and any monitoring application (an application using the snapshot monitor APIs) has its own logical view of the system monitor data. This means that when counters are reset or initialized, it only affects the event monitor or application that reset or initialized them. Event monitor counters cannot be reset, except by turning the event monitor off, and then on again. An application taking snapshots can reset its view of the counters at any time by using the RESET MONITOR command.

If you start a statement event monitor after a statement starts, the monitor will start collecting information when the next SQL statement starts. As a result, the event monitor will not return information about statements that the database manager is executing when the monitor was started. This is also true for transaction information.

System monitor output: the self-describing data stream

Aside from presenting system monitor data on screen or storing it in SQL tables, you can develop a client application to process it. The system monitor returns monitor data via a self-describing data stream for both the snapshot monitor and event monitor.

In a snapshot monitoring application you can call the snapshot APIs to capture a snapshot and then directly process the data stream.

Processing event monitor data is different, in that the event data is sent to the application at the pace database events occur. For a pipe event monitor, the application waits for event data to arrive, and then processes it when it does. For a file event monitor, the application parses event files, thus processing event records in batches.

This self-describing data stream allows you to parse through the returned data one element at a time. This opens up numerous monitoring possibilities, including looking for information regarding a particular application or a specific database state.

The returned monitor data is in the following format:

size The size (in bytes) of the data stored in the monitor element or logical data grouping. In the case of a logical data grouping, this is the size of all data

in the logical group. For example, the database logical grouping (*db*) contains individual monitor elements (such as *total_log_used*) along with other logical data groupings, such as rollforward information (*rollforward*). This does not include the size taken up by the 'size', 'type', and 'element' information.

type The type of element stored in the data (for example, variable length string or signed 32 bit numeric value). An element type of *header* refers to a logical data grouping for an element.

element id

The identifier for the monitor element that was captured by the monitor. In the case of a logical data grouping, this is the identifier for the group (for example, *collected*, *dbase*, or *event_db*).

data The value collected by a monitor for a monitor element. In the case of a logical data grouping, the data is composed of the monitor elements belonging to it.

All timestamps in monitor elements are returned in two unsigned 4 byte monitor elements (seconds and microseconds). These represent the number of seconds since January 1, 1970 in GMT time.

The size element of strings in monitor elements represents the actual size of data for the string element. This size does not include a null terminator, as the strings are not null terminated.

Memory requirements for monitor data

The memory required for monitor data is allocated from the monitor heap. Monitor heap size is controlled by the **mon_heap_sz** database configuration parameter. This parameter has a default value of AUTOMATIC, meaning that the monitor heap can increase as needed until the instance_memory limit is reached.

If you configure the **mon_heap_sz** parameter manually, consider the following factors:

- The number of monitoring applications
- The number and nature of event monitors
- The monitor switches set
- The level of database activity

Consider increasing the value for the **mon_heap_sz** parameter if monitor commands fail with an SQLCODE of -973.

The following formula provides an approximation of the number of pages required for the monitor heap:

$$\begin{aligned} & \text{(Memory used by applications} && + \\ & \text{Memory used by event monitors} && + \\ & \text{Memory used by monitoring applications} && + \\ & \text{Memory used by Gateway applications)} && / 4096 \end{aligned}$$

Memory used by each application

- If the STATEMENT switch is off, zero
- If the STATEMENT switch is on:
 - Add 400 bytes for each statement being run at the same time. (That is, the number of open cursors that an application might have). This is *not* the cumulative total of statements an application has run.

- If a partitioned database, add the following for each statement:
 - 200 bytes * (average # of subsections)
- If the application has issued `sqleseti()` info, add the sizes of the `userid`, `appliance`, `workstation` name and `accounting` string.

Memory used by each event monitor

For each event monitor of type `ACTIVITIES`:

- 3500 bytes
- If the event monitor is for type `TABLES`, add $36K * (\text{number of CPU cores} + 1)$
- If the event monitor is for type `FILE` or `PIPE`, add $2K * (\text{number of CPU cores} + 1)$

If you expect a heavy volume, add 250 megabytes for event records. Otherwise add a fraction that depends on the expected amount of work.

For each event monitor of type `LOCKING` or `UOW`:

- 3500 bytes
- $3K * (\text{number of CPU cores} + 1)$

If you expect a heavy volume, add 250 megabytes for event records. Otherwise add a fraction that depends on the expected amount of work.

For each event monitor of the following type: `DATABASE`, `TABLES`, `TABLESPACES`, `BUFFERPOOLS`, `CONNECTIONS`, `DEADLOCK`:

- 4100 bytes
- $2 * \text{BUFFERSIZE}$
- If the event monitor is written to a file, add 550 bytes.
- If the event monitor is for type `DATABASE`:
 - add 6000 bytes
 - add 100 bytes for each statement in the statement cache
- If the event monitor is for type `TABLES`:
 - add 1500 bytes
 - add 70 bytes for each table accessed
- If the event monitor is for type `TABLESPACES`:
 - add 450 bytes
 - add 350 bytes for each table space
- If the event monitor is for type `BUFFERPOOLS`:
 - add 450 bytes
 - add 340 bytes for each buffer pool
- If the event monitor is for type `CONNECTIONS`:
 - add 1500 bytes
 - for each connected application:
 - add 750 bytes
 - remember to add the value from “Memory used by each application” on page 489.
- If an event monitor is of type `DEADLOCK`:
 - and the `WITH DETAILS HISTORY` is running:

- add $X*475$ bytes times the maximum number of concurrent applications you expect to be running, where X is the expected maximum number of statements in your application's unit of work.
- and the WITH DETAILS HISTORY VALUES is running:
 - also add $X*Y$ bytes times the maximum number of concurrent applications you expect to be running, where Y is the expected maximum size of parameter values being bound into your SQL statements.

Memory used by each monitoring application

- 250 bytes
- For each database being reset:
 - 350 bytes
 - Add 200 bytes for each REMOTE database.
 - If the SORT switch is on, add 25 bytes.
 - If the LOCK switch is on, add 25 bytes.
 - If the TABLE switch is on:
 - add 600 bytes
 - add 75 bytes per table accessed
 - If the BUFFERPOOL switch is on:
 - add 300 bytes
 - add 250 bytes per table space accessed
 - add 250 bytes per buffer pool accessed
 - If the STATEMENT switch is on:
 - add 2100 bytes
 - add 100 bytes per statement
 - For each application connected to the database:
 - add 600 bytes
 - add 200 bytes for every REMOTE database the application is connected to
 - if the SORT switch is on, add 25 bytes
 - if the LOCK switch is on, add 25 bytes
 - if the BUFFERPOOL switch is on, add 250 bytes
- For each DCS database being reset:
 - add 200 bytes for the database
 - add 200 bytes for each application connected to the database
 - if the STATEMENT switch is ON, Transmission level data must be reset:
 - for each database, add 200 bytes for each transmission level
 - for each application, add 200 bytes for each transmission level

Memory used by gateway applications

- 250 bytes for each host database (even if all switches are off)
- 400 bytes for each application (even if all switches are off)
- If the STATEMENT switch is on:
 - For each application, add 200 bytes for each statement being run at the same time (That is, the number of open cursors that an application might have). This is NOT the cumulative total of statements an application has run.
 - Transmission level data must be accounted for:
 - for each database, add 200 bytes for each transmission level

- for each application, add 200 bytes for each transmission level
- If the UOW switch is on:
 - add 50 bytes for each application
- For each application using a TMDB (for SYNCPOINT TWOPHASE activity):
 - add 20 bytes plus the size of the XID itself
- For any application that has issued sqleseti to set client name, app name, wkstn or accounting:
 - add 800 bytes plus the size of the accounting string itself

Monitoring buffer pool activity

The database server reads and updates all data from a buffer pool. Data is copied from disk to a buffer pool as it is required by applications.

Pages are placed in a buffer pool:

- by the agent. This is synchronous I/O.
- by the I/O servers (prefetchers). This is asynchronous I/O.

Pages are written to disk from a buffer pool:

- by the agent, synchronously
- by page cleaners, asynchronously

If the server needs to read a page of data, and that page is already in the buffer pool, then the ability to access that page is much faster than if the page had to be read from disk. It is desirable to hit as many pages as possible in the buffer pool. Avoiding disk I/O is an important factor in database performance, therefore proper configuration of the buffer pools is one of the most important considerations for performance tuning.

The buffer pool *hit ratio* indicates the percentage of time that the database manager did not need to load a page from disk in order to service a page request because the page was already in the buffer pool. The greater the buffer pool hit ratio, the lower the frequency of disk I/O.

Note: The information that follows discusses buffer pools in environments other than DB2 pureScale environments. Buffer pools work differently in DB2 pureScale environments. For more information, see “Buffer pool monitoring in a DB2 pureScale environment”, in the *Database Monitoring Guide and Reference*.

For example, the overall buffer pool hit ratio can be calculated as follows:

$$\frac{\begin{aligned} & ((\text{pool_data_lbp_pages_found} \\ & + \text{pool_index_lbp_pages_found} \\ & + \text{pool_xda_lbp_pages_found} \\ & - \\ & \text{pool_async_data_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} \\ & - \text{pool_async_xda_lbp_pages_found}) \\ & / (\text{pool_data_l_reads} \\ & + \text{pool_index_l_reads} + \text{pool_xda_l_reads} + \text{pool_temp_data_l_reads} + \\ & \text{pool_temp_xda_l_reads} + \text{pool_temp_index_l_reads})) \times 100 \end{aligned}}$$

This calculation takes into account all of the pages (index and data) that are cached by the buffer pool.

You can also use the BP_HITRATIO administrative view as a convenient method of monitoring the hit ratio for your buffer pools.

For a large database, increasing the buffer pool size may have minimal effect on the buffer pool hit ratio. Its number of data pages may be so large, that the statistical chances of a hit are not improved by increasing its size. Instead, you might find that tuning the index buffer pool hit ratio achieves the required result. This can be achieved using two methods:

1. Split the data and indexes into two different buffer pools and tune them separately.
2. Use one buffer pool, but increase its size until the index hit ratio stops increasing. The index buffer pool hit ratio can be calculated as follows:

$$\frac{((\text{pool_index_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_temp_index_l_reads})}{(\text{pool_index_l_reads}) \times 100}$$

The first method is often more effective, but because it requires indexes and data to reside in different table spaces, it may not be an option for existing databases. It also requires tuning two buffer pools instead of one, which can be a more difficult task, particularly when memory is constrained.

You should also consider the impact that prefetchers may be having on the hit ratio. Prefetchers read data pages into the buffer pool anticipating their need by an application (asynchronously). In most situations, these pages are read just before they are needed (the required case). However, prefetchers can cause unnecessary I/O by reading pages into the buffer pool that will not be used. For example, an application starts reading through a table. This is detected and prefetching starts, but the application fills an application buffer and stops reading. Meanwhile, prefetching has been done for a number of additional pages. I/O has occurred for pages that will not be used and the buffer pool is partially taken up with those pages.

Page cleaners monitor the buffer pool and asynchronously write pages to disk. Their goals are:

- Ensure that agents will always find free pages in the buffer pool. If an agent does not find free pages in the buffer pool, it must clean them itself, and the associated application will have a poorer response.
- Speed database recovery, if a system crash occurs. The more pages that have been written to disk, the smaller the number of log file records that must be processed to recover the database.

Although dirty pages are written out to disk, the pages are not removed from the buffer pool right away, unless the space is needed to read in new pages.

Note: Buffer pool information is typically gathered at a table space level, but the facilities of the database system monitor can roll this information up to the buffer pool and database levels. Depending on your type of analysis, you may need to examine this data at any or all of these levels.

Database system monitor interfaces

There is a number of system monitor tools that you can use to control the collection of monitor data and review the results.

Monitoring task	API
Capturing a snapshot	db2GetSnapshot
Converting the self-describing data stream	db2ConvMonStream

Monitoring task	API
Displaying the database system monitor switches	db2MonitorSwitches
Estimating the size of a snapshot	db2GetSnapshotSize
Get/update monitor switches	db2MonitorSwitches
Resetting monitor counters	db2ResetMonitor
Updating the database system monitor switches	db2MonitorSwitches

Monitoring task	CLP Command
Capturing a snapshot	GET SNAPSHOT
Displaying the database manager monitor switches	GET DATABASE MANAGER MONITOR SWITCHES
Displaying the monitoring application's monitor switches	GET MONITOR SWITCHES
Formatting the event monitor trace	db2evmon
Generating sample SQL for write-to-table CREATE EVENT MONITOR statements	db2evtbl
Listing the active databases	LIST ACTIVE DATABASES
Listing the applications connected to a database	LIST APPLICATIONS
Listing the DCS applications	LIST DCS APPLICATIONS
Resetting monitor counters	RESET MONITOR
Updating the database system monitor switches	UPDATE MONITOR SWITCHES

Monitoring task	SQL Statement
Activating an event monitor	SET EVENT MONITOR STATE
Creating an event monitor	CREATE EVENT MONITOR
Deactivating an event monitor	SET EVENT MONITOR STATE
Removing an event monitor	DROP
Writing event monitor values	FLUSH EVENT MONITOR

Monitoring task	SQL Function
Determining the state of an event monitor	EVENT_MON_STATE scalar function
Getting a database manager level snapshot	SNAPDBM administrative view and SNAP_GET_DBM table function
Getting the current monitor switch settings at the database manager level	SNAPSWITCHES administrative view and SNAP_GET_SWITCHES table function
Getting a fast communication manager snapshot	SNAPFCM administrative view and SNAP_GET_FCM table function
Getting a fast communication manager snapshot for a given partition	SNAPFCM_PART administrative view and SNAP_GET_FCM_PART table function
Getting a database level snapshot	SNAPDB administrative view and SNAP_GET_DB table function
Getting an application level snapshot	SNAPAPPL administrative view and SNAP_GET_APPL table function

Monitoring task	SQL Function
Getting an application level snapshot	SNAPAPPL_INFO administrative view and SNAP_GET_APPL_INFO table function
Getting an application level snapshot for lock wait information	SNAPLOCKWAIT administrative view and SNAP_GET_LOCKWAIT table function
Getting an application level snapshot for statement information	SNAPSTMT administrative view and SNAP_GET_STMT table function
Getting an application level snapshot for agent information	SNAPAGENT administrative view and SNAP_GET_AGENT table function
Getting an application level snapshot for subsection information	SNAPSUBSECTION administrative view and SNAP_GET_SUBSECTION table function
Getting a buffer pool level snapshot	SNAPBP administrative view and SNAP_GET_BP table function
Getting a table space level snapshot	SNAPTbsp administrative view and SNAP_GET_TBSP table function
Getting a table space level snapshot for configuration information	SNAPTbsp_PART administrative view and SNAP_GET_TBSP_PART table function
Getting a table space level snapshot for container information	SNAPCONTAINER administrative view and SNAP_GET_CONTAINER table function
Getting a table space level snapshot for quiescer information	SNAPTbsp_QUIESCER administrative view and SNAP_GET_TBSP_QUIESCER table function
Getting a table space level snapshot for the ranges of a table space map	SNAPTbsp_RANGE administrative view and SNAP_GET_TBSP_RANGE table function
Getting a table level snapshot	SNAPTAB administrative view and SNAP_GET_TAB table function
Getting a lock level snapshot	SNAPLOCK administrative view and SNAP_GET_LOCK table function
Getting a snapshot of SQL statement cache information	SNAPDYN_SQL administrative view and SNAP_GET_DYN_SQL table function

Determining the date a database object was last used

The last date that an object was used is indicated by the last referenced date (also referred to as the last used date). The last referenced date is available for indexes, packages, tables, table data partitions, and materialized query tables (MQTs).

You can use the last referenced date to identify objects which have not been used for an extended period of time and which might be considered as candidates for removal.

The last referenced date is stored in the LASTUSED column of the corresponding catalog table for the object and accessible through the catalog view on the table. Usage information in the catalogs is updated by an engine dispatchable unit (EDU), called **db21used** (the LASTUSED daemon), that runs on the database catalog partition. Every 15 minutes, the LASTUSED daemon gathers usage information for all objects across all partitions and updates the LASTUSED column in the corresponding catalog tables to write the information to disk. At most, the catalog entry for a given object is updated once per day, which means the same object will not be checked again until a 24 hour interval has passed. The 15 minute interval was chosen to minimally affect performance on the database server and is not user configurable. The updates to the last referenced date are performed asynchronously and, therefore, object access is not immediately recorded in the catalogs.

Note: If the corresponding row in a catalog table is locked, an update of usage information might be deferred until the next 15 minute collection interval. Also, when a database is deactivated, any usage information that was not gathered by the LASTUSED daemon before deactivation (for example, any objects accessed for the first time since the last poll was done by the daemon) cannot be written to disk. Explicitly activate the database for this feature to behave as expected.

The last referenced date is of interest when an object has not been used for an extended period of time (for example, several months). The last referenced date is useful in the following cases:

- Tables and table data partitions: can help to identify opportunities to reclaim unused space
- Indexes: can help to identify opportunities to reclaim unused space, avoid unnecessary inserts and maintenance, and can improve compile time by reducing the number of choices for an index to consider
- Packages: can help to detect unused package versions which can be freed
- MQTs: can help to detect unused MQTs, to reclaim unused space, or help to investigate and understand why an MQT is not being used

The following examples describe some specific scenarios in which the last referenced date can be useful:

- To identify opportunities to save space and maintenance time, you can examine last used information for indexes every year by checking the LASTUSED column in the SYSCAT.INDEXES catalog view. If an index has not been used in the last year, the index can be considered as a candidate for being dropped. The final decision to drop an index remains under your control because there might be circumstances in which dropping an index is not required. For example, you might have a table which is known to be accessed only under emergency or infrequent cases where fast access is critical, or the index for a table might be unique and used to enforce the uniqueness constraint even though it is never explicitly used. The last used date information can be used as an aid in making decisions to remove indexes.
- Your company has internal applications that were deployed on the database and were either replaced or are no longer in use after a period of months or years. The retired applications have been identified as opportunities to save space. The last used date information can be used to identify database objects that are no longer in use and were not cleaned up after an application was retired. For example, these database objects might be tables storing values used to populate a GUI. The last used date for these tables can be found in the LASTUSED column of the SYSCAT.TABLES catalog view and this date can be used as a starting point in the investigation of table objects that can be removed to reclaim space.

For additional information about the LASTUSED column of the catalog view for a specific database object, particularly which operations result in an update, see the following topics:

- SYSCAT.DATAPARTITIONS catalog view
- SYSCAT.INDEXES catalog view
- SYSCAT.PACKAGES catalog view
- SYSCAT.TABLES catalog view

Chapter 5. Deprecated monitoring tools

The health monitor and Windows Management Instrumentation (WMI) are deprecated and might be removed in a future release.

Start to use IBM InfoSphere Optim tools. IBM InfoSphere Optim Performance Manager provides a Web interface that you can use to isolate and analyze typical database performance problems. You can also view a summary of the health of your databases and drill down. For more details, see *Monitoring with Optim Performance Manager* at http://publib.boulder.ibm.com/infocenter/idm/docv3/topic/com.ibm.datatools.perfmgmt.monitor.doc/p_monitor.html.

Introduction to the health monitor

The health monitor is a server-side tool that adds a management-by-exception capability by constantly monitoring the health of an instance and active databases. The health monitor can also alert a database administrator (DBA) of potential system health issues.

The health monitor proactively detects issues that might lead to hardware failure, or to unacceptable system performance or capability. The proactive nature of the health monitor enables users to address an issue before it becomes a problem that affects system performance.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

The health monitor checks the state of your system using health indicators to determine whether an alert should be issued. Preconfigured actions can be taken in response to alerts. The health monitor can also log alerts in the administration notification log and send notifications by email or pager. This management-by-exception model frees up valuable DBA resources by generating alerts to potential system health issues without requiring active monitoring.

The health monitor periodically gathers information about the health of the system with a minimal impact to overall performance. It does not turn on any snapshot monitor switches to collect information.

Health indicators

The health monitor uses health indicators to evaluate the health of specific aspects of database manager performance or database performance. A health indicator measures the health of some aspect of a particular class of database objects, such as table spaces. Criteria are applied to the measurement to determine healthiness. The criteria applied depends on the type of health indicator. A determination of unhealthiness is based on the criteria generates an alert.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information,

see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Three types of health indicators are returned by the health monitor:

- **Threshold-based** indicators are measurements that represent a statistic (on a continuous range of values) of the behavior of the object. Warning and alarm threshold values define boundaries or zones for normal, warning, and alarm ranges. Threshold-based health indicators have three valid states: Normal, Warning, or Alarm.
- **State-based** indicators are measurements that represent a finite set of two or more distinct states of an object that defines whether the database object or resource is operating normally. One of the states is normal and all others are considered non-normal. State-based health indicators have two valid states: Normal, Attention.
- **Collection state-based** indicators are database-level measurements that represent an aggregate state or one or more objects within the database. Data is captured for each object in the collection and the highest severity of conditions among those objects is represented in the aggregated state. If one or more objects in the collection are in a state requiring an alert, the health indicator shows Attention state. Collection state-based health indicators have two valid states: Normal, Attention.

Health indicators exist at the instance, database, table space, and table space container level.

You can access health monitor information through the CLP, or APIs. You can configure health indicators through these same tools.

An alert is generated in response to either a change from a normal to a non-normal state or a change in the health indicator value to a warning or alarm zone that is based on defined threshold boundaries. There are three types of alerts: attention, warning, and alarm.

- For health indicators measuring distinct states, an attention alert is issued if a non-normal state is registered.
- For health indicators measuring a continuous range of values, threshold values define boundaries or zones for normal, warning and alarm states. For example, if the value enters the threshold range of values that defines an alarm zone, an alarm alert is issued to indicate that the problem needs immediate attention.

The health monitor will only send notification and run an action on the first occurrence of a particular alert condition for a given health indicator. If the health indicator stays in a particular alert condition, no further notification will be sent and no further actions will be run. If the health indicator changes alert conditions, or goes back to normal state and re-enters the alert condition, notification will be sent anew and actions will be run.

The following table shows an example of a health indicator at different refresh intervals and the health monitor response to the health indicator state. This example uses the default warning of 80% and alarm thresholds of 90%.

Table 122. Health indicator conditions at different refresh intervals

Refresh interval	Value of ts.ts_util (Table space utilization) health indicator	State of ts.ts_util health indicator	Health monitor response
1	80	warning	notification of warning is sent, actions for a warning alert condition are run
2	81	warning	no notification is sent, no actions are run
3	75	normal	no notification is sent, no actions are run
4	85	warning	notification of warning is sent, actions for a warning alert condition are run
5	90	alarm	notification of alarm is sent, actions for an alarm condition are run

Health indicator process cycle

The following diagram illustrates the evaluation process for health indicators. The set of steps runs every time the refresh interval for the specific health indicator elapses.

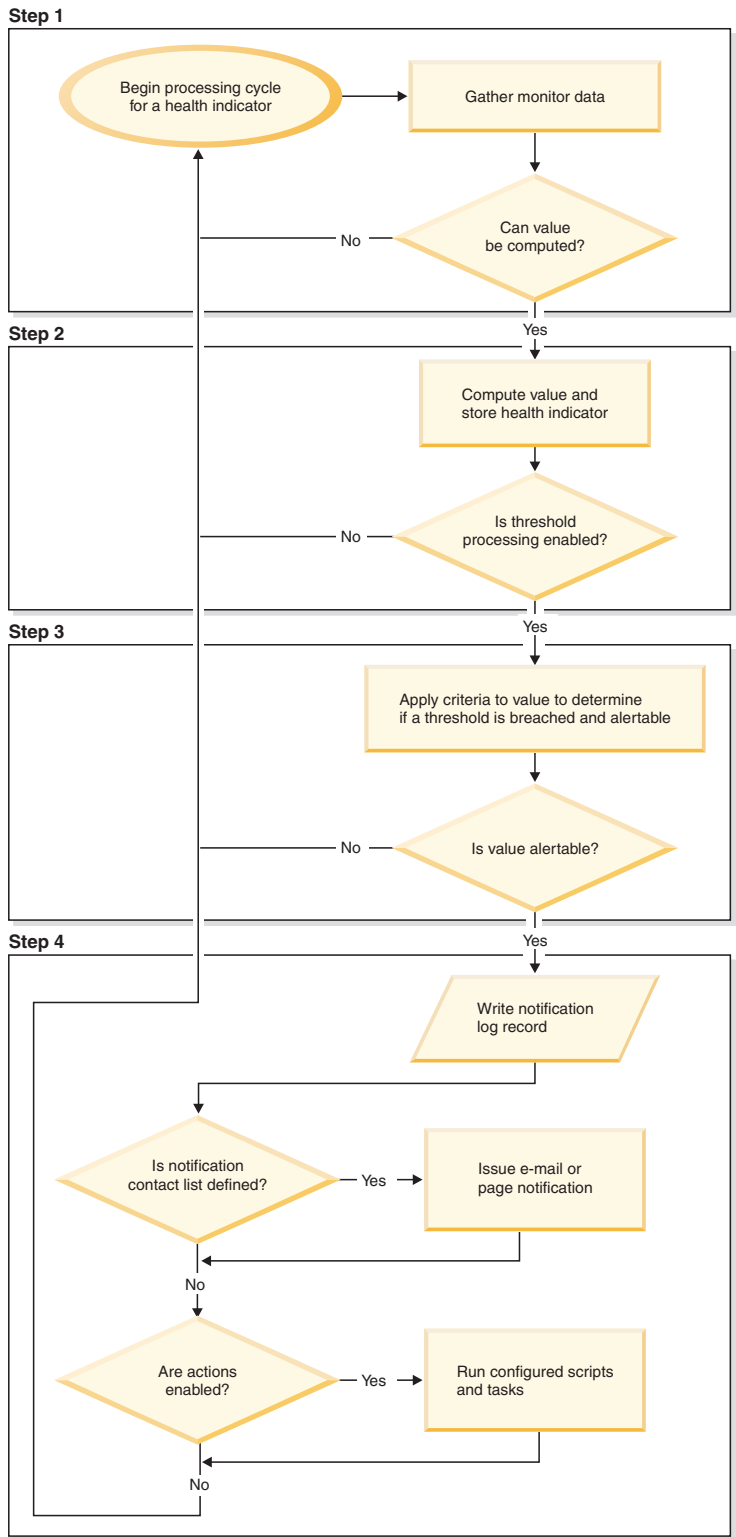


Figure 8. Health indicator process cycle

Note:

1. The NOTIFYLEVEL database manager configuration parameter controls whether alert notifications are sent to the DB2 administration notification log

and to any defined contacts. A minimum severity level of 2 is required for alarm notifications. A minimum severity level of 3 is required for warnings and attention alerts to be sent.

Health indicator format

A description of the data collected by the health indicator.

The documentation for health indicators is described in a standard format as follows:

Identifier

The name of the health indicator. This identifier is used for configuration from the CLP.

Health monitor level

The level at which the health indicator is captured by the health monitor.

Category

The category for the health indicator.

Type The type of the health indicator. There are four possible values for type:

- Upper-bounded threshold-based, where the progression to an alert is: Normal, Warning, Alarm
- Lower-bounded threshold-based
- State-based, where one state is normal and all others are non-normal
- Collection state-based, where the state is based on the aggregation of states from objects in the collection

Unit The unit of the data measured in the health indicator, such as percentage. This is not applicable for state-based or collection state-based health indicators.

Health indicators summary

This reference might help you create, maintain, and read health indicators on your database.

The following tables list all health indicators, grouped by category.

Table 123. Database automatic storage utilization health indicators

Name	Identifier	Additional Information
Database Automatic Storage Utilization	db.auto_storage_util	"db.auto_storage_util - Database automatic storage utilization health indicator" on page 505

Table 124. Table space storage health indicators

Name	Identifier	Additional Information
Table Space Automatic Resize Status	ts.ts_auto_resize_status	"ts.ts_auto_resize_status - Table space automatic resize status health indicator" on page 506
Automatic Resize Table Space Utilization	ts.ts_util_auto_resize	"ts.ts_util_auto_resize - Automatic resize table space utilization health indicator" on page 506
Table Space Utilization	ts.ts_util	"ts.ts_util - Table Space Utilization" on page 507
Table Space Container Utilization	tsc.tscont_util	"tsc.tscont_util - Table Space Container Utilization" on page 508

Table 124. Table space storage health indicators (continued)

Name	Identifier	Additional Information
Table Space Operational State	ts.ts_op_status	"ts.ts_op_status - Table Space Operational State" on page 509
Table Space Container Operational State	tsc.tscont_op_status	"tsc.tscont_op_status - Table Space Container Operational State" on page 509
Table Space Automatic Resize Status	ts.ts_auto_resize_status	"ts.ts_auto_resize_status - Table space automatic resize status health indicator" on page 506

Table 125. Sorting health indicators

Name	Identifier	Additional Information
Private Sort Memory Utilization	db2.sort_privmem_util	"db2.sort_privmem_util - Private Sort Memory Utilization" on page 510
Shared Sort Memory Utilization	db.sort_shrmem_util	"db.sort_shrmem_util - Shared Sort Memory Utilization" on page 511
Percentage of Sorts That Overflowed	db.spilled_sorts	"db.spilled_sorts - Percentage of Sorts That Overflowed" on page 511
Long Term Shared Sort Memory Utilization	db.max_sort_shrmem_util	"db.max_sort_shrmem_util - Long Term Shared Sort Memory Utilization" on page 512

Table 126. Database manager health indicators

Name	Identifier	Additional Information
Instance Operational State	db2.db2_op_status	"db2.db2_op_status - Instance Operational State" on page 513
Instance Highest Severity Alert State	-	"Instance Highest Severity Alert State" on page 513

Table 127. Database health indicators

Name	Identifier	Additional Information
Database Operational State	db.db_op_status	"db.db_op_status - Database Operational State" on page 514
Database Highest Severity Alert State	-	"Database Highest Severity Alert State" on page 514

Table 128. Maintenance health indicators

Name	Identifier	Additional Information
Reorganization Required	db.tb_reorg_req	"db.tb_reorg_req - Reorganization Required" on page 515
Statistics Collection Required health indicator	db.tb_runstats_req	"db.tb_runstats_req - Statistics Collection Required" on page 516
Database Backup Required	db.db_backup_req	"db.db_backup_req - Database Backup Required" on page 516

Table 129. High availability disaster recovery health indicators

Name	Identifier	Additional Information
HADR Operational Status health indicator	db.hadr_op_status	"db.hadr_op_status - HADR Operational Status" on page 517
HADR Log Delay health indicator	db.hadr_delay	"db.hadr_delay - HADR Log Delay" on page 517

Table 130. Logging health indicators

Name	Identifier	Additional Information
Log Utilization	db.log_util	"db.log_util - Log Utilization" on page 518
Log File System Utilization	db.log_fs_util	"db.log_fs_util - Log File System Utilization" on page 519

Table 131. Application concurrency health indicators

Name	Identifier	Additional Information
Deadlock Rate	db.deadlock_rate	"db.deadlock_rate - Deadlock Rate" on page 519
Lock List Utilization	db.locklist_util	"db.locklist_util - Lock List Utilization" on page 520
Lock Escalation Rate	db.lock_escal_rate	"db.lock_escal_rate - Lock Escalation Rate" on page 521
Percentage of Applications Waiting on Locks	db.apps_waiting_locks	"db.apps_waiting_locks - Percentage of Applications Waiting on Locks" on page 522

Table 132. Package cache, catalog cache, and workspace health indicators

Name	Identifier	Additional Information
Catalog Cache Hit Ratio	db.catcache_hitratio	"db.catcache_hitratio - Catalog Cache Hit Ratio" on page 522
Package Cache Hit Ratio	db.pkgcache_hitratio	"db.pkgcache_hitratio - Package Cache Hit Ratio" on page 523
Shared Workspace Hit Ratio	db.shrworkspace_hitratio	"db.shrworkspace_hitratio - Shared Workspace Hit Ratio" on page 523

Table 133. Memory health indicators

Name	Identifier	Additional Information
Monitor Heap Utilization	db2.mon_heap_util	"db2.mon_heap_util - Monitor Heap Utilization" on page 524
Database Heap Utilization	db.db_heap_util	"db.db_heap_util - Database Heap Utilization" on page 525

Table 134. Federated health indicators

Name	Identifier	Additional Information
Nickname Status	db.fed_nicknames_op_status	"db.fed_nicknames_op_status - Nickname Status" on page 525
Data Source Server Status	db.fed_servers_op_status	"db.fed_servers_op_status - Data Source Server Status" on page 526

Table space storage health indicators:

Health indicators for DMS table spaces:

You can determine the health indicators that are relevant for a DMS table space based on the characteristics of the table space.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

This table describes which table space health indicators are relevant for a DMS table space based on the characteristics of the table space:

Table 135. Relevant table space health indicators for a DMS table space

Table space characteristics	Maximum table space size defined	Maximum table space size undefined
Automatic resize enabled = Yes	<p>ts.ts_util_auto_resize - Tracks percentage of table space used relative to the maximum defined by you. An alert indicates that the table space will soon be full and requires intervention by you. As long as the maximum size has been set to a reasonable value (that is, the amount of space specified by the maximum size does exist), this is the most important health indicator for this configuration.</p> <p>ts.ts_util - Tracks usage of currently allocated table space storage. An alert may not require intervention by you to resolve any problems since the table space will attempt to increase in size when it is full.</p> <p>ts.ts_auto_resize_status - Tracks health of resize attempts. An alert indicates that the table space failed to resize (that is, the table space is full).</p>	<p>ts.ts_util_auto_resize - Not applicable. No upper bound specified for the table space size.</p> <p>ts.ts_util - Tracks usage of currently allocated table space storage. An alert may not require intervention by you to resolve any problems since the table space will attempt to increase in size.</p> <p>ts.ts_auto_resize_status - Tracks health of resize attempts. An alert indicates that the table space failed to resize (that is, the table space is full). Note: If a DMS table space is defined using automatic storage and there is no maximum size specified, you should also pay attention to the db.auto_storage_util health indicator. This health indicator tracks utilization of the space associated with the database storage paths. When this space fills up, the table space is unable to grow. This may result in a table space full condition.</p>

Table 135. Relevant table space health indicators for a DMS table space (continued)

Table space characteristics	Maximum table space size defined	Maximum table space size undefined
Automatic resize enabled = No	Not a valid configuration. Maximum table space size is only valid for table spaces that have automatic resize enabled.	ts.ts_util_auto_resize - Not applicable. Table space will not attempt to resize. ts.ts_util - Tracks usage of currently allocated table space storage. An alert indicates a table space full condition and requires immediate intervention by you. The table space will not attempt to resize itself. ts.ts_auto_resize_status - Not applicable. Table space will not attempt to resize.

db.auto_storage_util - Database automatic storage utilization health indicator:

Indicates the consumption of storage for the defined database storage paths.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.auto_storage_util

Health monitor level

Database

Category

Database

Type Upper-bounded threshold-based

Unit Percentage

When automatic storage table spaces are created, containers are allocated automatically for these table spaces on the database storage paths. If there is no more space on any of the file systems on which the database storage paths are defined, automatic storage table spaces will be unable to increase in size and may become full.

The indicator is calculated using the formula:

$$(db.auto_storage_used / db.auto_storage_total) * 100$$

where

- *db.auto_storage_used* is the sum of used space across all physical file systems identified in the list of database storage paths
- *db.auto_storage_total* is the sum of total space across all physical file systems identified in the list of database storage paths

Database automatic storage path utilization is measured as a percentage of the space consumed on the database storage path file systems, where a high percentage indicates less than optimal function for this indicator.

The “Time to fullness” in the Additional Information line returned for this health indicator is a prediction of how much time is remaining until the maximum size for the table space has been reached.

Usage note

If you use storage groups, this health indicator indicates the consumption of storage for the defined database storage paths in the default storage group only.

ts.ts_auto_resize_status - Table space automatic resize status health indicator:

This health indicator identifies whether table space resize operations are succeeding for DMS table spaces which have automatic resize enabled.

When a DMS table space with automatic resize enabled fails to increase in size, it is effectively full. This condition may be due to lack of free space on the file systems on which the table space containers are defined, or a result of the table space automatic resize settings. For example, the defined maximum size may have been reached, or the increase amount may be set too high to be accommodated by the remaining free space.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

ts.ts_auto_resize_status

Health monitor level

Table Space

Category

Table Space Storage

Type State-based

Unit Not applicable

ts.ts_util_auto_resize - Automatic resize table space utilization health indicator:

This health indicator tracks the consumption of storage for each automatic resize DMS table space on which a maximum size has been defined. The DMS table space is considered full when the maximum size has been reached.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

ts.ts_util_auto_resize

Health monitor level

Table Space

Category

Table Space Storage

Type Upper-bounded threshold-based**Unit** Percentage

The indicator is calculated using the formula:

$$((ts.used * ts.page_size) / ts.max_size) * 100$$

where

- *ts.used* is the value of “tablespace_used_pages - Used pages in table space monitor element” on page 1397
- *ts.page_size* is the value of “tablespace_page_size - Table space page size monitor element” on page 1385
- *ts.max_size* is the value of “tablespace_max_size - Maximum table space size” on page 1382

Automatic resize DMS table space utilization is measured as a percentage of the maximum table space storage consumed. A high percentage indicates the table space is approaching fullness. The short term and long term growth rates, included in the additional information for this indicator, can be used to determine if the current rate of growth is a short term aberration, or consistent with long term growth.

The “Time to fullness” in the Additional Information line returned for this health indicator is a prediction of how much time is remaining until the maximum size for the table space has been reached.

ts.ts_util - Table Space Utilization:

This health indicator tracks the consumption of storage for each DMS table space.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

ts.ts_util

Health monitor level

Table Space

Category

Table Space Storage

Type Upper-bounded threshold-based**Unit** Percentage

The DMS table space is considered full when all containers are full.

If automatic resize is enabled on the table space, this health indicator will not be evaluated. Instead, the database automatic storage utilization (**db.auto_storage_util**) and table space automatic resize status (**ts.ts_auto_resize_status**) health indicators are relevant for table space storage monitoring. The automatic resize table space utilization (**ts.ts_util_auto_resize**) health indicator will also be available if a maximum size was defined on this table space. The table space utilization percentage can still be retrieved from column **TBSP_UTILIZATION_PERCENT** of the **TBSP_UTILIZATION** administrative view if it is required.

The indicator is calculated using the formula:

$$(ts.used / ts.usable) * 100$$

where

- *ts.used* is the value of “tablespace_used_pages - Used pages in table space monitor element” on page 1397
- *ts.usable* is the value of “tablespace_usable_pages - Usable pages in table space monitor element” on page 1397

Table space utilization is measured as the percentage of space consumed, where a high percentage indicates less than optimal function for this indicator.

The short term and long term growth rates, included in the additional information for this indicator, can be used to determine if current rate of growth is a short term aberration or consistent with longer term growth.

The “Time to fullness” in the Additional Information line returned for this health indicator is a prediction of how much time is remaining until the maximum size for the table space has been reached.

tsc.tscont_util - Table Space Container Utilization:

This health indicator tracks the consumption of storage for each SMS table space that is not using automatic storage.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

tsc.tscont_util

Health monitor level

Table Space Container

Category

Table Space Storage

Type Upper-bounded threshold-based

Unit Percentage

An SMS table space is considered full if there is no more space on any of the file systems for which containers are defined.

If free space is not available on the file system to expand an SMS container, the associated table space becomes full.

An alert may be issued for each container defined on the file system that is running out of free space.

The indicator is calculated using the formula:

$$(fs.used / fs.total)*100$$

where fs is the file system in which the container resides.

SMS table space utilization is measured as the percentage of space consumed, where a high percentage indicates less than optimal function for this indicator.

The short term and long term growth rates, included in the additional information for this indicator, can be used to determine if current rate of growth is a short term aberration or consistent with longer term growth.

The “Time to fullness” in the Additional Information line returned for this health indicator is a prediction of how much time is remaining until the maximum size for the table space has been reached.

ts.ts_op_status - Table Space Operational State:

The state of a table space can restrict activity or tasks that can be performed. A change from normal to another state may generate an Attention alert.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

ts.ts_op_status

Health monitor level

Table Space

Category

Table Space Storage

Type State-based

Unit Not applicable

tsc.tscont_op_status - Table Space Container Operational State:

This health indicator tracks the accessibility of the table space container. The accessibility of the container can restrict activity or tasks that can be performed. If the container is not accessible, an Attention alert may be generated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information,

see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

tsc.tscont_op_status

Health monitor level

Table Space Container

Category

Table Space Storage

Type State-based

Unit Not applicable

Sorting health indicators:

db2.sort_privmem_util - Private Sort Memory Utilization:

This indicator tracks the utilization of the private sort memory. If `db2.sort_heap_allocated` (system monitor element) \geq `sheapthres` (DBM configuration parameter), sorts may not be getting full sort heap as defined by the `sortheap` parameter and an alert may be generated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db2.sort_privmem_util

Health monitor level

Database

Category

Sorting

Type Upper-bounded threshold-based

Unit Percentage

Sorting is considered healthy if there is sufficient heap space in which to perform sorting and sorts do not overflow unnecessarily.

The indicator is calculated using the formula:

$(db2.sort_heap_allocated / sheapthres) * 100$

The Post Threshold Sorts snapshot monitor element measures the number of sorts that have requested heaps after the sort heap threshold has been exceeded. The value of this indicator, shown in the Additional Details, indicates the degree of severity of the problem for this health indicator.

The Maximum Private Sort Memory Used snapshot monitor element maintains a private sort memory high watermark for the instance. The value of this indicator, shown in the Additional Information, indicates the maximum amount of private

sort memory that has been in use at any one point in time since the instance was last recycled. This value can be used to help determine an appropriate value for *sheapthres*.

db.sort_shrmem_util - Shared Sort Memory Utilization:

This indicator tracks the utilization of the shared sort memory. The *sheapthres_shr* database configuration parameter is a hard limit. If the allocation is close to the limit, an alert may be generated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.sort_shrmem_util

Health monitor level

Database

Category

Sorting

Type Upper-bounded threshold-based

Unit Percentage

Sorting is considered healthy if there is sufficient heap space in which to perform sorting and sorts do not overflow unnecessarily.

The indicator is calculated using the formula:

$(db.sort_shrheap_allocated / sheapthres_shr) * 100$

Note that if *sheapthres_shr* is set to 0, then *sheapthres* serves as the shared sort heap threshold.

The Maximum Shared Sort Memory Used snapshot monitor element maintains a shared sort memory high watermark for the database. The value of this indicator, shown in the Additional Information, indicates the maximum amount of shared sort memory that has been in use at any one point in time since the database has been active. This value can be used to help determine an appropriate value for the shared sort memory threshold.

Consider using the self-tuning memory feature to have sort memory resources automatically allocated as required by the current workload. If you have the self tuning memory feature enabled for the sort memory area, you should configure this health indicator to disable threshold checking.

db.spilled_sorts - Percentage of Sorts That Overflowed:

Sorts that overflow to disk can cause significant performance degradation. If this occurs, an alert may be generated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health

monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.spilled_sorts

Health monitor level

Database

Category

Sorting

Type Upper-bounded threshold-based

Unit Percentage

Sorting is considered healthy if there is sufficient heap space in which to perform sorting and sorts do not overflow unnecessarily.

The indicator is calculated using the formula:

$$\frac{(\text{db.sort_overflows}_t - \text{db.sort_overflows}_{t-1})}{(\text{db.total_sorts}_t - \text{db.total_sorts}_{t-1})} * 100$$

where t is the current snapshot and $t-1$ is a snapshot 1 hour ago. The system monitor element db.sort_overflows (based on the sort_overflows monitor element) is the total number of sorts that ran out of sort heap and may have required disk space for temporary storage. The element db.total_sorts (based on the total_sorts monitor element) is the total number of sorts that have been executed.

Consider using the self-tuning memory feature to have sort memory resources automatically allocated as required by the current workload. If you have the self tuning memory feature enabled for the sort memory area, you should configure this health indicator to disable threshold checking.

db.max_sort_shrmem_util - Long Term Shared Sort Memory Utilization:

This indicator tracks an over-configured shared sort heap, looking to see if there are resources that can be freed for use somewhere else in the DB2 database system.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.max_sort_shrmem_util

Health monitor level

Database

Category

Sorting

Type Lower-bounded threshold-based

Unit Percentage

Sorting is considered healthy if there is sufficient heap space in which to perform sorting and if sorts do not overflow unnecessarily.

An alert might be generated when the percentage usage is low.

The indicator is calculated using the formula:

$$(db.max_shr_sort_mem / sheapthres_shr) * 100$$

The system monitor element `db.max_shr_sort_mem` (based on the `sort_shrheap_top` monitor element) is the high watermark for shared sort memory usage.

Consider using the self-tuning memory feature to have sort memory resources automatically allocated as required by the current workload. If you have the self-tuning memory feature enabled for the sort memory area, you should configure this health indicator to disable threshold checking.

Database manager (DBMS) health indicators:

db2.db2_op_status - Instance Operational State:

An instance is considered healthy if the instance state does not restrict activity or tasks being performed.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

`db2.db2_op_status`

Health monitor level

Instance

Category

DBMS

Type State-based

Unit Not applicable

The state can be one of the following values: Active, Quiesce pending, Quiesced, or Down. A non-Active state may generate an Attention alert.

The health monitor is unable to execute actions for the `db2.db2_op_status` health indicator if the indicator enters the down state. This state can arise, for example, when an instance that the indicator is monitoring becomes inactive because of an explicit stop request or an abnormal termination. If you want to have the instance restart automatically after any abnormal termination, you can configure the fault monitor (**db2fm**) to keep the instance highly available.

Instance Highest Severity Alert State:

This indicator represents the rolled-up alert state of an instance being monitored. The alert state of an instance is the highest alert state of the instance and its databases, and database objects being monitored.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

Not applicable. This health indicator does not have configuration or recommendations support.

Health monitor level

Instance

Category

DBMS

Type State-based

Unit Not applicable

The order of the alert states is as follows:

- Alarm
- Warning
- Attention
- Normal

The alert state of the instance determines the overall health of the DB2 database system.

Database health indicators:

db.db_op_status - Database Operational State:

The state of the database can restrict activity or tasks that can be performed. The state can be one of the following values: Active, Quiesce pending, Quiesced, or Rollforward. A change from Active to another state may generate an Attention alert.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.db_op_status

Health monitor level

Database

Category

Database

Type State-based

Unit Not applicable

Database Highest Severity Alert State:

This indicator represents the rolled-up alert state of the database being monitored. The alert state of a database is the highest alert state of the database and its objects.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

Not applicable. This health indicator does not have configuration or recommendations support.

Health monitor level

Database

Category

Database

Type State-based

Unit Not applicable

The order of the alert states is as follows:

- Alarm
- Warning
- Attention
- Normal

Maintenance health indicators:

db.tb_reorg_req - Reorganization Required:

This health indicator tracks the need to reorganize tables or indexes within a database. Tables or all indexes defined on a table require reorganization to eliminate fragmented data. The reorganization is accomplished by compacting the information and reconstructing the rows or index data.

The result might yield an improved performance and freed space in the table or indexes.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.tb_reorg_req

Health monitor level

Database

Category

Database Maintenance

Type Collection state-based

Unit Not applicable

You can filter the set of tables evaluated by this health indicator by specifying in your automatic maintenance policy the names of the tables to be evaluated. This can be done using the Automatic Maintenance wizard.

An attention alert might be generated to indicate that reorganization is required. Reorganization can be automated by setting the AUTO_REORG database configuration parameter to ON. If automatic reorganization is enabled, the attention alert indicates either that one or more automatic reorganizations could not complete successfully or that there are tables which require reorganization, but automatic reorganization is not being performed because the size of the table per database partition exceeds the maximum size criteria for tables that should be considered for offline reorganization. Refer to the collection details of this health indicator for the list of objects that need attention.

db.tb_runstats_req - Statistics Collection Required:

This health indicator tracks the need to collect statistics for tables and their indexes within a database. Tables and all indexes defined on a table require statistics to improve query execution time.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.tb_runstats_req

Health monitor level

Database

Category

Database Maintenance

Type Collection state-based

Unit Not applicable

The tables considered by this health indicator can be limited using an SQL query. The scope in the additional information displays the subselect clause on system tables for this query.

An attention alert may be generated to indicate that statistics collection is required. Statistics can be automatically collected by setting the AUTO_RUNSTATS database configuration parameter to ON. If automatic statistics collection is enabled, the attention alert indicates that one or more automatic statistics collection actions did not complete successfully.

db.db_backup_req - Database Backup Required:

This health indicator tracks the need for a backup on the database. Backups should be taken regularly as part of a recovery strategy to protect your data against the possibility of loss in the event of a hardware or software failure.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.db_backup_req

Health monitor level

Database

Category

Database Maintenance

Type State-based

Unit Not applicable

This health indicator determines when a database backup is required based on the time elapsed and amount of data changed since the last backup.

An attention alert might be generated to indicate that a database backup is required. Database backups can be automated by setting the AUTO_DB_BACKUP database configuration parameter to ON. If automatic database backups are enabled, the attention alert indicates that one or more automatic database backups did not complete successfully.

High availability disaster recovery (HADR) health indicators:

db.hadr_op_status - HADR Operational Status:

This health indicator tracks the high availability disaster recovery (HADR) operational state of the database. The state between primary and standby servers can be one of the following values: Connected, Congested or Disconnected. A change from Connected to another state might generate an Attention alert.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.hadr_op_status

Health monitor level

Database

Category

High availability disaster recovery

Type State-based

Unit Not applicable

db.hadr_delay - HADR Log Delay:

This health indicator tracks the current average delay (in minutes) between the data changes on the primary database and the replication of those changes on the standby database.

With a large delay value, data loss can occur when failing over to the standby database after a failure on the primary database. A large delay value can also mean longer downtime when takeover is required, because the primary database is ahead of the standby database.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.hadr_delay

Health monitor level

Database

Category

High availability disaster recovery

Type Upper-bounded threshold-based

Unit Minutes

Logging health indicators:

db.log_util - Log Utilization:

This indicator tracks the total amount of active log space used in bytes in the database.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.log_util

Health monitor level

Database

Category

Logging

Type Upper-bounded threshold-based

Unit Percentage

Log utilization is measured as the percentage of space consumed, where a high percentage may generate an alert.

The indicator is calculated using the formula:

$(db.total_log_used / (db.total_log_used + db.total_log_available)) * 100$

The values for the log-related database configuration parameters, shown in the additional information, display the current allocations for logs. The additional information also includes the application id for the application which has the oldest active transaction. This application can be forced to free up log space.

db.log_fs_util - Log File System Utilization:

Log File System Utilization tracks the fullness of the file system on which the transaction logs reside.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.log_fs_util

Health monitor level

Database

Category

Logging

Type Upper-bounded threshold-based

Unit Percentage

The DB2 database system may not be able to create a new log file if there is no room on the file system.

Log utilization is measured as the percentage of space consumed. If the amount of free space in the file system is minimal (that is, there is a high percentage for utilization), an alert may be generated.

The indicator is calculated using the formula: $(fs.log_fs_used / fs.log_fs_total) * 100$ where fs is the file system on which the log resides.

The values for the log-related database configuration parameters, shown in the additional information, display the current allocations for logs. The additional details also shows if user exit is enabled.

If Block on Log Disk Full, shown in the additional details, is set to yes and utilization is at 100%, you should resolve any alerts as soon as possible to limit the impact to applications which cannot commit transactions until the log file is successfully created.

Application concurrency health indicators:

db.deadlock_rate - Deadlock Rate:

Deadlock rate tracks the rate at which deadlocks are occurring in the database and the degree to which applications are experiencing contention problems.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information,

see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.deadlock_rate

Health monitor level

Database

Category

Application Concurrency

Type Upper-bounded threshold-based

Unit Deadlocks per hour

Deadlocks may be caused by the following situations:

- Lock escalations are occurring for the database
- An application may be locking tables explicitly when system-generated row locks may be sufficient
- An application may be using an inappropriate isolation level when binding
- Catalog tables are locked for repeatable read
- Applications are getting the same locks in different orders, resulting in deadlock.

The indicator is calculated using the formula:

$(db.deadlocks_t - db.deadlocks_{t-1})$

where t is the current snapshot and $t-1$ is the last snapshot, taken 60 minutes before the current snapshot.

The higher the rate of deadlocks, the greater the degree of contention which may generate an alert.

db.locklist_util - Lock List Utilization:

This indicator tracks the amount of lock list memory that is being used.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.locklist_util

Health monitor level

Database

Category

Application Concurrency

Type Upper-bounded threshold-based

Unit Percentage

There is one lock list per database and it contains the locks held by all applications concurrently connected to the database. There is a set limit on lock list memory. Once the limit is reached, performance degrades because of the following situations:

- Lock escalation converts row locks to table locks, thereby reducing concurrency on shared objects in the database.
- More deadlocks between applications can occur since applications are waiting for a limited number of table locks. As a result, transactions are rolled back.

An error is returned to the application when the maximum number of lock requests has reached the limit set for the database.

The indicator is calculated using the formula:

$$(db.lock_list_in_use / (locklist * 4096)) * 100$$

Utilization is measured as a percentage of memory consumed, where a high percentage represents an unhealthy condition.

Consider using the self-tuning memory feature to have lock memory resources automatically allocated as required by the current workload. If you have the self-tuning memory feature enabled for the lock memory area, you should configure this health indicator to disable threshold checking.

db.lock_escal_rate - Lock Escalation Rate:

This indicator tracks the rate at which locks have been escalated from row locks to a table lock thereby impacting transaction concurrency.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.lock_escal_rate

Health monitor level

Database

Category

Application Concurrency

Type Upper-bounded threshold-based

Unit Lock escalations per hour

A lock is escalated when the total number of locks held by an application reaches the maximum amount of lock list space available to the application, or the lock list space consumed by all applications is approaching the total lock list space. The amount of lock list space available is determined by the *maxlocks* and *locklist* database configuration parameters.

When an application reaches the maximum number of locks allowed and there are no more locks to escalate, the application uses the space in the lock list allocated

for other applications. There is one lock list per database and it contains the locks held by all applications concurrently connected to the database. When the entire lock list is full, an error occurs.

The indicator is calculated using the formula:

$$(db.lock_escals_t - db.lock_escals_{t-1})$$

where 't' is the current snapshot and 't-1' is the last snapshot, taken 60 minutes before the current snapshot.

The higher the rate of deadlocks, the greater the degree of contention which may generate an alert.

Consider using the self-tuning memory feature to have lock memory resources automatically allocated as required by the current workload. If you have the self-tuning memory feature enabled for the lock memory area, you should configure this health indicator to disable threshold checking.

db.apps_waiting_locks - Percentage of Applications Waiting on Locks:

This indicator measures the percentage of all currently executing applications that are waiting on locks.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the "Health monitor has been deprecated" topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.apps_waiting_locks

Health monitor level

Database

Category

Application Concurrency

Type Upper-bounded threshold-based

Unit Percentage

A high percentage can indicate that applications are experiencing concurrency problems which can negatively affect performance.

The indicator is calculated using the formula:

$$(db.locks_waiting / db.appls_cur_cons) * 100$$

Package cache, catalog cache, and workspace health indicators:

db.catcache_hitratio - Catalog Cache Hit Ratio:

The hit ratio is a percentage indicating how well the catalog cache is helping to avoid actual accesses to the catalog on disk. A high ratio indicates it is successful in avoiding actual disk I/O accesses.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.catcache_hitratio

Health monitor level

Database

Category

Package and Catalog Caches, and Workspaces

Type Lower-bounded threshold-based

Unit Percentage

The indicator is calculated using the formula:

$(1 - (\text{db.cat_cache_inserts} / \text{db.cat_cache_lookups})) * 100$

db.pkgcache_hitratio - Package Cache Hit Ratio:

The hit ratio is a percentage indicating how well the package cache is helping to avoid reloading packages and sections for static SQL from the system catalogs as well as helping to avoid recompiling dynamic SQL statements. A high ratio indicates it is successful in avoiding these activities.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.pkgcache_hitratio

Health monitor level

Database

Category

Package and Catalog Caches, and Workspaces

Type Lower-bounded threshold-based

Unit Percentage

The indicator is calculated using the formula:

$(1 - (\text{db.pkg_cache_inserts} / \text{db.pkg_cache_lookups})) * 100$

Consider using the self-tuning memory feature to have package cache memory resources automatically allocated as required by the current workload. If you have the self-tuning memory feature enabled for the package cache memory area, you should configure this health indicator to disable threshold checking.

db.shrworkspace_hitratio - Shared Workspace Hit Ratio:

The hit ratio is a percentage indicating how well the shared SQL workspace is helping to avoid having to initialize sections for SQL statements that are about to be executed. A high ratio indicates it is successful in avoiding this action.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Note: The **db.shrworkspace_hitratio** health indicator is deprecated starting with DB2 Version 9.5. Using this health indicator will not generate an error. However, it does not return a valid value. This indicator is no longer recommended and might be removed in a future release.

Identifier

db.shrworkspace_hitratio

Health monitor level

Database

Category

Package and Catalog Caches, and Workspaces

Type Lower-bounded threshold-based

Unit Percentage

The indicator is calculated using the formula:

$(1 - (\text{db.shr_workspace_section_inserts} / \text{db.shr_workspace_section_lookups})) * 100$

Memory health indicators:

db2.mon_heap_util - Monitor Heap Utilization:

This indicator tracks the consumption of the monitor heap memory, based on the memory pool with the ID SQLM_HEAP_MONITOR.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db2.mon_heap_util

Health monitor level

Instance

Category

Memory

Type Upper-bounded threshold-based

Unit Percentage

The utilization is calculated using the formula:

$(\text{db2.pool_cur_size} / \text{db2.pool_config_size}) * 100$

for the Memory Pool Identifier SQLM_HEAP_MONITOR.

Once this percentage reaches the maximum, 100%, monitor operations may fail.

db.db_heap_util - Database Heap Utilization:

This indicator tracks the consumption of the monitor heap memory, based on the memory pool with the ID SQLM_HEAP_DATABASE.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.db_heap_util

Health monitor level

Database

Category

Memory

Type Upper-bounded threshold-based

Unit Percentage

The utilization is calculated using the formula
 $(db.pool_cur_size / db.pool_config_size) * 100$

for the Memory Pool Identifier SQLM_HEAP_DATABASE.

Once this percentage reaches the maximum, 100%, queries and operations may fail because there is no heap available.

Federated health indicators:

db.fed_nicknames_op_status - Nickname Status:

This health indicator checks all of the nicknames defined in a federated database to determine if there are any invalid nicknames. A nickname may be invalid if the data source object was dropped or changed, or if the user mapping is incorrect.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.fed_nicknames_op_status

Health monitor level

Database

Category

Federated

Type Collection state-based

Unit Not applicable

An attention alert might be generated if any nicknames defined in the federated database are invalid. Refer to the collection details of this health indicator for the list of objects that need attention.

The FEDERATED database manager parameter must be set to YES for this health indicator to check nicknames status.

db.fed_servers_op_status - Data Source Server Status:

This health indicator checks all of the data source servers defined in a federated database to determine if any are unavailable. A data source server might be unavailable if the data source server was stopped, no longer exists, or was incorrectly configured.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Identifier

db.fed_servers_op_status

Health monitor level

Database

Category

Federated

Type Collection state-based

Unit Not applicable

An attention alert might be generated if any nicknames defined in the federated database are not valid. Refer to the collection details of this health indicator for the list of objects that need attention.

The FEDERATED database manager parameter must be set to YES for this health indicator to check data source server status.

Health monitor interfaces

There are a number of different health monitor interfaces. The interface you chose depends on your database configuration and current state.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

The following table lists the health monitor interfaces for APIs:

Table 136. Health monitor interfaces: APIs

Monitoring task	API
Capturing a health snapshot	db2GetSnapshot - Get Snapshot with snapshot class SQLM_CLASS_HEALTH
Capturing a health snapshot with the full list of collection objects	db2GetSnapshot - Get Snapshot with snapshot class SQLM_CLASS_HEALTH and SQLM_HMON_OPT_COLL_FULL for agent_id
Capturing a health snapshot with formula, additional information, and history	db2GetSnapshot - Get Snapshot with snapshot class SQLM_CLASS_HEALTH_WITH_DETAIL
Capturing a health snapshot with formula, additional information, history, and the full list of collection objects	db2GetSnapshot - Get Snapshot with snapshot class SQLM_CLASS_HEALTH_WITH_DETAIL and SQLM_HMON_OPT_COLL_FULL for agent_id
Converting the self-describing data stream	db2ConvMonStream - Convert Monitor stream
Estimating the size of a health snapshot	db2GetSnapshotSize - Estimate Size Required for db2GetSnapshot Output Buffer

The **GET HEALTH SNAPSHOT** command is part of the health monitor components that have been deprecated.

The following table lists the health monitor interfaces for CLP commands:

Table 137. Health monitor interfaces: CLP commands

Monitoring task	CLP command
Capturing a health snapshot	GET HEALTH SNAPSHOT Command
Capturing a health snapshot with formula, additional information, and history	GET HEALTH SNAPSHOT WITH DETAILS Command

The health monitor SQL functions are part of the health monitor components that have been deprecated.

The following table lists the health monitor interfaces for SQL functions:

Table 138. Health monitor interfaces: SQL functions

Monitoring task	SQL Function
Database manager level health information snapshot	HEALTH_DBM_INFO
Database manager level health indicator snapshot	HEALTH_DBM_HI
Database manager level health indicator history snapshot	HEALTH_DBM_HI_HIS
Database level health information snapshot	HEALTH_DB_INFO
Database level health indicator snapshot	HEALTH_DB_HI
Database level health indicator history snapshot	HEALTH_DB_HI_HIS
Database level health indicator collection snapshot	HEALTH_DB_HIC
Database level health indicator collection history snapshot	HEALTH_DB_HIC_HIS
Table space level health information snapshot	HEALTH_TBS_INFO
Table space level health indicator snapshot	HEALTH_TBS_HI
Table space level health indicator history snapshot	HEALTH_TBS_HI_HIS
Table space container level health information snapshot	HEALTH_CONT_INFO
Table space container level health indicator snapshot	HEALTH_CONT_HI

Table 138. Health monitor interfaces: SQL functions (continued)

Monitoring task	SQL Function
Table space container level health indicator history snapshot	HEALTH_CONT_HI_HIS

Health monitor SQL table functions:

You might find it helpful to reference this summary of the health monitor SQL table functions. Please note that the health monitor SQL table functions have been deprecated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

The following table lists all of the snapshot table functions. Each table function corresponds to a health snapshot request type.

Table 139. Snapshot monitor SQL table functions

Monitor level	SQL table function	Information returned
Database manager	HEALTH_DBM_INFO	Basic information about the health snapshot from the database manager level
Database manager	HEALTH_DBM_HI	Health indicator information from the database manager level
Database manager	HEALTH_DBM_HI_HIS	Health indicator history information from the database manager level
Database	HEALTH_DB_INFO	Basic information about the health snapshot from a database
Database	HEALTH_DB_HI	Health indicator information from a database
Database	HEALTH_DB_HI_HIS	Health indicator history information from a database
Database	HEALTH_DB_HIC	Collection information for collection health indicators for a database
Database	HEALTH_DB_HIC_HIS	Collection history information for collection health indicators for a database
Table space	HEALTH_TBS_INFO	Basic information about the health snapshot for the table spaces for a database
Table space	HEALTH_TBS_HI	Health indicator information about the table spaces for a database
Table space	HEALTH_TBS_HI_HIS	Health indicator history information about the table spaces for a database
Table space	HEALTH_CONT_INFO	Basic information about the health snapshot for the containers for a database
Table space	HEALTH_CONT_HI	Health indicator information about the containers for a database
Table space	HEALTH_CONT_HI_HIS	Health indicator history information about the containers for a database

Health monitor CLP commands:

You can get health status information for the database manager and its databases by issuing health monitor commands.

The information returned represents a snapshot of the health state at the time the command was issued.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

The following table lists all the supported snapshot request types.

Table 140. Snapshot monitor CLP commands

Monitor level	CLP command	Information returned
Database manager	get health snapshot for dbm	Database manager level information.
Database	get health snapshot for all databases	Database level information. Information is returned only if the database is activated.
Database	get health snapshot for database on <i>database-alias</i>	Database level information. Information is returned only if the database is activated.
Database	get health snapshot for all on <i>database-alias</i>	Database, table space, and table space container information. Information is returned only if the database is activated.
Table space	get snapshot for tablespaces on <i>database-alias</i>	Table space level information for each table space that was accessed by an application connected to the database. Also includes health information for each table space container within the table space.

Health monitor API request types:

This summary of snapshot monitor API request type might be helpful when you are deciding which type best suits your situation.

The following table lists all the supported snapshot request types.

Table 141. Snapshot Monitor API Request Types

Monitor level	API request type	Information returned
Database manager	SQLMA_DB2	Database manager level information.
Database	SQLMA_DBASE_ALL	Database level information. Information is returned only if the database is activated.
Database	SQLMA_DBASE	Database level information. Information is returned only if the database is activated.

Table 141. Snapshot Monitor API Request Types (continued)

Monitor level	API request type	Information returned
Table space	SQLMA_DBASE_TABLESPACES	Table space level information for each table space that has been accessed by an application connected to the database. Also includes health information for each table space container within the table space.

Health monitor interface mappings to logical data groups

This reference might help you determine which health monitor interface is best for your current situation.

The following table lists all the supported health snapshot request types.

Table 142. Health monitor interface mappings to logical data groups

API request type	CLP command	SQL table function	Logical data groups
SQLMA_DB2	get health snapshot for dbm	HEALTH_DBM_INFO	db2
		HEALTH_DBM_HI	health_indicator
	get health snapshot for dbm show detail	HEALTH_DBM_HI_HIS	health_indicator_history
SQLMA_DBASE	get health snapshot for database on <i>dbname</i>	HEALTH_DB_INFO	dbase
		HEALTH_DB_HI	health_indicator
	get health snapshot for database on <i>dbname</i> show detail	HEALTH_DB_HI_HIS	health_indicator_history
SQLMA_DBASE with SQLM_HMON_OPT_COLL_FULL in the agent_id	get health snapshot for database on <i>dbname</i> with full collection	HEALTH_DB_HIC	health_indicator, hi_obj_list
	get health snapshot for database on <i>dbname</i> show detail with full collection	HEALTH_DB_HIC_HIST	health_indicator_history, hi_obj_list
SQLMA_DBASE_ALL	get health snapshot for all databases	HEALTH_DB_INFO	dbase
		HEALTH_DB_HI	health_indicator
	get health snapshot for all databases show detail	HEALTH_DB_HI_HIS	health_indicator_history
SQLMA_DBASE_TABLESPACES	get health snapshot for tablespaces on <i>dbname</i>	HEALTH_TS_INFO	tablespace
		HEALTH_TS_HI	health_indicator
		HEALTH_CONT_INFO	tablespace_container
		HEALTH_CONT_HI	health_indicator
	get health snapshot for tablespaces on <i>dbname</i> show detail	HEALTH_TS_HI_HIS	health_indicator_history
		HEALTH_CONT_HI_HIS	health_indicator_history

The following figure shows the order that logical data groupings can appear in a health snapshot data stream.

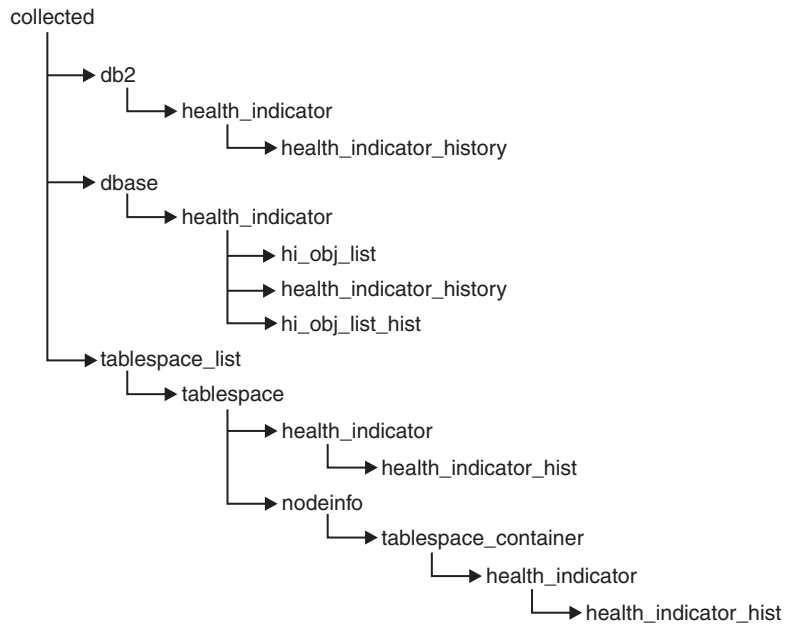


Figure 9. Health snapshot logical data groupings

Enabling health alert notification

To enable email or pager notification when an alert is generated, you must set configuration parameters and specify contact information.

Before you begin

The DB2 Administration Server (DAS) must be running on the system where the contact list is located. For example, if the `CONTACT_HOST` configuration parameter is set to a remote system, the DAS must be running on the remote system in order for contacts to be notified of alerts.

About this task

To enable health alert notification:

Procedure

1. Specify the `SMTP_SERVER` parameter. The DAS configuration parameter, `SMTP_SERVER`, specifies the location of the mail server to use when sending both email and pager notification messages. Omit this step if the system where the DB2 database is installed is enabled as an unauthenticated SMTP server.
2. Specify the `CONTACT_HOST` parameter. The DAS configuration parameter, `CONTACT_HOST`, specifies the remote location of the contact list for all instances on the local system. By setting this parameter, a single contact list can be shared between multiple systems. Omit this step if you want to keep the contact list on the local system where the DB2 database is installed.
3. Specify the default contact for health monitor notification. To enable email or pager notification from the health monitor when an alert is generated, a default administration contact must be specified. If you choose not to provide this information, notification messages cannot be sent for alert conditions. You can provide the default administration contact information during installation, or

you can defer the task until after installation is complete. If you choose to defer the task or want to add more contacts or groups to the notification list, you can specify contacts through the CLP, or C APIs:

-

To specify contacts using the CLP:

To define an email contact as the default for health monitor notification, issue the following commands:

```
DB2 ADD CONTACT contact_name TYPE EMAIL ADDRESS
      email_address DESCRIPTION 'Default Contact'
```

```
DB2 UPDATE NOTIFICATION LIST ADD CONTACT contact_name
```

For complete syntax details, see the Command Reference.

-

To specify contacts using C APIs:

The following C code excerpt illustrates how to define health notification contacts:

```
...
#include <db2ApiDf.h>

SQL_API_RC rc = 0;
struct db2AddContactData addContactData;
struct sqlca sqlca;

char* userid = "myuser";
char* password = "pwd";
char* contact = "DBA1";
char* email = "dba1@mail.com";
char* desc = "Default contact";

memset(&addContactData, '\0', sizeof(addContactData));
memset (&sqlca, '\0', sizeof(struct sqlca));

addContactData.piUserId = userid;
addContactData.piPassword = password;
addContactData.piName = contact;
addContactData.iType = DB2CONTACT_EMAIL;
addContactData.piAddress = email;
addContactData.iMaxPageLength = 0;
addContactData.piDescription = desc;

rc = db2AddContact(db2Version810, &addContactData, &sqlca);

if (rc == 0) {
    db2HealthNotificationListUpdate update;
    db2UpdateHealthNotificationListData data;
    db2ContactTypeData contact;

    contact.pName = contact;
    contact.contactType = DB2CONTACT_EMAIL;

    update.iUpdateType = DB2HEALTHNOTIFICATIONLIST_ADD;
    update.piContact = &contact;

    data.iNumUpdates = 1;
    data.piUpdates = &update;

    rc = db2UpdateHealthNotificationList (db2Version810, &data, &ca);
}
...

```

-

Health monitor

The health monitor captures information about the database manager, database, table space, and table space containers.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

The health monitor calculates health indicators based on data retrieved from database system monitor elements, the operating system, and DB2 database. The health monitor can only evaluate health indicators on a database and its objects when the database is active. You can keep the database active either by starting it with the **ACTIVATE DATABASE** command or by maintaining a permanent connection to the database.

The health monitor retains a maximum of 10 history records for each health indicator. This history is stored in the *instance_path*\hmonCache directory and is removed when the health monitor is stopped. The health monitor automatically prunes obsolete history records when the maximum number of records is reached.

Health monitor data is accessible through health snapshots. Each health snapshot reports the status for each health indicator based on its most recent refresh interval. The snapshots are useful for detecting existing database health problems and predicting potential poor health of the database environment. You can capture a health snapshot from the CLP, by using APIs in a C or C++ application, or by using the graphical administration tools.

Health monitoring requires an instance attachment. If an attachment to an instance was not established using the **ATTACH TO** command, then a default instance attachment to the local instance is created.

In partitioned database environments, snapshots can be taken at any partition of the instance, or globally using a single instance connection. A global snapshot aggregates the data collected at each partition and returns a single set of values.

Usage notes

The health monitor is supported on all editions of the DB2 database.

On Windows, the service for the DB2 instance needs to run under an account with SYSADM authority. You can use the **-u** option on the **db2icrt** command, or use the Services folder on Windows and edit the Log On properties to use an account with administrator privilege.

The health monitor process runs as a DB2 fenced mode process. These processes appear as DB2FMP on Windows. On other platforms, the health monitor process appears as DB2ACD.

The DB2 Administration server must be running on the system where the health monitor resides for notifications to be sent and alert actions to be run. If remote scripts, tasks, or contact lists are used, the DB2 Administration server on the remote system must also be started.

The tools catalog database is required only for creating tasks. If you do not use alert task actions for any health indicator, the tools catalog database is not required by the health monitor.

Health indicator data

The health monitor records a set of data for each health indicator on each database partition.

This data includes:

- Health indicator name
- Value
- Evaluation timestamp
- Alert state
- Formula, if applicable
- Additional information, if applicable
- History of up to ten of the most recent health indicator evaluations. Each history entry captures the following health indicator evaluations leading up to the current health indicator output:
 - Value
 - Formula (if applicable)
 - Alert state
 - Timestamp

The health monitor also tracks the highest severity alert state at the instance, database, and table space levels. At each level, this health indicator represents the highest severity alert existing for health indicators at that level, or any of the levels below it. For example, the highest severity alert state for an instance includes health indicators on the instance, any of its database, and any of the table spaces and table space containers for each of the databases.

Capturing database health snapshots

Capturing a database health snapshot using SQL table functions:

You can capture database health snapshots using SQL table functions. Each available health snapshot table function corresponds to a health snapshot request type.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

About this task

To capture a database health snapshots using SQL table functions:

Procedure

1. Identify the SQL table function you plan to use.

SQL table functions have two input parameters:

- A VARCHAR(255) for the database name
- An INT for the partition number (a value between 0 and 999). Enter the integer corresponding to the partition number you want to monitor. To capture a snapshot for the currently connected partition, enter a value of -1. To capture a global snapshot, enter a value of -2.

Note: The database manager snapshot SQL table functions are the only exception to this rule because they have only one parameter. The single parameter is for partition number. If you enter NULL for the database name parameter, the monitor uses the database defined by the connection through which the table function has been called.

2. Issue the SQL statement.

The following example captures a basic health snapshot for the currently connected partition, and on the database defined by the connection from which this table function call is made:

```
SELECT * FROM TABLE( HEALTH_DB_INFO( cast (NULL as VARCHAR(1)), -1))
      as HEALTH_DB_INFO
```

You can also select individual monitor elements from the returned table. Each column in the returned table corresponds to a monitor element. Accordingly, the monitor element column names correspond directly to the monitor element names. The following statement returns only the db path and server platform monitor elements:

```
SELECT db_path, server_platform
      FROM TABLE( HEALTH_DB_INFO( cast (NULL as VARCHAR(1)), -1 ) )
      as HEALTH_DB_INFO
```

Capturing a database health snapshot using the CLP:

You can capture health snapshots using the GET HEALTH SNAPSHOT command from the CLP. The command syntax supports retrieval of health snapshot information for the different object types monitored by the health monitor.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Before you begin

You must have an instance attachment to capture a health snapshot. If there is not an attachment to an instance, then a default instance attachment is created. To obtain a snapshot of a remote instance, you must first attach to that instance.

About this task

To capture a database health snapshot using the CLP

Procedure

1. From the CLP, issue the GET HEALTH SNAPSHOT command with the required parameters.
In the following example, a database manager level health snapshot is captured immediately after starting the database manager.

```
db2 get health snapshot for dbm
```
2. For partitioned database systems, you can capture a database snapshot specifically for a certain partition or globally for all partitions. To capture a health snapshot for a database on a specific partition (for example, partition number 2), issue the following command:

```
db2 get health snapshot for db on sample at dbpartitionnum 2
```


To capture a database snapshot for all applications on all partitions, issue the following command:

```
db2 get health snapshot for db on sample global
```


The following command captures a health snapshot with additional detail, including the formula, additional information, and health indicator history:

```
db2 get health snapshot for db on sample show detail
```
3. For collection state-based health indicators, you can capture a database snapshot for all collection objects, regardless of state. The regular GET HEALTH SNAPSHOT FOR DB command returns all collection objects requiring an alert for all collection state-based health indicators.
To capture a health snapshot for a database with all collection objects listed, issue the following command:

```
db2 get health snapshot for db on sample with full collection
```

Capturing a database health snapshot from a client application:

You can capture health snapshots using the snapshot monitor API in a C or C++ application. A number of different health snapshot request types can be accessed by specifying parameters in the db2GetSnapshot API.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Before you begin

You must be attached to an instance to capture a health snapshot. If there is not an attachment to an instance, then a default instance attachment is created. To obtain a snapshot of a remote instance, you must first attach to that instance.

Procedure

1. Include the sqlmon.h and db2ApiDf.h DB2 libraries in your code. These libraries are found in the sqllib\include directory.

```
#include <db2ApiDf.h>
#include <sqlmon.h>
```
2. Set the snapshot buffer unit size to 50 KB.

```
#define SNAPSHOT_BUFFER_UNIT_SZ 51200
```
3. Declare the sqlma, sqlca, sqlm_collected, and db2GetSnapshotData structures.

```

struct sqlma *pRequestedDataGroups;
struct sqlca sqlca;
memset (&sqlca, '\0', sizeof(struct sqlca));
struct sqlm_collected collectedData;
memset (&sqlm_collected, '\0', sizeof(struct sqlm_collected));
db2GetSnapshotData getSnapshotParam;
memset(&db2GetSnapshotData, '\0', sizeof(db2GetSnapshotData));

```

4. Initialize a pointer to contain the snapshot buffer, and to establish the buffer's size.

```

static sqluint32 snapshotBufferSize = SNAPSHOT_BUFFER_UNIT_SZ;
sqluint32 outputFormat;
char *snapshotBuffer;

```

5. Initialize the sqlma structure and specify that the snapshot you are capturing is of database manager level information.

```

pRequestedDataGroups = (struct sqlma *)malloc(SQLMASIZE(1));
memset(&pRequestedDataGroups, '\0', sizeof(struct pRequestedDataGroups));
pRequestedDataGroups->obj_num = 1;
pRequestedDataGroups->obj_var[0].obj_type = SQLMA_DB2;

```

6. Initialize the buffer, which will hold the snapshot output.

```

snapshotBuffer = (char *)malloc(snapshotBufferSize);
memset (&snapshotBuffer, '\0', sizeof(snapshotBuffer));

```

7. Populate the db2GetSnapshotData structure with the snapshot request type (from the sqlma structure), buffer information, and other information required to capture a snapshot.

```

getSnapshotParam.piSqlmaData = pRequestedDataGroups;
getSnapshotParam.poCollectedData = &collectedData;
getSnapshotParam.poBuffer = snapshotBuffer;
getSnapshotParam.iVersion = SQLM_DBMON_VERSION9_5;
getSnapshotParam.iBufferSize = snapshotBufferSize;
getSnapshotParam.iStoreResult = 0;
getSnapshotParam.iNodeNumber = SQLM_CURRENT_NODE;
getSnapshotParam.poOutputFormat = &outputFormat;
getSnapshotParam.iSnapshotClass = SQLM_CLASS_HEALTH;

```

8. Capture the health snapshot. Pass the following parameters:

- db2GetSnapshotData structure, which contains the information necessary to capture a snapshot
- A reference to the buffer where snapshot output is directed.

```

db2GetSnapshot(db2Version810, &getSnapshotParam, &sqlca);

```

9. Include logic to handle buffer overflow. After a snapshot is taken, the sqlcode is checked for a buffer overflow. If a buffer overflow occurs, the buffer is cleared, reinitialized, and the snapshot is taken again.

```

while (sqlca.sqlcode == 1606)
{
    free(snapshotBuffer);
    snapshotBufferSize += SNAPSHOT_BUFFER_UNIT_SZ;
    snapshotBuffer = (char *)malloc(snapshotBufferSize);
    if (snapshotBuffer == NULL)
    {
        printf("\nMemory allocation error.\n");
        return;
    }

    getSnapshotParam.iBufferSize = snapshotBufferSize;
    getSnapshotParam.poBuffer = snapshotBuffer;
    db2GetSnapshot(db2Version810, &getSnapshotParam, &sqlca);
}

```

10. Process the snapshot monitor data stream. Refer to the figure following these steps to see the snapshot monitor data stream.

11. Clear the buffer.
 free(snapshotBuffer);
 free(pRequestedDataGroups);

Results

After you capture a health snapshot with the db2GetSnapshot API, the API returns the health snapshot output as a self-describing data stream. The following example shows the data stream structure:

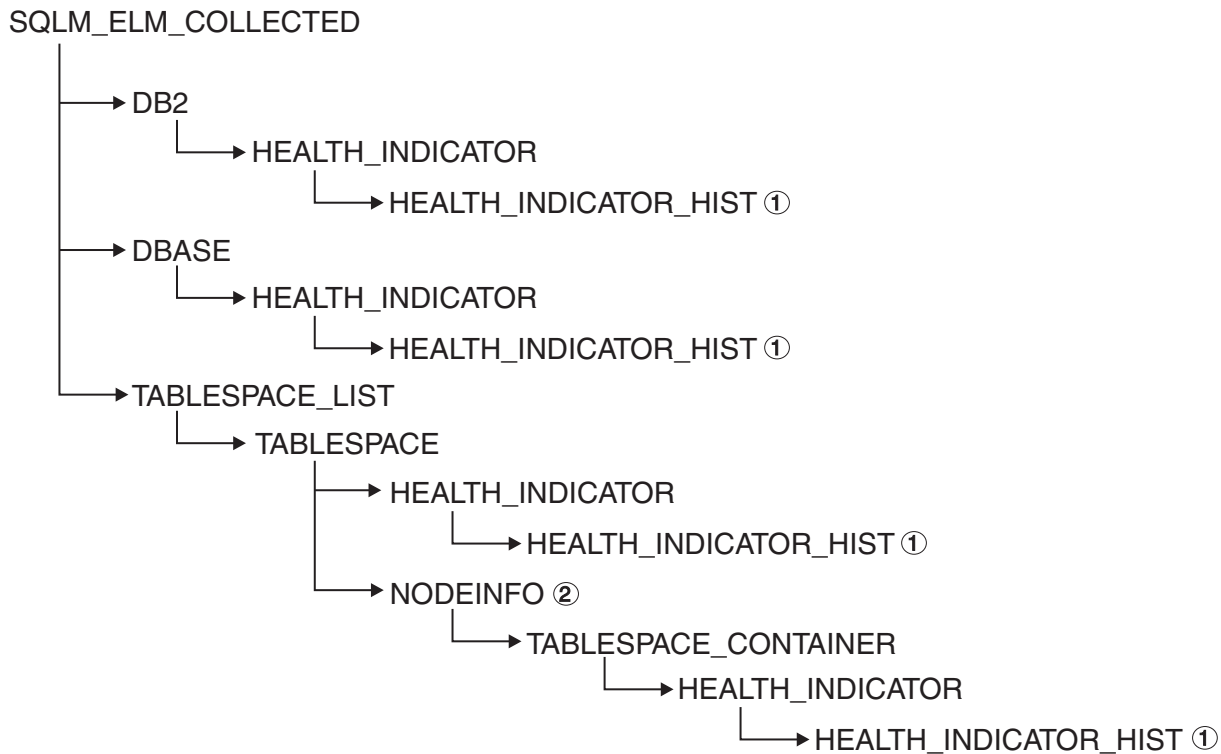


Figure 10. Health snapshot self-describing data stream

Legend:

1. Only available when the SQLM_CLASS_HEALTH_WITH_DETAIL snapshot class is used.
2. Only available in DB2 Enterprise Server Edition. Otherwise, table space container stream follows.

The following hierarchies display the specific elements in the health snapshot self-describing data stream.

The hierarchy of elements under SQLM_ELM_HI:

```

SQLM_ELM_HI
  SQLM_ELM_HI_ID
  SQLM_ELM_HI_VALUE
    SQLM_ELM_HI_TIMESTAMP
    SQLM_ELM_SECONDS
    SQLM_ELM_MICROSEC
  SQLM_ELM_HI_ALERT_STATE
  
```

The hierarchy of elements under SQLM_ELM_HI_HIST, available only with the SQLM_CLASS_HEALTH_WITH_DETAIL snapshot class:


```

SQLM_ELM_HI_HIST
  SQLM_ELM_HI_FORMULA
  SQLM_ELM_HI_ADDITIONAL_INFO
    SQLM_ELM_HEALTH_INDICATOR_HIST
      SQLM_ELM_HI_ID
      SQLM_ELM_HI_VALUE
        SQLM_ELM_HI_TIMESTAMP
          SQLM_ELM_SECONDS
          SQLM_ELM_MICROSEC
        SQLM_ELM_HI_ALERT_STATE
      SQLM_ELM_HI_FORMULA
      SQLM_ELM_HI_ADDITIONAL_INFO

```

The hierarchy of elements under SQLM_ELM_OBJ_LIST:

```

SQLM_ELM_HI_OBJ_LIST
  SQLM_ELM_HI_OBJ_NAME
  SQLM_ELM_HI_OBJ_DETAIL
  SQLM_ELM_HI_OBJ_STATE
  SQLM_ELM_HI_TIMESTAMP
  SQLM_ELM_SECONDS
  SQLM_ELM_MICROSEC

```

The hierarchy of elements under SQLM_ELM_OBJ_LIST_HIST, available only with the SQLM_CLASS_HEALTH_WITH_DETAIL snapshot class:

```

SQLM_ELM_HI_OBJ_LIST_HIST
  SQLM_ELM_HI_OBJ_NAME
  SQLM_ELM_HI_OBJ_STATE
  SQLM_ELM_HI_TIMESTAMP
  SQLM_ELM_SECONDS
  SQLM_ELM_MICROSEC

```

Health monitor sample output

While you are working with the health monitor, you might find it helpful to reference sample output.

The following examples show health snapshots taken using the CLP, and their corresponding output, and illustrate the nature of the health monitor. The objective in the examples is to check the overall health status immediately after starting the database manager.

1. Take the database manager snapshot, using the GET HEALTH SNAPSHOT command:

```
db2 get health snapshot for dbm
```

After the GET HEALTH SNAPSHOT command is issued from the CLP, the snapshot output is directed to the screen.

```

Node name                =
Node type                 = Database Server with local
                          and remote clients
Instance name             = DB2
Snapshot timestamp       = 11-07-2002 12:43:23.613425

Number of database partitions in DB2 instance = 1
Start Database Manager timestamp = 11-07-2002 12:43:18.000108
Instance highest severity alert state = Not yet evaluated

```

Health Indicators:

```
Not yet evaluated
```

- Analyze the output. From this health snapshot, you can see that the instance highest severity alert state is "Not yet evaluated". The instance is in this state because the health monitor has just started and has not yet evaluated any health indicators.

Should the instance highest severity alert state not change:

- Check the value of the HEALTH_MON database manager configuration parameter to determine if the health monitor is on.
- If HEALTH_MON=OFF, then the health monitor is not started. To start the health monitor, issue the UPDATE DBM CFG USING HEALTH_MON ON command.
- If HEALTH_MON=ON, attach to the instance to activate the health monitor. If an instance attachment exists, it is possible that the health monitor could not be loaded into memory.

Another example of taking a database health snapshot using the CLP is outlined below.

- Before you begin, ensure that a database connection exists, and that the database is quiesced.
- Take the database manager snapshot, using the GET HEALTH SNAPSHOT command:
db2 get health snapshot for db on sample
- After the GET HEALTH SNAPSHOT command is issued from the CLP, the snapshot output is directed to the screen.

Database Health Snapshot

```
Snapshot timestamp                = 12-09-2002 11:44:37.793184

Database name                     = SAMPLE
Database path                     = E:\DB2\NODE0000\SQL00002\
Input database alias              = SAMPLE
Operating system running at database server= NT
Location of the database          = Local
Database highest severity alert state = Attention
```

Health Indicators:

```
...
Indicator Name                   = db.log_util
Value                            = 60
Unit                             = %
Evaluation timestamp             = 12-09-2002 11:44:00.095000
Alert state                      = Normal

Indicator Name                   = db.db_op_status
Value                            = 2
Evaluation timestamp             = 12-09-2002 11:44:00.095000
Alert state                      = Attention
```

- Analyze the output.

This health snapshot reveals that there is an attention alert on the *db.db_op_status* health indicator. The value of 2 indicates that the database is in quiesced state.

Global health snapshots

On a partitioned database system you can take a health snapshot of the current partition, a specified partition, or all partitions. When taking a global health snapshot across all the partitions of a partitioned database, data is aggregated, where possible, before the results are returned.

The aggregated alert state for the health indicator is equivalent to the highest severity alert state across all the database partitions. Additional information and history data cannot be aggregated across the database partitions, and therefore are not available. The remaining data for the health indicator is aggregated as detailed in the table below.

Table 143. Aggregation of health indicator value, timestamp, and formula data

Health indicator	Aggregation details
<ul style="list-style-type: none"> • db2.db2_op_status • db2.sort_privmem_util • db2.mon_heap_util • db.db_op_status • db.sort_shrmem_util • db.spilled_sorts • db.log_util • db.log_fs_util • db.locklist_util • db.apps_waiting_locks • db.db_heap_util • db.db_backup_req • ts.ts_util 	<p>The health indicator value is obtained from the partition that contains the highest value.</p> <p>The evaluation timestamp and formula are obtained from the same partition.</p>
<ul style="list-style-type: none"> • db.max_sort_shrmem_util • db.pkgcache_hitratio • db.catcache_hitratio • db.shrworkspace_hitratio 	<p>The health indicator value is obtained from the partition that contains the lowest value.</p> <p>The evaluation timestamp and formula are obtained from the same partition.</p>
<ul style="list-style-type: none"> • db.deadlock_rate • db.lock_escal_rate 	<p>The health indicator value is the sum of the values across all the database partitions.</p> <p>The evaluation timestamp and formula cannot be aggregated and are not available.</p>
<ul style="list-style-type: none"> • ts.ts_op_status • tsc.tscont_op_status • tsc.tscont_util 	<p>These health indicators is not aggregated.</p>
<ul style="list-style-type: none"> • db.hadr_op_status • db.hadr_log_delay 	<p>These health indicators are not supported in a multiple partition database.</p>
<ul style="list-style-type: none"> • db.tb_reorg_req • db.tb_runstats_req • db.fed_nicknames_op_status • db.fed_servers_op_status 	<p>This health indicator is evaluated only on one partition, so no aggregation is required. The data is returned from the partition which is evaluating the health indicator.</p>

Note: When taking a global snapshot on a single partition object, the output includes all the attributes because there are no partitions to aggregate.

Retrieving health recommendations

Health recommendation queries with SQL:

Recommendations can be queried with SQL using the SYSPROC.HEALTH_HI_REC stored procedure.

When using the SYSPROC.HEALTH_HI_REC stored procedure, recommendations are returned in an XML document that is:

- Formatted according to the health recommendations XML schema DB2RecommendationSchema.xsd located in the sql\lib\misc directory.
- Encoded in UTF-8 and contains text in the client language.
- Organized as a collection of recommendation sets, where each recommendation set describes a problem (health indicator) being resolved and contains one or more recommendations to resolve that health indicator. Refer to the schema definition for specific details about information that can be retrieved from the document.

All information available through the CLP is also available in the XML recommendation document that is returned when you query with SQL.

The SYSPROC.HEALTH_HI_REC stored procedure takes the following arguments:

- A health indicator
- A definition of the object on which the health indicator has entered an alert state

The output recommendation document is returned as a BLOB. Therefore, it is not helpful to work with this stored procedure from the command line, since the CLP will limit the amount of output displayed. It is recommended that this stored procedure be invoked using a high level language (such as C or Java) that allows the returned XML document to be properly parsed to retrieve any required elements and attributes.

Retrieving health recommendations using the command line processor:

Recommendations can be retrieved using the GET RECOMMENDATIONS command from the command line processor (CLP). The command syntax supports querying recommendations to resolve a specific health alert, such as a health indicator that entered an alert state on a particular object.

Before you begin

You must have an instance attachment to retrieve recommendations from the health monitor. If there is not an attachment to an instance, a default instance attachment is created. To obtain recommendations from a health monitor on a remote instance, you must first attach to that instance. No special authority is required to retrieve recommendations from the health monitor.

About this task

The command syntax also supports retrieval of the complete set of recommendations for a specific health indicator, which does not have to be in an alert state when the command is executed. Recommendations for resolving an alert on a specific health indicator can be queried at either a single partition level or a global level.

When querying recommendations on a health alert on a specific object, the health monitor is solving a specific alert and is able to provide details on the alert that is being resolved in the problem section of the output.

The health monitor is also able to provide a ranking for the recommendations and, in some cases, it might be able to generate scripts that can be executed to resolve the alert. Additionally, the health monitor might reject and not display some recommendations if they are not applicable to the particular problem situation.

Alternatively, if recommendations are queried by health indicator name only, as in the first example shown, the total set of possible recommendations is always returned. In such cases, the CLP command is simply providing information about actions that you should consider undertaking if they see an alert.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the “Health monitor has been deprecated” topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

Procedure

Retrieve the recommendations using the GET RECOMMENDATIONS command:

- You might want to issue the following command to see the total set of actions that could be recommended to resolve an alert on the **db.db_op_status** health indicator.

```
db2 get recommendations for health indicator db.db_op_status
```

In this example, the full set of recommendations for the **db.db_op_status** health indicator is returned. The health indicator does not have to be in an alert state to issue this command.

This output shows that there are two possible recommendations for this health indicator: unquiesce the database or investigate rollforward progress on the database. Because the command is being used to query all possible recommendations, rather than to ask how to resolve a specific alert, the health monitor cannot identify the best recommendation in this case. As a result, the full set of recommendations is returned.

Recommendations:

Recommendation: Investigate rollforward progress.

A rollforward is in progress on the database due to an explicit request from the administrator. You have to wait for the rollforward to complete for the instance to return to active state.

From the Command Line Processor, issue the commands shown in the following example to view the progress of the rollforward utility:

```
LIST UTILITIES SHOW DETAIL
```

Recommendation: Unquiesce the database.

The database has been put into QUIESCE PENDING or QUIESCE state by an explicit request from the administrator. If you have QUIESCE_CONNECT authority, or are DBADM or SYSADM, you will still have access to the database and will be able to use it normally. For all other users, new connections to the database are not permitted and new units of work cannot be started. Also, depending on the quiesce request, active units of work will be allowed to complete or will be rolled back immediately. You can issue an unquiesce to return to active state.

From the Command Line Processor, issue the commands shown in the following example:

```
CONNECT TO DATABASE database-alias
UNQUIESCE DATABASE
```

- Suppose you observe that the health indicator **db.db_heap_util** entered an alert state for the database **SAMPLE**, and you want to determine how to resolve the alert. In this case, you want to resolve a specific problem, therefore you could issue the **GET RECOMMENDATIONS** command in the following way:

```
db2 get recommendations for health indicator db.db_heap_util
    for database on sample
```

This output shows a summary of the problem and a set of recommendations to resolve the problem. The health monitor ranked the recommendations in its order of preference. Each recommendation contains a description and a set of actions that indicate how to perform the recommended action.

Problem:

```
Indicator Name           = db.db_heap_util
Value                   = 42
Evaluation timestamp    = 11/25/2003 19:04:54
Alert state             = Alarm
Additional information   =
```

Recommendations:

Recommendation: Increase the database heap size.
Rank: 1

Increase the database configuration parameter **dbheap** sufficiently to move utilization to normal operating levels. To increase the value, set the new value of **dbheap** to be equal to $(\text{pool_cur_size} / (4096 * U))$ where **U** is the desired utilization rate. For example, if your desired utilization rate is 60% of the warning threshold level, which you have set at 75%, then $U = 0.6 * 0.75 = 0.45$ (or 45%). Execute the following commands at the DB2 server (this can be done using the **EXEC_DB2_CMD** stored procedure):

```
CONNECT TO DATABASE SAMPLE;
UPDATE DB CFG USING DBHEAP 149333;
CONNECT RESET;
```

Recommendation: Investigate memory usage of database heap.
Rank: 2

There is one database heap per database and the database manager uses it on behalf of all applications connected to the database. The data area is expanded as needed up to the maximum specified by **dbheap**.

For more information on the database heap, refer to the DB2 Information Center.

Investigate the amount of memory that was used for the database heap over time to determine the most appropriate value for the database heap configuration parameter. The database system monitor tracks the highest amount of memory that was used for the database heap.

- For partitioned database systems, you can query recommendations for a health indicator that entered an alert state on a certain partition, or globally for all partitions. When recommendations are queried globally, a set of recommendations is returned that applies to the health indicator on all partitions. For example, if the health indicator is in an alert state on partitions 1 and 3, a collection of two scripts might be returned where each script is to be applied to a different partition.

The following example shows how to query recommendations for a health indicator on a specific partition (in this example, partition number 2):

```
db2 get recommendations for health indicator db.db_heap_util
    for database on sample at dbpartitionnum 2
```

The following example shows how to retrieve a set of recommendations to resolve a health indicator that is in an alert state on several partitions:

```
db2 get recommendations for health indicator db.db_heap_util
for database on sample global
```

Retrieving health recommendations using a client application:

Recommendations can be queried using the db2GetRecommendations API in a C or C++ application.

Before you begin

You must have an instance attachment to capture a health snapshot. If there is not an attachment to an instance, then a default instance attachment is created. To query recommendations on a remote instance, you must first attach to that instance.

About this task

When using the db2GetRecommendations API, recommendations are returned in an XML document that is:

- Formatted according to the health recommendations XML schema DB2RecommendationSchema.xsd located in the MISC subdirectory within the SQLLIB directory.
- Encoded in UTF-8 and contains text in the client language.
- Organized as a collection of recommendation sets, where each recommendation set describes a problem (health indicator) being resolved and contains one or more recommendations to resolve that health indicator. Refer to the schema definition for specific details about what information that can be retrieved from the document.

All information available through the CLP is also available in the XML recommendation document that is returned.

To retrieve health recommendations using a client application:

Procedure

1. Include the sqlmon.h and db2ApiDf.h DB2 header files. These are found in the sqllib\include directory.

```
#include <db2ApiDf.h>
#include <sqlmon.h>
```

2. Declare the sqlca, and the db2GetRecommendationsData structure.

```
struct sqlca sqlca ;
db2GetRecommendationsData recData ;
```

```
memset( &sqlca, '\0', sizeof( struct sqlca ) ) ;
memset( &recData, '\0', sizeof( db2GetRecommendationsData ) ) ;
```

3. Populate the db2GetRecommendationsData structure with information about the alert for which you want to retrieve recommendations. In the code excerpt that follows, recommendations are being queried for the **db2.db_heap_util** health indicator on the Sample database.

```
recData.iSchemaVersion = DB2HEALTH_RECSCHEMA_VERSION8_2 ;
recData.iNodeNumber = SQLM_CURRENT_NODE ;
recData.iIndicatorID = SQLM_HI_DATABASE_HEAP_UTILIZATION ;
recData.iObjType = DB2HEALTH_OBJTYPE_DATABASE ;
recData.piDbName = "SAMPLE" ;
```

4. Invoke the `db2GetRecommendations` API to retrieve recommendations for an alert on this health indicator on the specified database.
`db2GetRecommendations(db2Version820, &recData, &sqlca) ;`
5. Check the `sqlcode` returned in the `sqlca` for any errors that occurred. If the API call was successful, process the recommendation XML document that is returned in the `poRecommendation` field of the `db2GetRecommendationsData` structure. Use your choice of XML parser to extract the required elements or attributes. Refer to the `DB2RecommendationSchema.xsd` XML schema in the `sql1lib\misc` directory for details about the information that can be retrieved from the XML document.
6. Free any memory allocated by the `db2GetRecommendations` API. This will free the recommendation document returned in the `poRecommendation` field of the `db2GetRecommendationsData` structure.
`db2GetRecommendationsFree(db2Version820, &recData, &sqlca) ;`

Results

Typically you would combine the preceding code with a call to the snapshot APIs to take a health snapshot because recommendations are generally queried when you detect a health indicator has entered an alert state.

Health indicator configuration

A default health monitor configuration is provided during installation. This configuration ensures that the health monitor can evaluate the health of the database environment as soon as DB2 is started.

However, the health monitor's behavior in evaluating health indicators and reacting to alert states can be fine-tuned through configuration for a specific user's environment.

The health monitor SQL table functions have been deprecated.

Important: The health monitor, health indicators, and related components have been deprecated in Version 9.7 and might be removed in a future release. Health monitor is not supported in DB2 pureScale environments. For more information, see the "Health monitor has been deprecated" topic at <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/topic/com.ibm.db2.luw.wn.doc/doc/i0055045.html>.

There are different levels at which the configuration can be defined. A default configuration of factory settings is provided for each health indicator when DB2 is installed. When the health monitor starts for the first time, a copy of the factory settings provides the defaults for the instance and global settings.

Instance settings apply to the instance. Global settings apply to objects such as databases, table spaces, and table space containers in the instance that do not have customized settings defined.

Updating health indicator settings for a specific database, table space, or table space container creates object settings for the updated health indicators. The default for object settings is the global settings.

The health monitor checks the object settings when it processes a health indicator for a particular database, table space, or table space container. If the settings for a particular health indicator have never been updated, the default global settings are

used to process the health indicator. The instance settings are used when the health monitor processes a health indicator for the instance.

You can alter health monitor behavior by using a number of attributes that can be configured for each health indicator. The first set of parameters (evaluation flag, thresholds, sensitivity) defines when the health monitor will generate an alert for a health indicator. The second set of parameters (action flag, actions) defines what the health monitor does upon generating the alert.

Evaluation flag

Each health indicator has an evaluation flag to enable or disable evaluation of alert state.

Warning and alarm thresholds

Threshold-based health indicators have settings defining the warning and alarm regions for the health indicator value. These warning and alarm threshold values can be modified for your particular database environment.

Sensitivity parameter

The sensitivity parameter defines the minimum amount of time, in seconds, that the health indicator value has to be in an alert state before the alert is generated. The wait time associated with the sensitivity value starts on the first refresh interval during which the health indicator value enters an alert state. You can use this value to eliminate erroneous alerts generated due to temporary spikes in resource usage.

Consider an example using the Log Utilization (*db.log_util*) health indicator. Suppose that you review the DB2 notify log on a weekly basis. In the first week, an entry for *db.log_util* is in alarm state. You recall having received notification for this situation, but on checking for the alert situation from the CLP, the health indicator was back in normal state. After a second week, you notice a second alarm notification entry for the same health indicator at the same time of the week. You investigate activity in your database environment on the two occasions that alerts were generated, and you discover that an application that takes a long time to commit is run weekly. This application causes the log utilization to spike for a short time, approximately eight to nine minutes, until the application commits. You can see from the history entries in the alarm notification record in the notification log, that the *db.log_util* health indicator is evaluated every 10 minutes. Because the alert is being generated, the application time must be spanning that refresh interval. You set the sensitivity for the *db.log_util* parameter to ten minutes. Now every time the value of *db.log_util* first enters the warning or alarm threshold regions, the value must remain in that region for at least ten minutes before the alert is generated. No further notification entries are recorded in the notification log for this situation because the application only lasts eight to nine minutes.

Action flag

The running of actions on alert generation is controlled by the action flag. Only when the action flag is enabled are the configured alert actions run.

Actions

Script or task actions can be configured to run on alert occurrence. For threshold-based health indicators, actions can be configured to run on warning or alarm thresholds. For state-based health indicators, actions can be configured to run on any of the possible non-normal conditions. The DB2 administration server must be running for actions to run.

The following input parameters are passed to every operating system command script:

- <health indicator shortname>
- <object name>
- <value | state>
- <alert type>

Script actions use the default interpreter on the operating system. If you want to use a non-default interpreter, create a task using the ADMIN_TASK_ADD procedure with the script content. In a multipartitioned environment, the script defined in the script action must be accessible by all partitions.

The refresh interval at which the health monitor checks each health indicator cannot be configured. The recommendation actions considered by the health monitor cannot be configured.

The health monitor configuration is stored in a binary file, HealthRules.reg:

- On Windows, HealthRules.reg is stored in x:\<SQLLIB_PATH>\<INSTANCE_NAME>. For example, d:\sql11b\DB2.
- On UNIX, HealthRules.reg is stored in ~/<SQLLIB_PATH>/cfg. For example, ~/home/sql11b/cfg.

It is possible to replicate a health monitor configuration to other DB2 instances on a Linux, UNIX, or Windows server. You can accomplish this replication by copying the binary configuration file to the appropriate directory location on the target instance.

Retrieving health indicator configuration using the CLP:

The GET ALERT CONFIGURATION command allows you to view the factory settings and the instance, global, and object settings.

Procedure

1. To view the global settings for database-level health indicators, which apply to all databases without customized settings for the health indicator, issue the following command:

```
DB2 GET ALERT CONFIGURATION FOR DATABASES
```

2. To view the global settings for database-level health indicators, which apply to all databases without customized settings for the health indicator, issue the following command:

```
DB2 GET ALERT CONFIGURATION FOR DATABASES
```

The output of each health indicator's settings indicates whether it has been changed from its default. In the following output, the global settings have not been updated; therefore, they are the same as the default factory settings. To view factory settings for database-level health indicators, issue the same command as in the preceding example with the DEFAULT keyword.

Alert Configuration

Indicator Name	= db.db_op_status
Default	= Yes
Type	= State-based
Sensitivity	= 0
Formula	= db.db_status;
Actions	= Disabled
Threshold or State checking	= Enabled

```

Indicator Name           = db.sort_shrmem_util
Default                 = Yes
Type                   = Threshold-based
Warning                 = 70
Alarm                  = 85
Unit                   = %
Sensitivity             = 0
Formula                = ((db.sort_shrheap_allocated/sheapthres_shr)
                        *100);
Actions                 = Disabled
Threshold or State checking = Enabled
...

```

- To view the custom settings for the SAMPLE database, issue the following command:

```
DB2 GET ALERT CONFIGURATION FOR DATABASE ON SAMPLE
```

If there are no specific settings for a particular health indicator on the object specified, the global settings for all databases are displayed. To view the settings for a particular health indicator, add the `USING health-indicator-name` clause to any of the preceding examples.

Health indicator configuration updates using the CLP:

The health indicator configuration for a particular health indicator can be updated for the global settings or the object settings for a particular object.

The `UPDATE ALERT CONFIGURATION` command has four sub-clauses that cover the different update options. Only one sub-clause can be used in each `UPDATE ALERT CONFIGURATION` command. To use more than one of the options, multiple `UPDATE ALERT CONFIGURATION` commands must be issued.

The first sub-clause, `SET parameter-name value`, provides support to update:

- The evaluation flag
- The warning and alarm thresholds (if applicable)
- The sensitivity flag
- The action flag

The corresponding parameter names for these settings are:

- `THRESHOLDSCHECKED`
- `WARNING` and `ALARM`
- `SENSITIVITY`
- `ACTIONSENABLED`

The other three sub-clauses provide support to add, to update, and to delete script or task actions.

The following commands update a threshold-based health indicator configuration for the `db.spilled_sorts` health indicator on the SAMPLE database. The update changes the warning threshold to 25, to enable actions, and to add a script action:

```

DB2 UPDATE ALERT CONFIGURATION FOR DATABASE ON SAMPLE USING DB.SPILLED_SORTS
SET WARNING 25, ACTIONSENABLED YES
DB2 UPDATE ALERT CONFIGURATION FOR DATABASE ON SAMPLE USING DB.SPILLED_SORTS
ADD ACTION SCRIPT c:\myscript TYPE OS COMMAND LINE PARAMETERS 'space'
WORKING DIRECTORY c:\ ON ALARM USER dba1 PASSWORD dba1

```

The following commands update a state-based health indicator configuration for the `ts.ts_util` health indicator for the global settings. The update defines an action to run when any table space is in backup pending state.

```
DB2 UPDATE ALERT CONFIGURATION FOR TABLESPACES USING TS.TS_UTIL
SET ACTIONSENABLED YES
DB2 UPDATE ALERT CONFIGURATION FOR TABLESPACES USING TS.TS_UTIL
ADD ACTION TASK 0.1 ON ATTENTION 32 ON localhost USER dba1 PASSWORD dba1
```

This update will apply to all table spaces for the instance that do not have customized settings for this health indicator.

When adding actions to a health indication configuration, the options for the *ON condition* clause are based on the type of health indicator:

- For a threshold-based health indicator, WARNING and ALARM are valid conditions.
- For a state-based health indicator, the ON ATTENTION *state* option must be used. A valid numeric state, as defined for the health indicator, should be used. The database manager and database operational state values can be found in `sqllib\include\sqlmon.h`. The table space and table space container operational values are listed in `sqllib\include\sqlutil.h`. Note that actions cannot be executed for the database manager down state. Refer to the description of the `db2.db2_op_status` health indicator for details.

Resetting health indicator configuration using the CLP:

The CLP provides support for the global settings to be reset to the factory settings. The object settings for a particular object can also be reset to the custom settings for that object type.

Procedure

- To reset the object settings for the SAMPLE database to the current global settings for databases:

```
DB2 RESET ALERT CONFIGURATION FOR DATABASE ON SAMPLE
```
- Issue the following command to reset the global settings for databases to the factory settings:

```
DB2 RESET ALERT CONFIGURATION FOR DATABASES
```
- To reset the configuration for a particular health indicator, add the USING *health-indicator-name* clause to any of the preceding examples.

Configuring health indicators using a client application:

Health monitor configuration is accessible through the `db2GetAlertCfg`, `db2UpdateAlertCfg`, and `db2ResetAlertCfg` APIs in a C or C++ application. Each of these APIs can access the factory, instance, global, and object settings.

Before you begin

You must have an instance attachment to access the health monitor configuration. If there is not an attachment to an instance, then a default instance attachment is created. To access the health monitor configuration of a remote instance, you must first attach to that instance.

About this task

Combinations of the **objType** and **defaultType** parameters in the `db2GetAlertCfgData` structure allow access to the various levels of health indicator configuration.

Table 144. Settings for objType and defaultType to access configuration levels

Setting	objType and defaultType
Factory settings	objType = DB2ALERTCFG_OBJTYPE_{DBM DATABASES TABLESPACES CONTAINERS} and defaultType = DB2ALERTCFG_DEFAULT
Global settings	objType = DB2ALERTCFG_OBJTYPE_{DBM DATABASES TABLESPACES CONTAINERS} and defaultType = DB2ALERTCFG_NOT_DEFAULT or objType = DB2ALERTCFG_OBJTYPE_{DATABASE TABLESPACE CONTAINER} and defaultType = DB2ALERTCFG_DEFAULT
Object settings	objType = DB2ALERTCFG_OBJTYPE_{DATABASE TABLESPACE CONTAINER} and defaultType = DB2ALERTCFG_NOT_DEFAULT

Procedure

- To get the specific object setting for health indicators on the SAMPLE database:

- Include the db2ApiDf.h DB2 header file, found in the sql\lib\include directory.

```
#include <db2ApiDf.h>
```

- Declare and initialize the sqlca and db2GetAlertCfgData structures.

```
struct sqlca ca;
memset (&sqlca, '\0', sizeof(struct sqlca));
```

```
char* objName = NULL;
char* dbName = "SAMPLE";
db2Uint32 objType = DB2ALERTCFG_OBJTYPE_DATABASE;
db2Uint32 defaultType = DB2ALERTCFG_NOT_DEFAULT;
```

```
db2GetAlertCfgData data = {objType, objName, defaultType, dbName, 0, NULL} ;
```

- Call the db2GetAlertCfg API.

```
rc = db2GetAlertCfg (db2Version810, &data, &ca);
```

- Process the returned configuration and free the buffer allotted by the API.

```
if (rc >= SQL0_OK) {
    if ((data.ioNumIndicators > 0) && (data.pioIndicators != NULL)) {
        db2GetAlertCfgInd *pIndicators = data.pioIndicators;

        for (db2Uint32 i=0; i < data.ioNumIndicators; i++) {
            //process the entry as necessary using fields defined in db2ApiDf.h
        }
    }

    db2GetAlertCfgFree (db2Version810, &data, &ca);
}
```

- The following steps detail the procedure to update the alert configuration of the **db.sort_shrmem_util** health indicator for the global settings for database objects, setting warning threshold to 80 and adding task action 1.1:

- Include the db2ApiDf.h DB2 header file, found in the sql\lib\include directory.

```
#include <db2ApiDf.h>
```

- Declare and initialize the sqlca and db2AlertTaskAction structures.

```
struct sqlca ca;
memset (&sqlca, '\0', sizeof(struct sqlca));
```

```
db2Uint32 objType = DB2ALERTCFG_OBJTYPE_DATABASES;
```

```

db2Uint32 taskCondition = DB2ALERTCFG_CONDITION_WARNING;
char* taskname = "1.1";
char* hostname = NULL;
char* userid = "nobody";
char* password = "nothing";

db2AlertTaskAction newTask={taskname,taskCondition,userid,password,hostname};

```

- c. Declare and initialize the db2UpdateAlertCfgData structure.

```

struct db2UpdateAlertCfgData setData;

setData.iObjType = objType;
setData.piObjName = NULL;
setData.piDbName = NULL;

setData.iIndicatorID = 1002;

setData.iNumIndAttribUpdates = 1;
setData.piIndAttribUpdates[0].iAttribID = DB2ALERTCFG_WARNING;
setData.piIndAttribUpdates[0].piAttribValue == 80;

setData.iNumActionUpdates = 0;
setData.piActionUpdates = NULL;

setData.iNumActionDeletes = 0;
setData.piActionDeletes = NULL;

setData.iNumNewActions = 1;
setData.piNewActions[0].iActionType = DB2ALERTCFG_ACTIONTYPE_TASK;
setData.piNewActions[0].piScriptAttribs = NULL;
setData.piNewActions[0].piTaskAttribs = &newTask;

```

- d. Call the db2UpdateAlertCfg API.

```
rc = db2UpdateAlertCfg(db2Version810, &setData, &ca);
```

3. The following steps detail the procedure to RESET the custom settings for the MYTS table space in the SAMPLE database.

- a. Include the db2ApiDf.h DB2 header file, found in the sqllib\include directory.

```
#include <db2ApiDf.h>
```

- b. Declare and initialize the sqlca and db2ResetAlertCfgData structures.

```

struct sqlca ca;
memset (&sqlca, '\0', sizeof(struct sqlca));

char* objName = "MYTS";
char* dbName = "SAMPLE";
db2Uint32 objType = DB2ALERTCFG_OBJTYPE_TABLESPACE;

db2ResetAlertCfgData data = {objType, objName, dbName};

```

- c. Call the db2ResetAlertCfg API.

```
rc = db2ResetAlertCfg (db2Version810, &data, &ca);
```

Health monitor alert actions on combined states:

Alert actions are tasks or scripts that are run when a health indicator goes into an alert state.

Starting in DB2 V9.1, the health monitor alert actions defined for the health indicator **ts.ts_op_status** on a single alert state are executed whenever this state is set for the table space, irrespective of the other combined states. This makes it possible to run alert actions on a specific table space state even when it is set in conjunction with other states.

In the following example, an alert action script1 defined on attention state QUIESCED:share will run, even if the table space state is QUIESCED:share and QUIESCE:update at the same time.

```

db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
set actionsenabled yes')
db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
add action script /home/guest001/script1 type operating system command line
parameters userParam working directory /home/guest001/
on attention QUIESCED_SHARE on aix1 user guest001 using passwd')

```

In the following example, an alert action defined using a combination of states (QUIESCED:share + QUIESCED:update = 3) is executed if and only if the table space state is both QUIESCED:share and QUIESCED:update.

```

db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
set actionsenabled yes')
db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
add action script /home/guest001/script1 type operating system command line
parameters userParam working directory /home/guest001/
on attention 3 on aix1 user guest001 using passwd')

```

Starting in DB2 V9.1, health monitor alert actions defined on an object with the same action attributes (name, working directory, command line parameters, host, user and password) run only once, even if it was defined on multiple alert states.

In the following example, the same action is defined on two different alert states. The action is only executed once for a given table space, even if the table space state is in both QUIESCED:share and QUIESCED:update.

```

db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
add action script /home/guest001/script1 type operating system command line
parameters userParam working directory /home/guest001/
on attention QUIESCED_SHARE on aix1 user guest001 using passwd')
db2 call SYSPROC.ADMCMD('update alert cfg for tablespaces using ts.ts_op_status
add action script /home/guest001/script1 type operating system command line
parameters userParam working directory /home/guest001/
on attention QUIESCED_UPDATE on aix1 user guest001 using passwd')

```

Introduction to Windows Management Instrumentation (WMI)

There is an industry initiative that establishes management infrastructure standards and provides a way to combine information from various hardware and software management systems. This initiative is called Web-Based Enterprise Management (WBEM).

WBEM is based on the Common Information Model (CIM) schema, which is an industry standard driven by the Desktop Management Task Force (DMTF).

Microsoft Windows Management Instrumentation (WMI) is an implementation of the WBEM initiative for supported Windows platforms. WMI is useful in a Windows enterprise network where it reduces the maintenance and cost of managing enterprise network components. WMI provides:

- A consistent model of Windows operation, configuration, and status.
- A COM API to allow access to management information.
- The ability to operate with other Windows management services.
- A flexible and extensible architecture allowing vendors a means of writing other WMI providers to support new devices, applications, and other enhancements.
- The WMI Query Language (WQL) to create detailed queries of the information.
- An API for management application developers to write Visual Basic or Windows Scripting Host (WSH) scripts.

The WMI architecture has two parts:

1. A management infrastructure that includes the CIM Object Manager (CIMOM) and a central storage area for management data called the CIMOM object repository. CIMOM allows applications to have a uniform way to access management data.
2. WMI providers. WMI providers are the intermediaries between CIMOM and managed objects. Using WMI APIs, WMI providers supply CIMOM with data from managed objects, handle requests on behalf of management applications, and generate event notifications.

Windows Management Instrumentation (WMI) providers are standard COM or DCOM servers that function as mediators between managed objects and the CIM Object Manager (CIMOM). If the CIMOM receives a request from a management application for data that is not available from the CIMOM object repository, or for events, the CIMOM forwards the request to the WMI providers. WMI providers supply data, and event notifications, for managed objects that are specific to their particular domain.

DB2 database system integration with Windows Management Instrumentation

The snapshot monitors can be accessed by Windows Management Instrumentation (WMI) by means of the DB2 performance counters and using the built-in PerfMon provider.

The DB2 profile registry variables can be accessed by WMI by using the built-in Registry provider.

The WMI Software Development Kit (WMI SDK) includes several built-in providers:

- PerfMon provider
- Registry event provider
- Registry provider
- Windows event log provider
- Win32 provider
- WDM provider

The DB2 errors that are in the Event Logs can be accessed by WMI by using the built-in Windows Event Log provider.

DB2 database system has a DB2 WMI Administration provider, and sample WMI script files, to access the following managed objects:

1. Instances of the database server including those instances that are distributed. The following operations can be done:
 - Enumerate instances
 - Configure database manager parameters
 - Start/stop/query the status of the DB2 server service
 - Setup or establish communication
2. Databases. The following operations can be done:
 - Enumerate databases
 - Configure database parameters
 - Create/drop databases

- Backup/restore/roll forward databases

You will need to register the DB2 WMI provider with the system before running WMI applications. Registration is done by entering the following commands:

- `mofcomp %DB2PATH%\bin\db2wmi.mof`

This command loads the definition of the DB2 WMI schema into the system.

- `regsvr %DB2PATH%\bin\db2wmi.dll`

This command registers the DB2 WMI provider COM DLL with Windows.

In both commands, %DB2PATH% is the path where DB2 is installed. Also, db2wmi.mof is the .MOF file that contains the DB2 WMI schema definition.

There are several benefits to integrating with the WMI infrastructure:

1. You are able to easily write scripts to manage DB2 servers in a Windows-based environment using the WMI provided tool. Sample Visual Basic (VBS) scripts are provided to carry out simple tasks such as listing instances, creating and dropping databases, and updating configuration parameters. The sample scripts are included in the DB2 Application Development for Windows product.
2. You can create powerful management applications that perform many tasks using WMI. The tasks could include:
 - Displaying system information
 - Monitoring DB2 performance
 - Monitoring DB2 system resource consumption

By monitoring both system events and DB2 events through this type of management application, you can manage the database better.

3. You can use existing COM and Visual Basic programming knowledge and skills. By providing a COM or Visual Basic interface, your programmers can save time when developing enterprise management applications.

Performance monitoring on Windows platforms

When working with DB2 database manager for Windows, there are tools that can be used to monitor performance.

Important: The Windows Performance Monitor has been deprecated and may be discontinued in a future release. In Version 10.1 the IBM InfoSphere Optim Performance Manager should be used instead.

• Windows Performance Monitor

The Windows Performance Monitor enables you to monitor both database and system performance, retrieving information from any of the performance data providers registered with the system. Windows also provides performance information data on all aspects of computer operation including:

- CPU usage
- Memory utilization
- Disk activity
- Network activity

Registering DB2 with the Windows performance monitor

The setup program automatically registers DB2 with the Windows Performance Monitor for you. To make DB2 database and DB2 Connect™ performance information accessible to the Windows Performance Monitor, you must register the DLL for the DB2 for Windows Performance Counters.

About this task

This process also enables any other Windows application using the Win32 performance APIs to get performance data. To install and register the DB2 Performance Counters DLL (DB2Perf.DLL) with the Windows Performance Monitor, type:

```
db2perfi -i
```

Registering the DLL also creates a new key in the services option of the registry. One entry gives the name of the DLL, which provides the counter support. Three other entries give names of functions provided within that DLL. These functions include:

Open Called when the DLL is first loaded by the system in a process.

Collect

Called to request performance information from the DLL.

Close Called when the DLL is unloaded.

Enabling remote access to DB2 performance information

To see Windows performance objects from another DB2 for Windows computer, you must register an administrator username and password with the DB2 database manager. The default Windows Performance Monitor username, SYSTEM, is a DB2 database reserved word and cannot be used.

About this task

If your DB2 for Windows workstation is networked to other Windows computers, you can use the feature described in this section.

To register the name, type:

```
db2perfr -r username password
```

Note: The username used must conform to the DB2 database naming rules.

The username and password data is held in a key in the registry, with security that allows access only by administrators and the SYSTEM account. The data is encoded to prevent security concerns about storing an administrator password in the registry.

Note:

1. Once a username and password combination has been registered with the DB2 database system, even local instances of the Performance Monitor will explicitly log on using that username and password. This means that if the username information registered with DB2 database system does not match, local sessions of the Performance Monitor will not show DB2 database performance information.
2. The username and password combination must be maintained to match the username and password values stored in the Windows Security database. If the username or password is changed in the Windows Security database, the username and password combination used for remote performance monitoring must be reset.
3. To deregister, type:

```
db2perfr -u <username> <password>
```

Displaying DB2 database and DB2 Connect performance values

While you are conducting maintenance, or if you are trying to improve overall database performance, it is good to review the current performance values.

About this task

To display DB2 database and DB2 Connect performance values using the Performance Monitor, simply choose the performance counters whose values you want displayed from the **Add to** box. This box displays a list of performance objects providing performance data. Select an object to see a list of the counters it supplies.

A performance object can also have multiple instances. For example, the LogicalDisk object provides counters such as “% Disk Read Time” and “Disk Bytes/sec”; it also has an instance for each logical drive in the computer, including “C:” and “D:”.

Windows performance objects

When DB2 is installed on a Windows operating system, there are a number of performance monitor objects that are provided.

Windows provides the following performance objects:

- **DB2 Database Manager**

This object provides general information for a single Windows instance. The DB2 database instance being monitored appears as the object instance.

For practical and performance reasons, you can only get performance information from one DB2 database instance at a time. The DB2 database instance that the Performance Monitor shows is governed by the `db2instance` registry variable in the Performance Monitor process. If you have multiple DB2 database instances running simultaneously and want to see performance information from more than one, you must start a separate session of the Performance Monitor, with `db2instance` set to the relevant value for each DB2 database instance to be monitored.

If you are running a partitioned database environment, you can only get performance information from one database partition server at a time. By default, the performance information for the default database partition (that is, the database partition that has logical port 0) is displayed. To see performance information of another database partition, you must start a separate session of the Performance Monitor with the `DB2NODE` environment variable set to the database partition number of the database partition to be monitored.

- **DB2 Databases**

This object provides information for a particular database. Information is available for each currently active database.

- **DB2 Applications**

This object provides information for a particular DB2 database application. Information is available for each currently active DB2 database application.

- **DB2 DCS Databases**

This object provides information for a particular DCS database. Information is available for each currently active database.

- **DB2 DCS Applications**

This object provides information for a particular DB2 DCS application. Information is available for each currently active DB2 DCS application.

Which of these objects will be listed by the Windows Performance Monitor depends on what is installed on your Windows computer and what applications are active. For example, if the DB2 database manager is installed has been started, the DB2 Database Manager object will be listed. If there are also some DB2 databases and applications currently active on that computer, the DB2 Databases and DB2 Applications objects will be listed as well. If you are using your Windows system as a DB2 Connect gateway and there are some DCS databases and applications currently active, the DB2 DCS Databases and DB2 DCS Applications objects will be listed.

Accessing remote DB2 database performance information

If the database is in a remote location, you might prefer to access and analyze performance information from a different location.

About this task

Enabling remote access to DB2 Performance Information was discussed earlier. In the **Add to** box, select another computer to monitor. This brings up a list of all the available performance objects on that computer.

In order to be able to monitor DB2 Performance object on a remote computer, the level of the DB2 database or DB2 Connect code installed on that computer must be Version 6 or higher.

Resetting DB2 performance values

There might be some situations in which you want to reset the performance values that are stored on the DB2 database system.

About this task

When an application calls the DB2 monitor APIs, the information returned is normally the cumulative values since the DB2 database server was started. However, often it is useful to:

- Reset performance values
- Run a test
- Reset the values again
- Re-run the test.

To reset database performance values, use the **db2perf** program. Type:

```
db2perf
```

By default, this resets performance values for all active DB2 databases. However, you can also specify a list of databases to reset. You can also use the **-d** option to specify that performance values for DCS databases should be reset. For example:

```
db2perf  
db2perf dbalias1 dbalias2 ... dbaliasn
```

```
db2perf -d  
db2perf -d dbalias1 dbalias2 ... dbaliasn
```

The first example resets performance values for all active DB2 databases. The next example resets values for specific DB2 databases. The third example resets performance values for all active DB2 DCS databases. The last example resets values for specific DB2 DCS databases.

The **db2perf** program resets the values for ALL programs currently accessing database performance information for the relevant DB2 database server instance (that is, the one held in DB2INSTANCE in the session in which you run **db2perf**).

Invoking **db2perf** also resets the values seen by anyone remotely accessing DB2 database performance information when the **db2perf** command is executed.

Note: There is a DB2 database API, **sqlmrset**, that allows an application to reset the values it sees locally, not globally, for particular databases.

Part 2. Monitor elements

Monitor elements are data structures used to store information about a particular aspect of the database system status. For example, the monitor element **direct_reads** reflects the number of read operations that take place that are performed directly from disk, rather than from any buffer pool.

Each monitor element reflects one of the following types of data:

Counter

Counters track the number of times something happens. For example, the **deadlocks** monitor element records the total number of deadlocks that have occurred. Other examples of counters include **commit_sql_stmts** (**commit statements attempted**), **rows_deleted** and **total_sorts**.

Gauge Gauges reflect a measurement of how much of something is happening or is used. For example, time-spent monitor elements, such as **total_section_proc_time** or **total_sort_time** are measures of how much time is used in different phases of processing. Other examples of gauges include: **locks_held**, **num_extent_moved**, and **sort_heap_allocated**. Compared to counters, which can only increase over time, the values in gauges might go up or down, depending on what is happening in the database.

Watermark

Watermarks reflect the highest value reached for a given measurement. For example, **uow_total_time_top** shows the lifetime of the longest-running unit of work since the database was activated. Other examples of watermarks include: **pkg_cache_size_top**, and **sort_heap_top**.

Text Many monitor elements report text values. For example, **stmt_text** contains the text of an SQL statement. Other examples of text monitor elements include: **table_name**, **tablespace_type**, and **db_storage_path_state**.

Timestamp

Timestamp monitor elements show the time that something happened. For example, **conn_time** shows the time that a connection was made to a database. Other examples of timestamp monitor elements include: **lock_wait_start_time**, **stmt_first_use_time**, and **uow_stop_time**. Compared to gauges that measure elapsed time, timestamps measure the exact point in time that something begins or ends.

You can examine monitor elements using one or more of the various monitoring interfaces provided with the DB2 product, such as table functions or event monitors..

Chapter 6. Request monitor elements

Request monitor elements, also known as *request metrics*, measure the volume of work or effort expended by the database server to process different types of requests, including overall system processing, requests related to a specific type of processing, and requests related to a specific data server environment.

Use request monitor elements to monitor the database system, specifically the volume of work and the effort expended by the data server to process application requests.

A *request* is a directive to a database agent to perform some work that expends database resources. Sources of the request can include:

- A directive issued directly by an external application, such as an OPEN or EXECUTE directive. These are referred to as application requests.
- A directive issued by a coordinator agent to a subagent at the same or a different database member.
- A directive issued by an agent at a different database member.

Some representative monitor elements for measuring overall system processing information:

- The **rqsts_completed_total** monitor element measures the number of completed by the system.
- The **total_rqst_time** monitor element measures the time spent by requests in the data server, including wait time and processing time
- The **total_wait_time** monitor element measures the overall wait time.
- The **total_cpu_time** monitor element measures the CPU usage time.

Some representative monitor elements for measuring client-server processing information:

- The **client_idle_wait_time** monitor element measures the time spent waiting for the next request from an open connection.
- The **tcPIP_recv_volume** monitor element measures the volume of data received by the data server from clients over TCP/IP.

Some representative monitor elements for measuring common data server processing operations:

- **pool_data_l_reads** is one of the monitor elements providing information about buffer pool resource usage.
- **pool_read_time** is one of the monitor elements providing information about I/O processing.
- **lock_wait_time** is one of the monitor elements providing information about locks and locking.
- **total_section_sorts** is one of the monitor elements providing information about sorts.

Some representative monitor elements for monitoring processing relevant to selected types of data server environments:

- **fcm_recv_wait_time** is one of the monitor elements measuring fast communications manager (FCM) processing.

- `wlm_queue_time_total` is one of the monitor elements measuring workload management control actions.

Accessing request metrics using table functions

You can use the following table functions to access the request metrics:

- `MON_GET_SERVICE_SUBCLASS` and `MON_GET_SERVICE_SUBCLASS_DETAILS`
- `MON_GET_WORKLOAD` and `MON_GET_WORKLOAD_DETAILS`
- `MON_GET_CONNECTION` and `MON_GET_CONNECTION_DETAILS`
- `MON_GET_UNIT_OF_WORK` and `MON_GET_UNIT_OF_WORK_DETAILS`

Each table function in this set of monitor table functions has two forms, one of which has a name ending with "DETAILS." The function that does not end with "DETAILS" provides an SQL relational interface that returns the most commonly needed data. The other function provides XML-based access to the monitor data and returns a more comprehensive set of data.

This set of table functions enables you to focus on request metrics at a particular level of aggregation. You can choose the table function that enables you to focus on subset (or aggregation) of the system workload you are interested in a given situation. All of these table functions include a common set of request metric monitor elements. Each table function may return a few additional details not common with all the table functions.

In a database with no user-defined workloads or service classes, all of the user work performed by the database manager occurs in the default user workload and user service class. The table functions that return data for each service class (or workload) return data for a single service class (or workload) that represents the processing for the user workload for the entire database.

In a database with user-defined workloads and service classes, table functions that return data for each service class (or workload) enable you to compare processing per service class (or workload). Using SQL, you can sum the values across service classes (or workloads) to obtain the value of a monitor element that represents the processing for the user workload for the entire database.

Accessing request metrics using event monitors

Request metrics are reported by the following event monitors:

- Statistics event monitor - Request metrics are one of several types of information reported by this event monitor.
- UoW event monitor - This event monitor reports similar or identical fields as the `MON_GET_UNIT_OF_WORK` table function

Activity monitor elements

Activity monitor elements, also known as *activity metrics*, are a subset of request monitor elements. Use activity metrics to monitor the subset of data server processing related to executing activities, especially processing done to execute SQL statement sections.

Request monitor elements monitor the complete volume of work and effort expended by the data server to process application requests. Activity monitor elements monitor the work done to execute SQL statement sections, including locking, sorting, and row processing.

To access the current values for activity monitor elements, use the following table functions:

MON_GET_ACTIVITY_DETAILS

Returns details about one or more activities in progress. Specify the activities of interest in the input parameters. Data returned includes activity metric monitor elements, many other monitor elements, and statement text. Data is returned in XML format.

MON_GET_PKG_CACHE_STMT

Returns details for some or all SQL statement sections in the database package cache, which includes both static and dynamic SQL statements. Data returned includes activity metric monitor elements aggregated over all executions of the section since it was added to the package cache. Data is returned in a relational form.

Use the activity event monitor to access historical data about activities. This monitor captures data for each execution of each activity. The activity event monitor captures the same activity monitor elements as the `MON_GET_ACTIVITY_DETAILS` table function. It also captures some additional information.

Chapter 7. Data object monitor elements

Data object monitor elements provide information about operations performed on particular data objects, including tables, indexes, buffer pools, table spaces, and containers.

Every data object type has a set of monitor elements that can be monitored. For example, buffer pools have elements that can be used to calculate buffer pool hit ratios.

Use the following table functions to access current values for data object monitor elements. These monitor table functions return data in a relational form:

- MON_GET_BUFFERPOOL
- MON_GET_TABLESPACE
- MON_GET_CONTAINER
- MON_GET_TABLE
- MON_GET_INDEX

Chapter 8. Monitor element collection levels

The *monitor element collection level* for a monitor element refers to what, if any settings must be active for data to be collected for that element.

For many monitor elements, data collection is controlled by configuration parameters, clauses in the DDL used to define workload management objects, or a combination of both.

Collection level settings

Setting collection levels using database configuration parameters sets the default collection level for a specific class of monitor elements for the entire database. For example, setting the configuration parameter `mon_req_metrics` to `BASE` causes request metrics to be collected for all agents running in the database. For request and activity metrics, and for section actuals monitor elements, you can also specify a collection level for specific WLM objects that is different from the level used for the database as a whole. In this way, the *effective collection level* for a given monitor element is determined by applying the broadest (highest) collection level specified for that element for the scope in which it is collected. See the section titled “Examples” on page 570 for examples of how the different collection scopes work together.

Collection levels are used in the topics that describe most monitor elements. (Monitor elements returned by snapshot interfaces use monitor switches rather than collection levels.) For example, Table 145 shows the table that describes the interfaces that return the monitor element `skipped_prefetch_data_p_reads`, along with the monitor element collection level that must be active for data to be collected for this element.

Most topics include such a table to show what interfaces return the monitor element, and what the minimum collection level must be for data to be collect for the monitor element described in the topic.

Table 145. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

The collection levels used in monitor element reference topics are as follows:

Always collected

Data for this monitor element is always collected. There are no configuration parameters, or SQL statement options to control collection of this information.

DATA OBJECT METRICS BASE, DATA OBJECT METRICS EXTENDED

Monitor elements with this collection level are collected if the database configuration parameter `mon_obj_metrics` is set to `BASE` or `EXTENDED`. If `mon_obj_metrics` is set to `NONE`, no data is collected.

REQUEST METRICS BASE, REQUEST METRICS EXTENDED

Monitor elements with this collection level are collected if the effective collection level set to BASE or EXTENDED. The effective collection level for request metrics is determined by examining the current setting for the database configuration parameter `mon_req_metrics` and the settings specified for the COLLECT REQUEST METRICS clause for WLM service superclasses.

ACTIVITY METRICS BASE, ACTIVITY METRICS EXTENDED

Monitor elements with this collection level are collected if the effective collection level set to BASE or EXTENDED. The effective collection level for activity metrics is determined by examining the current setting for the database configuration parameter `mon_act_metrics` and the settings specified for the COLLECT ACTIVITY METRICS clause for WLM workloads.

SECTION ACTUALS BASE

Monitor elements with this collection level are collected if the effective collection level set to BASE. The effective collection level for section actuals is determined by examining the current setting for the database configuration parameter `section_actuals` along with the settings for the following items:

- The INCLUDE ACTUALS clause as part of the CREATE or ALTER WORKLOAD, CREATE or ALTER WORK ACTION SET, or CREATE or ALTER SERVICE CLASS statements.
- The <collectsectionactuals> setting on the WLM_SET_CONN_ENV routine.

COLLECT AGGREGATE ACTIVITY DATA, COLLECT AGGREGATE REQUEST DATA Monitor elements with this collection level are collected if the clause COLLECT AGGREGATE ACTIVITY DATA or COLLECT AGGREGATE REQUEST DATA is included as part of the CREATE or ALTER statement for specific types of WLM objects.

Some elements are marked as “Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.” In these cases, the element is returned by a function that merely formats the output of event data already collected.

Examples

Example 1: Default collection level of NONE for the database as a whole, EXTENDED for a specific service super class.

This example shows how you can specify a collection level of NONE for, in this case, request metrics monitor elements for the database as a whole, but still collect EXTENDED metrics for agents running in a service super class.

To disable the collection of request metrics for agents running in the database in general, but collect extended metrics for a specific service super class, then perform the following steps:

1. Set the collection level for request metrics for the database as whole to NONE by issuing the following command:

```
DB2 UPDATE DB CFG FOR database-name USING MON_REQ_METRICS NONE
```
2. Alter the service super class for which you want to collect request metrics by executing the following statement:

```
ALTER SERVICE CLASS service-class-name COLLECT REQUEST METRICS EXTENDED
```


Results: Request metrics are collected for all agents that run in the service super class with the name *service-class-name*. Request metrics are not collected for agents that run outside of that service super class.

Example 2: Default collection level of EXTENDED for the database as a whole.

This example shows how the broadest collection level is applied for collecting monitor element data, perhaps with unintended consequences.

- Specify that activity metrics are to be captured for all activities running in the database using the following command:

```
DB2 UPDATE DB CFG FOR database-name USING MON_ACT_METRICS EXTENDED
```

- Modify a WLM workload so that activity metrics are not collected:

```
ALTER WORKLOAD workload-name COLLECT ACTIVITY METRICS NONE
```

Results: Activity metrics are collected for all agents running in the database, including those running as part of the workload *workload-name*. In this case, the effective collection level is determined by the broader collection level (EXTENDED) specified for the database as a whole through the **mon_act_metrics** configuration parameter.

Chapter 9. Time-spent monitor elements

Time-spent monitor elements track how time is spent in the system. You can query them to see where time is spent waiting, or performing different types of processing. You can also view the elapsed time spent in a particular system component.

Figure 11 shows an example of one way that you can view the relative time spent in waits and processing times for a request.

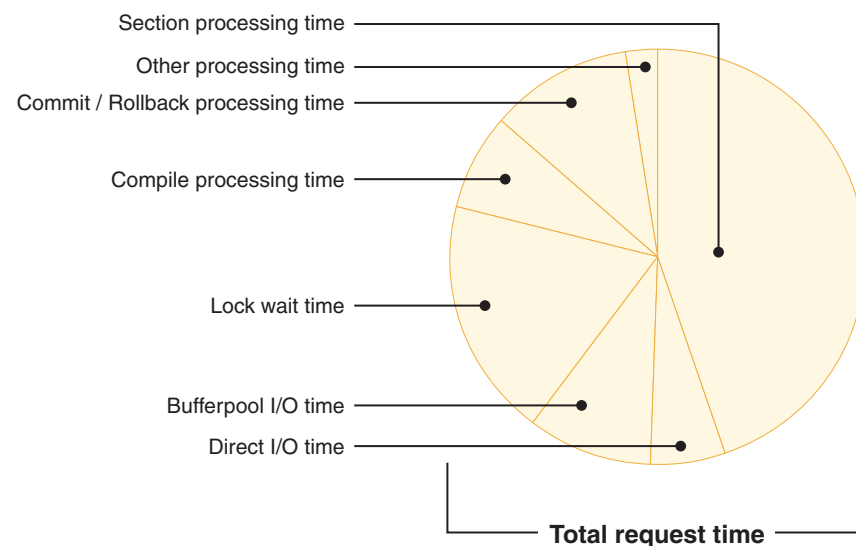


Figure 11. How time-spent metrics can provide an overall view of where time is spent in the system. Time is broken down into time spent waiting (lock wait time, buffer pool I/O time, direct I/O time, and time spent doing actual processing.

There are three ways that the database manager monitors time spent in the system:

- Wait times
- Component processing times
- Component elapsed times.

Wait times

Wait-time monitor elements reflect the time that the database manager spends waiting on something before it can proceed with processing. Some examples include time spent waiting for the following services:

- Incoming client requests
- Locks on objects to be released
- Writing to the diagnostic log
- Reading from or writing to the buffer pool.

Examples of monitor elements that track wait time include `lock_wait_time` and `pool_read_time`.

Component processing times

These times represent the time spent doing actual processing within a specific logical component of the database. Some examples include time spent doing the following services:

- Committing or rolling back transactions
- Performing database reorganizations
- Compiling SQL
- Loading data
- Performing runstats operations.

Examples of monitor elements that track component processing time include **total_compile_proc_time** and **total_commit_proc_time**.

Component elapsed times

Component elapsed times reflect the total amount of elapsed time spent within a logical component of the database. They include *both* processing time and various types of wait times that might be incurred during that overall stage of processing. For example, the overall time spent doing a commit includes actual commit processing and might also include various types of wait times, such as time incurred waiting for I/O operations or log file operations to complete.

Note: Elapsed time is not the same as elapsed time as measured on a clock; if the overall time spent was split among multiple threads, the time spent in each thread is represented in this number.

Some examples of how you can use component times include:

- Learning where relatively costly processing is taking place for a given workload (for example SQL compilation, as compared to query execution)
- Determining whether the cost of a specific component area can be attributed to actual processing, or whether wait time plays a significant role in reducing throughput
- Understanding the cost of a particular component area (for example, rollback processing) in the context of the overall time spent in the system.

Examples of monitor elements that track overall component times include **total_compile_time** and **total_commit_time**

You can query component processing times and wait times to get a breakdown of specific wait times relative to processing times. Figure 11 on page 573 is an example of how these two types of time-spent metrics can be viewed relative to one another.

While component elapsed times cannot be used to obtain a breakdown of specific types of wait times (for example, lock waits, I/O-related waits), they do provide an alternative view that you can use to view processing times relative to the overall time spent in a given logical database component. An example would be examining the ratio of actual processing time for table or index reorganizations (**total_reorg_proc_time**), to the overall elapsed time spent performing reorgs (**total_reorg_time**), which could include time spent on a variety of miscellaneous processing and waits not directly related to the reorg itself.

Time-spent monitor element hierarchy

The information in many time-spent monitor elements is rolled up in more general monitor elements.

For example, individual wait time elements, such as that for the time spent waiting to receive the information in the next buffer from a table queue (**fc_m_tq_rcv_wait_time**) and time spent waiting for an FCM reply message (**fc_m_message_rcv_wait_time**) are both included in overall **fc_m_rcv_wait_time** element. The hierarchical organization of time-spent monitor element makes it possible to choose the element with the most appropriate level of specificity for your needs.

Dimensions and perspectives for viewing time-spent monitor elements

There are different ways that you can look at the hierarchies of time-spent monitor elements. One way is to look at them from the viewpoint of the system as a whole; you can also look at them in the context of specific activities within the system.

The system-level view or system *dimension* includes elements that you can use to see what the system is doing as a whole. You can also use elements in the system dimension to view time-spent information for specific workloads.

The activity-level view or activity dimension includes elements that you can use to see which specific activities the system is spending time on, such as the execution of SQL statements. All monitor elements in the activity dimension are included in the higher-level system dimension.

Within each of these two dimensions are two different *perspectives* that you can use to look at time-spent monitor elements:

- Component processing times as compared to wait times
- Component elapsed times as compared to component processing times

In the first perspective, the values for wait-time elements are independent of and complementary to the values for component processing time elements. If you add the sum of all of the reported wait times to the sum of all component processing times, the resulting value is very close to the value that is reported by the **total_rqst_time** monitor element. Any minor difference between the two values is the result of a small amount of miscellaneous component processing time that is not tracked by any monitor element.

In the second perspective, component elapsed times are a superset of component processing times. For example, for a logical component of the database such as that component that performs commits, the total amount of commit processing time, as reported by the **total_commit_proc_time** monitor element, is included in the overall elapsed time for the commit, as reported by the **total_commit_time** monitor element. The difference between the total elapsed time and the total processing time is made up of miscellaneous wait or processing times that are not individually tracked by the component elapsed time monitor element.

Viewing component elapsed times relative to wait times is not meaningful, because component elapsed times already include wait times that are incurred as part of the elapsed time in that part of the system. If you created a pie chart consisting of both component elapsed times and wait times, it would not be an accurate representation of the time that is spent in your system because you would be double-counting the various types of wait times.

The sections that follow describe the various dimensions (system and activity) and perspectives (component processing, wait times and component elapsed, and component processing times) from which you can view the information in time-spent monitor elements.

Tip: Not all information from time-spent elements is reported through all interfaces. For example, the **client_idle_wait_time** monitor element is applicable only to system-level interfaces such as the `MON_GET_SERVICE_SUBCLASS` table function. See the reference topic for each monitor element for a list of the interfaces that report the element.

- “System dimension”
- “Activity dimension” on page 580

System dimension

Figure 12 on page 577 shows an overall view of how the monitor elements for wait time and component processing time relate to one another, as viewed from the system dimension.

- “client_idle_wait_time - Client idle wait time monitor element” on page 776
- “total_rqst_time - Total request time monitor element” on page 1474
 - “total_wait_time - Total wait time monitor element” on page 1501
 - “agent_wait_time - Agent wait time monitor element” on page 715
 - “wlm_queue_time_total - Workload manager total queue time monitor element” on page 1538
 - “lock_wait_time - Time waited on locks monitor element” on page 1009
 - “log_buffer_wait_time - Log buffer wait time monitor element” on page 1019
 - “log_disk_wait_time - Log disk wait time monitor element” on page 1021
 - “tcpip_rcv_wait_time - TCP/IP received wait time monitor element” on page 1402
 - “tcpip_send_wait_time - TCP/IP send wait time monitor element” on page 1405
 - “ipc_rcv_wait_time - Interprocess communication received wait time monitor element” on page 971
 - “ipc_send_wait_time - Interprocess communication send wait time monitor element” on page 974
 - “fcm_rcv_wait_time - FCM received wait time monitor element” on page 904¹
 - “fcm_tq_rcv_wait_time - FCM table queue received wait time monitor element” on page 913¹
 - “fcm_message_rcv_wait_time - FCM message received wait time monitor element” on page 894¹
 - “fcm_send_wait_time - FCM send wait time monitor element” on page 908¹
 - “fcm_tq_send_wait_time - FCM table queue send wait time monitor element” on page 917¹
 - “fcm_message_send_wait_time - FCM message send wait time monitor element” on page 899¹
 - “audit_subsystem_wait_time - Audit subsystem wait time monitor element” on page 745
 - “audit_file_write_wait_time - Audit file write wait time monitor element” on page 741
 - “diaglog_write_wait_time - Diagnostic log file write wait time monitor element” on page 854
 - “pool_read_time - Total buffer pool physical read time monitor element” on page 1207
 - “pool_write_time - Total buffer pool physical write time monitor element” on page 1223
 - “direct_read_time - Direct read time monitor element” on page 860
 - “direct_write_time - Direct write time monitor element” on page 866
 - “evmon_wait_time - Event monitor wait time monitor element” on page 883
 - “total_extended_latch_wait_time - Total extended latch wait time monitor element” on page 1441
 - “prefetch_wait_time - Time waited for prefetch monitor element” on page 1249
 - “comm_exit_wait_time - Communication buffer exit wait time monitor element” on page 784
 - “ida_send_wait_time - Time spent waiting to send data monitor element” on page 952
 - “ida_rcv_wait_time - Time spent waiting to receive data monitor element” on page 947
 - “total_compile_proc_time - Total compile processing time monitor element” on page 1428
 - “total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element” on page 1495
 - “total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element” on page 1490
 - *Other monitor elements*²
 - “total_implicit_compile_proc_time - Total implicit compile processing time monitor element” on page 1448
 - “total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470
 - “total_section_proc_time - Total section processing time monitor element” on page 1479
 - “total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480
 - *Other monitor elements*²
 - “total_commit_proc_time - Total commits processing time monitor element” on page 1424
 - “total_rollback_proc_time - Total rollback processing time monitor element” on page 1463
 - “total_runstats_proc_time - Total runtime statistics processing time monitor element” on page 1476
 - “total_reorg_proc_time - Total reorganization processing time monitor element” on page 1460
 - “total_load_proc_time - Total load processing time monitor element” on page 1450
 - “total_connect_request_proc_time - Total connection or switch user request processing time monitor element” on page 1434
 - “total_connect_authentication_proc_time - Total connection authentication processing time monitor element” on page 1431
 - *Other monitor elements*²
 - *Other monitor elements*³

¹These FCM-related wait times do not yield meaningful information when aggregated across members. For more information, see “Wait times for FCM communications for more information”, Chapter 9. Time-spent monitor elements

²These processing time elements include miscellaneous processing and wait times that are not specifically related to this component. For example, the time that the **total_section_proc_time** element reports includes the time that the

Figure 13 on page 579 shows a detailed view of the monitor elements for the time that is spent in various component areas. Each component time is represented by two different monitor elements:

- One that reports the total amount of processing time in a component or stage of processing
- One that reports the overall elapsed time that is spent in the component. This overall time includes the processing time for the component and any other processing or wait times that might be involved.

- “total_rqst_time - Total request time monitor element” on page 1474
 - “total_compile_time - Total compile time monitor element” on page 1429
 - “total_stats_fabrication_time - Total statistics fabrication time monitor element” on page 1491
 - “total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element” on page 1490
 - “total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements” on page 1494
 - “total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element” on page 1495
 - *Other monitor elements*¹
 - “total_implicit_compile_time - Total implicit compile time monitor element” on page 1449
 - “total_implicit_compile_proc_time - Total implicit compile processing time monitor element” on page 1448
 - *Other monitor elements*¹
 - “total_routine_user_code_time - Total routine user code time monitor element” on page 1471
 - “total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470
 - “total_section_time - Total section time monitor element” on page 1485
 - “total_section_sort_time - Total section sort time monitor element” on page 1482
 - “total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480
 - *Other monitor elements*¹
 - *Other monitor elements*¹
 - “total_commit_time - Total commit time monitor element” on page 1426
 - “total_commit_proc_time - Total commits processing time monitor element” on page 1424
 - *Other monitor elements*¹
 - “total_rollback_time - Total rollback time monitor element” on page 1464
 - “total_rollback_proc_time - Total rollback processing time monitor element” on page 1463
 - *Other monitor elements*¹
 - “total_runstats_time - Total runtime statistics time monitor element” on page 1477
 - “total_runstats_proc_time - Total runtime statistics processing time monitor element” on page 1476
 - *Other monitor elements*¹
 - “total_reorg_time - Total reorganization time monitor element” on page 1461
 - “total_reorg_proc_time - Total reorganization processing time monitor element” on page 1460
 - *Other monitor elements*¹
 - “total_load_time - Total load time monitor element” on page 1451
 - “total_load_proc_time - Total load processing time monitor element” on page 1450
 - *Other monitor elements*¹
 - “total_connect_request_time - Total connection or switch user request time monitor element” on page 1436
 - “total_connect_request_proc_time - Total connection or switch user request processing time monitor element” on page 1434
 - *Other monitor elements*¹
 - “total_connect_authentication_time - Total connection or switch user authentication request time monitor element” on page 1433
 - “total_connect_authentication_proc_time - Total connection authentication processing time monitor element” on page 1431
 - *Other monitor elements*¹
 - *Other monitor elements*²

¹These monitor elements include one or more different types of wait times.

²These monitor elements include a small number of miscellaneous types of time spent (processing and wait times) that are not currently monitored.

Figure 13. Component processing time spent monitor elements - System dimension. The values for indented monitor elements are included in the element that precedes those elements in the next-highest level of the hierarchy.

Activity dimension

Figure 14 shows the monitor elements that you can view for activities from the perspective of wait times as compared to component processing times.

- “stmt_exec_time - Statement execution time monitor element” on page 1348
 - “total_act_wait_time - Total activity wait time monitor element” on page 1417 ¹
 - “lock_wait_time - Time waited on locks monitor element” on page 1009
 - “log_buffer_wait_time - Log buffer wait time monitor element” on page 1019
 - “log_disk_wait_time - Log disk wait time monitor element” on page 1021
 - “fcm_rcv_wait_time - FCM received wait time monitor element” on page 904²
 - “fcm_tq_rcv_wait_time - FCM table queue received wait time monitor element” on page 913²
 - “fcm_message_rcv_wait_time - FCM message received wait time monitor element” on page 894²
 - “fcm_send_wait_time - FCM send wait time monitor element” on page 908²
 - “fcm_tq_send_wait_time - FCM table queue send wait time monitor element” on page 917²
 - “fcm_message_send_wait_time - FCM message send wait time monitor element” on page 899²
 - “audit_subsystem_wait_time - Audit subsystem wait time monitor element” on page 745
 - “evmon_wait_time - Event monitor wait time monitor element” on page 883
 - “audit_file_write_wait_time - Audit file write wait time monitor element” on page 741
 - “diaglog_write_wait_time - Diagnostic log file write wait time monitor element” on page 854
 - “pool_read_time - Total buffer pool physical read time monitor element” on page 1207
 - “pool_write_time - Total buffer pool physical write time monitor element” on page 1223
 - “direct_read_time - Direct read time monitor element” on page 860
 - “direct_write_time - Direct write time monitor element” on page 866
 - “total_extended_latch_wait_time - Total extended latch wait time monitor element” on page 1441
 - “prefetch_wait_time - Time waited for prefetch monitor element” on page 1249
 - “ida_send_wait_time - Time spent waiting to send data monitor element” on page 952
 - “ida_rcv_wait_time - Time spent waiting to receive data monitor element” on page 947
 - “total_routine_non_sect_proc_time - Non-section processing time monitor element” on page 1467
 - “total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470
 - *Other monitor elements*³
 - “total_section_proc_time - Total section processing time monitor element” on page 1479
 - “total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480
 - *Other monitor elements*³
 - *Other monitor elements*⁴

¹This monitor element does not include any wait time that is incurred by nested (child) activities that the statement executes.

²These FCM-related wait times do not yield meaningful information when aggregated across members. For more information, see “Wait times for FCM communications”.

³Includes miscellaneous processing times that are not specifically related to this component.

⁴Includes a small number of miscellaneous types of time spent (processing and wait times) that are not currently monitored. In addition, this time includes any processing and wait times that child activities incur.

Figure 14. Wait time spent and component processing time spent monitor elements - Activity dimension. The values for indented monitor elements are included in the element that precedes those elements in the next-highest level of the hierarchy.

Figure 15 on page 581 shows the monitor elements that you can view for activities from the perspective of component elapsed times, which include component processing times.

- “stmt_exec_time - Statement execution time monitor element” on page 1348
 - “total_section_time - Total section time monitor element” on page 1485
 - “total_section_sort_time - Total section sort time monitor element” on page 1482
 - “total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480
 - *Other*¹
 - *Other*²
 - “total_routine_time - Total routine time monitor element” on page 1468
 - “total_routine_non_sect_time - Non-section routine execution time monitor elements” on page 1467
 - “total_routine_user_code_time - Total routine user code time monitor element” on page 1471
 - *Other*²
 - *Other*²

¹These monitor elements include one or more different types of wait times.

²These processing time elements include miscellaneous processing and wait times that are not specifically related to this component.

Figure 15. Component elapsed time and component processing time monitor elements - Activity dimension. The values for indented monitor elements are included in the element that precedes those elements in the next-highest level of the hierarchy.

Wait times for FCM communications

In a multi-partition database, or in an environment where there is intrapartition parallelism, the Fast Communications Manager (FCM) manages communication between different agents working on the same statement, whether those agents are on the same or on different members.

All FCM communications involve the potential for wait times as one agent waits for work to be done by another, or for data to be transferred from one to another.

FCM-related wait times do not necessarily indicate that processing is blocked across members; for a given statement, work might be proceeding in parallel or serially on sub-agents across members. The FCM-related wait times show the time that an agent is blocked on a single member waiting for another; however, work might very well be proceeding on the other member.

For example, Agent A on member 0 might be blocked waiting for Agent B on member 1 to read the data being sent to it. If Agent B is busy and does not receive the data from the table queue immediately, Agent A will only be allowed to send a limited amount of data before being forced to wait for an acknowledgement from Agent B before sending the remaining data. This wait time is counted as **fcm_tq_send_wait_time** by Agent A.

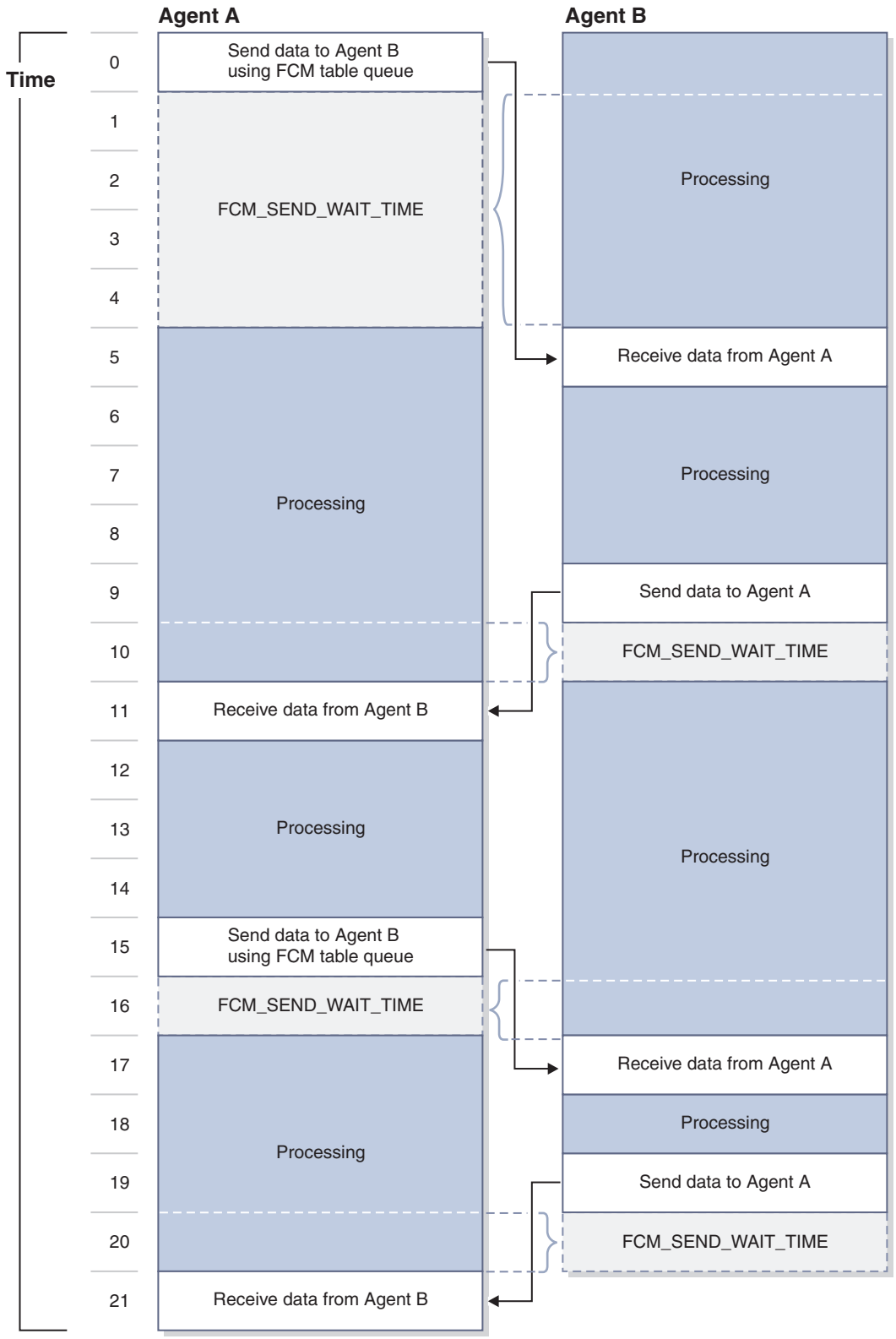


Figure 16. Wait times in FCM communications

Another scenario might involve an agent on one member dispatching a request to an agent on another member. `fcmessage_recv_wait_time` will be incurred if one of the following situations takes place:

- Agent A sends a lengthy request to agent B, and agent B is forced to wait for the full request to be received. In this case, agent B incurs **fcm_message_rcv_wait_time**.
- Agent A sends a request to agent B, and awaits a reply from agent B. In this case, agent A incurs **fcm_message_rcv_wait_time**.

fcm_message_send_wait_time will be incurred if one of the following situations takes place:

- Agent A sends a lengthy request to agent B, and is blocked for some reason. For example, Agent A might need to wait while the first portion of the request being sent is processed by the local FCM daemon. In this case, agent A incurs **fcm_message_send_wait_time**.
- Agent B sends a reply to a request from agent A. If agent B is for some reason blocked before the entire message can be sent, then agent B incurs **fcm_message_send_wait_time**.

Depending on what it is that you want to measure, it might be appropriate to subtract FCM wait times from the total time spent if you are aggregating metrics for time spent across multiple partitions.

Retrieving and working with time-spent monitor element data

Time-spent monitor element data can be used in almost unlimited ways. For example, you can automate the production of charts that show, at a glance, how time is spent in the system.

Or you could use the data to track certain types of wait times in the system over a period of time.

The topics that follow provide some basic examples of how to use the time-spent monitor elements, as well as the table functions that you use to access the data they contain.

Seeing where time is spent across the system

You can use the time-spent monitor elements to get a view of where time is being spent in the system. Time spent monitor elements can be used to report on specific units of work, service subclasses, workloads or connections.

About this task

Once you retrieve the various monitor elements that report where time is being spent in the system, you can view them in several ways. At the most basic level, you can view the reported values as a list. You might want to use the values to create ratios, for example the ratio of lock wait time to total request time. Or you could use the values retrieved to create charts to help you visualize time spent monitor elements relative to another.

Notes:

- The values shown in the output for queries are for illustrative purposes only, and should not be construed as representative of what you might see in your own system.
- This task shows you how to retrieve specific time-spent monitor elements. You can also use new formatting functions introduced in Version 9.7 Fix Pack 1 to retrieve time spent monitor elements that meet specific criteria, such as those

with non-zero values, those within a certain range of values that you specify, or the top *n* monitor element (for example, the top five wait times). Example 4 illustrates how these functions work.

Procedure

1. First, determine what time-spent elements you are interested in. For example, you might want to look at total wait time as compared to the total request time for all connections in your system.
2. Formulate an SQL query that uses one of the monitoring table functions that retrieve the elements you are interested in. In this case, you can retrieve the **total_request_time** and the **total_wait_time** monitor elements for a connection using the MON_GET_CONNECTION table function:

```
SELECT APPLICATION_HANDLE,
       TOTAL_WAIT_TIME,
       TOTAL_RQST_TIME
FROM TABLE(MON_GET_CONNECTION(NULL,NULL))
```

The preceding query will return the following output (times are reported in milliseconds):

APPLICATION_HANDLE	TOTAL_WAIT_TIME	TOTAL_RQST_TIME
39	179	269
78	0	0
51	207	316
77	0	21
50	1014	1408
40	109	351
79	89	167

7 record(s) selected.

3. In this case, there are 7 application connections; you could use the results from the second and third columns to determine the percentage of time spent waiting for each application. For example, for application 50, compared to the total request time, the wait time spent by that application is $(1014 \div 1408) \times 100 \approx 72\%$.

Example

Example 1: Determining the average across all connections of the time spent waiting relative to overall request time.

This example is similar to the preceding one, except that the calculation of the average percentage wait time is done within the SQL:

```
WITH PCTWAIT AS (
  SELECT SUM(TOTAL_WAIT_TIME)AS WAIT_TIME,
         SUM(TOTAL_RQST_TIME)AS RQST_TIME
  FROM TABLE(MON_GET_CONNECTION(NULL,NULL)) AS METRICS)
SELECT WAIT_TIME,
       RQST_TIME,
       CASE WHEN RQST_TIME > 0
            THEN DEC((FLOAT(WAIT_TIME))/FLOAT(RQST_TIME) * 100,5,2)
            ELSE NULL END AS WAIT_PCT FROM PCTWAIT
```

The results of running the preceding query would look something like this:

WAIT_TIME	RQST_TIME	WAIT_PCT
1515	2439	62.11

1 record(s) selected.

Example 2: Comparing total wait time against selected component processing times for a specific service subclass

This example shows how you can compare time spent in specific types of component processing with the time spent waiting:

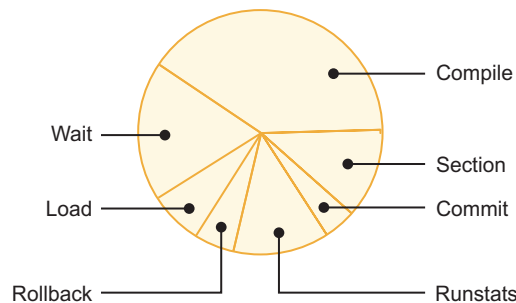
```
SELECT SUM(TOTAL_WAIT_TIME) AS WAIT,
       SUM(TOTAL_COMPILE_PROC_TIME) AS COMPILE,
       SUM(TOTAL_IMPLICIT_COMPILE_PROC_TIME) AS IMP_COMPILE,
       SUM(TOTAL_SECTION_PROC_TIME) AS SECTION,
       SUM(TOTAL_COMMIT_PROC_TIME) AS COMMIT,
       SUM(TOTAL_REORG_PROC_TIME) AS REORG,
       SUM(TOTAL_RUNSTATS_PROC_TIME) AS RUNSTATS,
       SUM(TOTAL_ROLLBACK_PROC_TIME) AS ROLLBACK,
       SUM(TOTAL_LOAD_PROC_TIME) AS LOAD
FROM TABLE(MON_GET_SERVICE_SUBCLASS( 'SYSDEFAULTUSERCLASS', 'SYSDEFAULTSUBCLASS', NULL))
```

The results of the preceding query would look something like this (the output rows from the query have been split for presentation purposes):

WAIT	COMPILE	IMP_COMPILE	SECTION	COMMIT
611	1931	0	395	15
REORG	RUNSTATS	ROLLBACK	LOAD	
0	432	18	0	

1 record(s) selected.

The numbers reported could be used to construct a pie chart to show the relative time spent waiting as compared to time spent in different stages of processing (component times of 0 are not included):



Example 3: View the ratio of total time spent as compared to processing time in different components

This example shows you how you can get an overview of the time spent doing work in different stages of processing (components), relative to the total time spent in that component. The following query computes the ratio (expressed as a percentage) of the time spent in actual processing as compared to the total elapsed time spent in a specific component.

```

WITH PCTPROC AS (
  SELECT SUM(TOTAL_SECTION_TIME) AS SECT_TIME, SUM(TOTAL_SECTION_PROC_TIME) AS SECT_PROC_TIME,
    SUM(TOTAL_COMPILE_TIME) AS COMP_TIME, SUM(TOTAL_COMPILE_PROC_TIME) AS COMP_PROC_TIME,
    SUM(TOTAL_IMPLICIT_COMPILE_TIME) AS IMP_C_TIME, SUM(TOTAL_IMPLICIT_COMPILE_PROC_TIME) AS IMP_C_PROC_TIME,
    SUM(TOTAL_COMMIT_TIME) AS COMMIT_TIME, SUM(TOTAL_COMMIT_PROC_TIME) AS COMMIT_PROC_TIME,
    SUM(TOTAL_ROLLBACK_TIME) AS ROLLBACK_TIME, SUM(TOTAL_ROLLBACK_PROC_TIME) AS ROLLBACK_PROC_TIME,
    SUM(TOTAL_RUNSTATS_TIME) AS RUNSTATS_TIME, SUM(TOTAL_RUNSTATS_PROC_TIME) AS RUNSTATS_PROC_TIME,
    SUM(TOTAL_REORG_TIME) AS REORG_TIME, SUM(TOTAL_REORG_PROC_TIME) AS REORG_PROC_TIME,
    SUM(TOTAL_LOAD_TIME) AS LOAD_TIME, SUM(TOTAL_LOAD_PROC_TIME) AS LOAD_PROC_TIME
  FROM TABLE(MON_GET_CONNECTION(NULL, -2)) AS METRICS)
  SELECT CASE WHEN SECT_TIME > 0
    THEN DEC((FLOAT(SECT_PROC_TIME) / FLOAT(SECT_TIME)) * 100,5,1)
    ELSE NULL END AS SECT_PROC_PCT,
    CASE WHEN COMP_TIME > 0
    THEN DEC((FLOAT(COMP_PROC_TIME) / FLOAT(COMP_TIME)) * 100,5,1)
    ELSE NULL END AS COMPILE_PROC_PCT,
    CASE WHEN IMP_C_TIME > 0
    THEN DEC((FLOAT(IMP_C_PROC_TIME) / FLOAT(IMP_C_TIME)) * 100,5,1)
    ELSE NULL END AS IMPL_COMPILE_PROC_PCT,
    CASE WHEN ROLLBACK_TIME > 0
    THEN DEC((FLOAT(ROLLBACK_PROC_TIME) / FLOAT(ROLLBACK_TIME)) * 100,5,1)
    ELSE NULL END AS ROLLBACK_PROC_PCT,
    CASE WHEN COMMIT_TIME > 0
    THEN DEC((FLOAT(COMMIT_PROC_TIME) / FLOAT(COMMIT_TIME)) * 100,5,1)
    ELSE NULL END AS COMMIT_PROC_PCT,
    CASE WHEN RUNSTATS_TIME > 0
    THEN DEC((FLOAT(RUNSTATS_PROC_TIME) / FLOAT(RUNSTATS_TIME)) * 100,5,1)
    ELSE NULL END AS RUNSTATS_PROC_PCT,
    CASE WHEN REORG_TIME > 0
    THEN DEC((FLOAT(REORG_PROC_TIME) / FLOAT(REORG_TIME)) * 100,5,1)
    ELSE NULL END AS REORG_PROC_PCT,
    CASE WHEN LOAD_TIME > 0
    THEN DEC((FLOAT(LOAD_PROC_TIME) / FLOAT(LOAD_TIME)) * 100,5,1)
    ELSE NULL END AS LOAD_PROC_PCT
  FROM PCTPROC

```

The query produces the following output:

SECT_PROC_PCT	COMPILE_PROC_PCT	IMPL_COMPILE_PROC_PCT	ROLLBACK_PROC_PCT	COMMIT_PROC_PCT	RUNSTATS_PROC_PCT	REORG_PROC_PCT	LOAD_PROC_PCT
57.6	0.1	-	96.9	95.6	0.0	71.1	84.6

1 record(s) selected.

A graphical representation of this data might look something like what is shown in Figure 17:

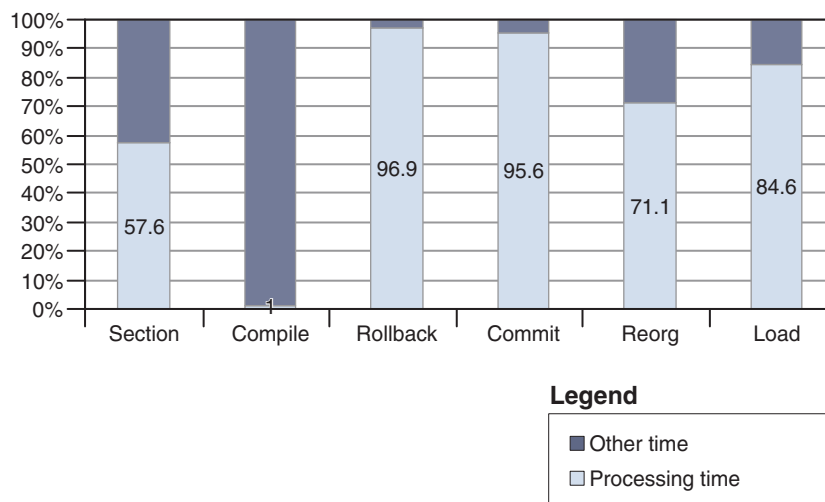


Figure 17. Component processing times as a percentage of overall time spent

Example 4: Ranking time-spent monitor elements

In the preceding examples, all monitor elements that are displayed are specified explicitly in the SQL for the query; each appears in its own column in the query results. However, there might be times when you do not know which time spent monitor elements you want to examine, such

as if you want to see the top ten wait-time monitor elements, or only the non-zero time-spent monitor elements.

Several table functions were added in DB2 Version 9.7 Fix Pack 1 that you can use to display monitor elements in a row-oriented format, where each element appears in a row by itself. The table functions you can use to do this have names of the form `MON_FORMAT_XML_*_BY_ROW`. These functions extract metrics from XML documents returned by certain monitoring interfaces. (See “Interfaces that return monitor data in XML documents” on page 18 for more information.)

The `MON_FORMAT_XML_*_BY_ROW` functions are useful when you do not know which elements you want to view. For example, you might want to see the top 10 wait-time monitor elements for the workload named `CLPWORKLOAD`. To collect this information, you can create a statistics event monitor called `DBSTATS` (event_wlstats logical data group).

Assuming you set up this event monitor to write to a table, it records metrics in a column called `DETAILS_XML`. Once the output table from the event monitor is populated with monitor data, you can construct a query that uses the `MON_FORMAT_XML_WAIT_TIMES_BY_ROW` function to extract the monitor elements you want to see:

```
SELECT SUBSTR(STATS.WORKLOAD_NAME,1,15) AS WORKLOAD_NAME,
       SUBSTR(METRICS.METRIC_NAME,1,30) AS METRIC_NAME,
       SUM(METRICS.TOTAL_TIME_VALUE) AS TOTAL_TIME_VALUE
FROM   WLSTATS_DBSTATS AS STATS,
       TABLE(MON_FORMAT_XML_WAIT_TIMES_BY_ROW(STATS.DETAILS_XML)) AS METRICS
WHERE  WORKLOAD_NAME='CLPWORKLOAD' AND (PARENT_METRIC_NAME='TOTAL_WAIT_TIME')
GROUP BY WORKLOAD_NAME,METRIC_NAME
ORDER BY TOTAL_TIME_VALUE DESC
FETCH FIRST 10 ROWS ONLY
```

Remember: Time spent monitor elements are organized into hierarchies. In this example, to avoid double-counting wait times, only the monitor elements that roll-up to **total_wait_time** are included (see the `WHERE` clause in the preceding SQL statement). Otherwise, **total_wait_time** itself would be included in the results, which includes several individual wait times.

The output that follows shows what the results of the preceding query might look like:

WORKLOAD_NAME	METRIC_NAME	TOTAL_TIME_VALUE
CLPWORKLOAD	LOCK_WAIT_TIME	15138541
CLPWORKLOAD	DIRECT_READ_TIME	6116231
CLPWORKLOAD	POOL_READ_TIME	6079458
CLPWORKLOAD	DIRECT_WRITE_TIME	452627
CLPWORKLOAD	POOL_WRITE_TIME	386208
CLPWORKLOAD	IPC_SEND_WAIT_TIME	283172
CLPWORKLOAD	LOG_DISK_WAIT_TIME	103888
CLPWORKLOAD	DIAGLOG_WRITE_WAIT_TIME	78198
CLPWORKLOAD	IPC_RECV_WAIT_TIME	15612
CLPWORKLOAD	TCP_IP_SEND_WAIT_TIME	3291

10 record(s) selected.

Determining where time is spent during SQL statement execution

One example of retrieving time-spent information at the activity level is viewing time spent monitor elements for specific SQL statements. You can use the `MON_GET_PKG_CACHE_STMT` table function to retrieve this information.

About this task

This task shows an example of how to retrieve selected time-spent details for SQL statements in the package cache.

Note:

- The time-spent metrics reported for a given statement in the package cache are aggregates of the time-spent metrics for all executions of that statement.
- The values shown in the output for queries are for illustrative purposes only, and should not be construed as representative of what you might see in your own system.

Procedure

1. Formulate an SQL statement that uses the MON_GET_PKG_CACHE_STMT table function to retrieve information about statements in the package cache. For example, assume that you want to determine the total wait time relative to the total statement execution time. A query to retrieve this might look like this:

```

SELECT SUM(STMT_EXEC_TIME) AS TOTAL_EXEC_TIME,
       SUM(TOTAL_ACT_WAIT_TIME) AS TOTAL_WAIT_TIME,
       EXECUTABLE_ID
FROM TABLE(MON_GET_PKG_CACHE_STMT ( NULL, NULL, NULL, -2)) AS T
WHERE STMT_EXEC_TIME <> 0
GROUP BY EXECUTABLE_ID
ORDER BY TOTAL_EXEC_TIME DESC

```

2. Run the query. The results might look like the following output:

TOTAL_EXEC_TIME	TOTAL_WAIT_TIME	EXECUTABLE_ID
9021	9021	x'010000000000000320000000000000000000000000020020091111120320140000'
3017	372	x'0100000000000003000000000000000000000000002002009111115438062000'
591	0	x'0100000000000001000000000000000000000000002002009111115252265000'
203	192	x'0100000000000002700000000000000000000000002002009111115936750000'
142	0	x'0100000000000002B00000000000000000000000002002009111115944000000'
111	48	x'0100000000000007000000000000000000000000002002009111115441359002'
108	35	x'010000000000000B00000000000000000000000002002009111115441750000'
55	0	x'010000000000000D000000000000000000000000002002009111115442062000'
50	0	x'010000000000000C00000000000000000000000002002009111115441921000'
38	0	x'010000000000000260000000000000000000000002002009111115936609003'
35	2	x'010000000000000A00000000000000000000000002002009111115441609000'
35	35	x'0100000000000001300000000000000000000000002002009111115442593001'
33	0	x'0100000000000001200000000000000000000000002002009111115442531000'
32	0	x'0100000000000002400000000000000000000000002002009111115936578000'
29	0	x'010000000000000E00000000000000000000000002002009111115442203000'
24	23	x'0100000000000004000000000000000000000000002002009111115440640000'
24	0	x'0100000000000001100000000000000000000000002002009111115442484003'
20	0	x'01000000000000030000000000000000000000000020020091111120241828000'
15	0	x'0100000000000005000000000000000000000000002002009111115440984000'
14	0	x'0100000000000008000000000000000000000000002002009111115441437000'
13	13	x'010000000000000F00000000000000000000000002002009111115442406001'
4	0	x'0100000000000001000000000000000000000000002002009111115442484001'
3	0	x'0100000000000001800000000000000000000000002002009111115442828000'
3	3	x'0100000000000001F0000000000000000000000002002009111115936515000'
3	0	x'0100000000000002900000000000000000000000002002009111115943968001'
2	0	x'0100000000000001500000000000000000000000002002009111115442656001'
2	0	x'0100000000000001700000000000000000000000002002009111115442750000'
1	0	x'0100000000000001600000000000000000000000002002009111115442734000'
1	0	x'0100000000000002800000000000000000000000002002009111115937000001'
1	0	x'0100000000000002A0000000000000000000000002002009111115943984000'

30 record(s) selected.

Results

At this point, you could use the MON_GET_PKG_CACHE_STMT table function again to retrieve the statement text for any statement you are particularly interested in. For example, the statement with the highest wait time previously shown could be determined using the following query:

```

SELECT VARCHAR(STMT_TEXT, 80) AS STMT_TEXT
FROM TABLE(MON_GET_PKG_CACHE_STMT(NULL, x'01000000000000032000000000000000000000000020020091111120320140000', NULL, -2))
AS T

```

The output of the preceding query would look something like this:

STMT_TEXT

UPDATE EMPLOYEE SET BONUS=10000 WHERE PERF_RATING=1
1 record(s) selected.

Chapter 10. Logical data groups overview

When examining monitor element data, it is frequently useful to look at multiple related elements at the same time. *Logical data groups* are groupings of elements that complement each other.

For example, the uow logical data group includes elements like **appl_id** (application ID) and **appl_name** (application name), which are two elements that you can easily imagine wanting to see together.

Logical data groups are used by snapshot monitoring interfaces, and in particular, by event monitors. There are over a thousand monitor elements in the DB2 product. When examining monitor elements, it would be very tiresome to be forced to always have to think about and be forced to specify specifically which elements you want to see. For example, if you are creating an event monitor, thinking about and specifying what elements to capture data for might be very tedious. Instead, the DB2 product associates a default set of logical data groups with each event monitor. This means that you do not need to specify anything in the CREATE EVENT MONITOR statement to capture a useful set of monitor elements; only monitor elements relevant to the events being captured are included. For event monitors that write to regular tables, you have the added flexibility of being able to specify the logical data groups for which you want monitor element data captured.

Event monitors that write to unformatted event (UE) tables capture also capture a default set of monitor elements; when you use the EVMON_FORMAT_UE_TO_TABLES procedure to generate relational tables, logical data groups are used to group related elements together in separate tables. For example, the lock logical data group contains the elements used in the LOCK_EVENT table; the participant logical data group contains the elements used in the LOCK_PARTICIPANT table.

Event monitor logical data groups and monitor elements

Monitor elements that are often useful to examine together are grouped in *logical data groups*.

All event monitors use logical data groups in one way or another. For some event monitor types, you can specify what information you want to collect by specifying the logical data groups for which you want information recorded. Logical data groups are also used to group data together in the output event monitors generate; for example, event monitors that write to tables generally create one table for each logical data group of monitor elements.

The following table lists the logical data groupings and monitor elements that can be returned by event monitoring.

- “changesummary logical data group” on page 48
- “dbdbmcfg logical data group” on page 48
- “ddlstmexec logical data group” on page 48
- “dllock logical data group” on page 49
- “event_activity logical data group” on page 49
- “event_activitymetrics logical data group” on page 51

- “event_activitystmt logical data group” on page 54
- “event_activityvals logical data group” on page 55
- “event_bufferpool logical data group” on page 55
- “event_conn logical data group” on page 57
- “event_connheader logical data group” on page 59
- “event_connmemuse logical data group” on page 60
- “event_data_value logical data group” on page 60
- “event_db logical data group” on page 60
- “event_dbheader logical data group” on page 64
- “event_dbmemuse logical data group” on page 64
- “event_deadlock logical data group” on page 65
- “event_detailed_dlconn logical data group” on page 65
- “event_dlconn logical data group” on page 66
- “event_histogrambin logical data group” on page 67
- “event_log_header logical data group” on page 67
- “event_overflow logical data group” on page 67
- “event_qstats logical data group” on page 67
- “event_scmetrics logical data group” on page 68
- “event_scstats logical data group” on page 76
- “event_start logical data group” on page 77
- “event_stmt logical data group” on page 77
- “event_stmt_history logical data group” on page 78
- “event_subsection logical data group” on page 79
- “event_table logical data group” on page 79
- “event_tablespace logical data group” on page 80
- “event_thresholdviolations logical data group” on page 81
- “event_wcstats logical data group” on page 82
- “event_wlmetrics logical data group” on page 83
- “event_wlstats logical data group” on page 90
- “event_xact logical data group” on page 91
- “evmonstart logical data group” on page 92
- “lock logical data group” on page 92
- “lock_participants logical data group” on page 94
- “lock_participant_activities logical data group” on page 93
- “lock_activity_values logical data group” on page 92
- “pkgcache logical data group” on page 95
- “pkgcache_metrics logical data group” on page 96
- “pkgcache_stmt_args logical data group” on page 100
- “regvar logical data group” on page 100
- “sqlca logical data group” on page 101
- “txncompletion logical data group” on page 101
- “uow logical data group” on page 101
- “uow_metrics logical data group” on page 103
- “uow_package_list logical data group” on page 109
- “uow_executable_list logical data group” on page 102

- “utillocation logical data group” on page 109
- “utilphase logical data group” on page 109
- “utilstart logical data group” on page 109
- “utilstop logical data group” on page 110

changesummary logical data group

- “event_id - Event ID monitor element” on page 879
- “event_type - Event Type monitor element” on page 881
- “event_timestamp - Event timestamp monitor element” on page 880
- “member - Database member monitor element” on page 1044
- “coord_member - Coordinator member monitor element” on page 814
- “utility_invocation_id - Utility invocation ID” on page 1528
- “utility_type - Utility Type” on page 1533
- “appl_id - Application ID monitor element” on page 727
- “appl_name - Application name monitor element” on page 731
- “application_handle - Application handle monitor element” on page 736
- “system_auth_id - System authorization identifier monitor element” on page 1371
- “session_auth_id - Session authorization ID monitor element” on page 1312
- “client_platform - Client operating platform monitor element” on page 778
- “client_protocol - Client communication protocol monitor element” on page 780
- “client_port_number - Client port number monitor element” on page 779
- “client_pid - Client process ID monitor element” on page 778
- “client_hostname - Client hostname monitor element” on page 776
- “client_wrkstname - Client workstation name monitor element” on page 782
- “client_acctng - Client accounting string monitor element” on page 773
- “client_userid - Client user ID monitor element” on page 781
- “client_applname - Client application name monitor element” on page 774
- “backup_timestamp - Backup timestamp” on page 751

dbdbmcfg logical data group

- “event_id - Event ID monitor element” on page 879
- “event_timestamp - Event timestamp monitor element” on page 880
- “member - Database member monitor element” on page 1044
- “event_type - Event Type monitor element” on page 881
- “cfg_name - Configuration name” on page 769
- “cfg_value - Configuration value” on page 770
- “cfg_value_flags - Configuration value flags” on page 770
- “cfg_old_value - Configuration old value” on page 769
- “cfg_old_value_flags - Configuration old value flags” on page 770
- “cfg_collection_type - Configuration collection type” on page 768
- “deferred - Deferred” on page 851

ddlstmexec logical data group

- “event_id - Event ID monitor element” on page 879
- “event_timestamp - Event timestamp monitor element” on page 880

“member - Database member monitor element” on page 1044
“event_type - Event Type monitor element” on page 881
“global_transaction_id - Global transaction identifier monitor element” on page 925
“local_transaction_id - Local transaction identifier monitor element” on page 984
“savepoint_id - Savepoint ID” on page 1299
“uow_id - Unit of work ID monitor element” on page 1517
“ddl_classification - DDL classification” on page 846
“stmt_text - SQL statement text monitor element” on page 1358

dllock logical data group

“data_partition_id - Data partition identifier monitor element” on page 833
“lock_attributes - Lock attributes monitor element” on page 985
“lock_count - Lock count monitor element” on page 986
“lock_current_mode - Original lock mode before conversion monitor element” on page 987
“lock_escalation - Lock escalation monitor element” on page 988
“lock_hold_count - Lock hold count monitor element” on page 995
“lock_mode - Lock mode monitor element” on page 996
“lock_name - Lock name monitor element” on page 999
“lock_object_name - Lock Object Name” on page 1000
“lock_object_type - Lock object type waited on monitor element” on page 1000
“lock_release_flags - Lock release flags monitor element” on page 1002
“lock_status - Lock status monitor element” on page 1003
“node_number - Node Number” on page 1058
“table_file_id - Table file ID monitor element” on page 1372
“table_name - Table name monitor element” on page 1373
“table_schema - Table schema name monitor element” on page 1375
“tablespace_name - Table space name monitor element” on page 1383

Note: The underlying implementation for this logical data group is the snapshot monitor LOCK logical data group. If you examine the output for this logical group in the self-describing stream used for the file and pipe output options, you can see that the LOCK group is used to generate the output.

event_activity logical data group

“act_exec_time - Activity execution time monitor element” on page 699
“activate_timestamp - Activate timestamp monitor element” on page 704
“activity_id - Activity ID monitor element” on page 706
“activity_secondary_id - Activity secondary ID monitor element” on page 706
“activity_type - Activity type monitor element” on page 708
“address - IP address from which the connection was initiated” on page 710
“agent_id - Application handle (agent ID) monitor element” on page 710
“appl_id - Application ID monitor element” on page 727
“appl_name - Application name monitor element” on page 731

"arm_correlator - Application response measurement correlator monitor element" on page 738
 "coord_partition_num - Coordinator partition number monitor element" on page 815
 "db_work_action_set_id - Database work action set ID monitor element" on page 843
 "db_work_class_id - Database work class ID monitor element" on page 843
 "details_xml - Details XML monitor element" on page 853
 "intra_parallel_state - Current state of inrapartition parallelism monitor element" on page 969
 "num_remaps - Number of remaps monitor element" on page 1069
 "parent_activity_id - Parent activity ID monitor element" on page 1102
 "parent_uow_id - Parent unit of work ID monitor element" on page 1103
 "partial_record - Partial Record monitor element" on page 1103
 "pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139
 "pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142
 "query_actual_degree - Actual runtime degree of inrapartition parallelism monitor element" on page 1261
 "sc_work_action_set_id - Service class work action set ID monitor element" on page 1300
 "sc_work_class_id - Service class work class ID monitor element" on page 1300
 "section_actuals - Section actuals monitor element" on page 1302
 "service_subclass_name - Service subclass name monitor element" on page 1310
 "service_superclass_name - Service superclass name monitor element" on page 1311
 "session_auth_id - Session authorization ID monitor element" on page 1312
 "sort_overflows - Sort overflows monitor element" on page 1326
 "sqlca - SQL Communications Area (SQLCA)" on page 1332
 "time_completed - Time completed monitor element" on page 1413
 "time_created - Time created monitor element" on page 1413
 "time_started - Time started monitor element" on page 1414
 "total_sort_time - Total sort time monitor element" on page 1487
 "total_sorts - Total sorts monitor element" on page 1488
 "tpmon_acc_str - TP monitor client accounting string monitor element" on page 1502
 "tpmon_client_app - TP monitor client application name monitor element" on page 1503
 "tpmon_client_userid - TP monitor client user ID monitor element" on page 1503
 "tpmon_client_wkstn - TP monitor client workstation name monitor element" on page 1504
 "uow_id - Unit of work ID monitor element" on page 1517
 "workload_id - Workload ID monitor element" on page 1542
 "workload_occurrence_id - Workload occurrence identifier monitor element" on page 1544

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173
 "pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175
 "pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210
 "pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212
 "pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214
 "pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216
 "pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218
 "pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220
 "pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
 "pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
 "prep_time - Preparation time monitor element" on page 1253
 "query_card_estimate - Query Number of Rows Estimate" on page 1261
 "query_cost_estimate - Query cost estimate monitor element" on page 1262
 "rows_fetched - Rows fetched monitor element" on page 1289
 "rows_modified - Rows modified monitor element" on page 1290
 "rows_returned - Rows returned monitor element" on page 1294
 "system_cpu_time - System CPU time monitor element" on page 1371
 "user_cpu_time - User CPU time monitor element" on page 1527
 "wl_work_action_set_id - Workload work action set identifier monitor element" on page 1536
 "wl_work_class_id - Workload work class identifier monitor element" on page 1536
 "mon_interval_id - Monitor interval identifier monitor element" on page 1055
 "member - Database member monitor element" on page 1044
 "query_data_tag_list - Estimated query data tag list monitor element" on page 1262
 "total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491
 "total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492
 "total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496
 "total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494

event_activitymetrics logical data group

"audit_events_total - Total audit events monitor element" on page 740
 "audit_file_writes_total - Total audit files written monitor element" on page 743

"audit_subsystem_wait_time - Audit subsystem wait time monitor element" on page 745

"audit_subsystem_waits_total - Total audit subsystem waits monitor element" on page 747

"coord_stmt_exec_time - Execution time for statement by coordinator agent monitor element" on page 816

"deadlocks - Deadlocks detected monitor element" on page 849

"diaglog_write_wait_time - Diagnostic log file write wait time monitor element" on page 854

"diaglog_writes_total - Total diagnostic log file writes monitor element" on page 856

"direct_read_reqs - Direct read requests monitor element" on page 858

"direct_read_time - Direct read time monitor element" on page 860

"direct_reads - Direct reads from database monitor element" on page 862

"direct_write_reqs - Direct write requests monitor element" on page 864

"direct_write_time - Direct write time monitor element" on page 866

"direct_writes - Direct writes to database monitor element" on page 868

"fcm_message_rcv_volume - FCM message received volume monitor element" on page 893

"fcm_message_rcv_wait_time - FCM message received wait time monitor element" on page 894

"fcm_message_rcvs_total - Total FCM message receives monitor element" on page 896

"fcm_message_send_volume - FCM message send volume monitor element" on page 898

"fcm_message_send_wait_time - FCM message send wait time monitor element" on page 899

"fcm_message_sends_total - Total FCM message sends monitor element" on page 901

"fcm_rcv_volume - FCM received volume monitor element" on page 902

"fcm_rcv_wait_time - FCM received wait time monitor element" on page 904

"fcm_rcvs_total - FCM receives total monitor element" on page 905

"fcm_send_volume - FCM send volume monitor element" on page 907

"fcm_send_wait_time - FCM send wait time monitor element" on page 908

"fcm_sends_total - FCM sends total monitor element" on page 910

"fcm_tq_rcv_volume - FCM table queue received volume monitor element" on page 911

"fcm_tq_rcv_wait_time - FCM table queue received wait time monitor element" on page 913

"fcm_tq_rcvs_total - FCM table queue receives total monitor element" on page 914

"fcm_tq_send_volume - FCM table queue send volume monitor element" on page 916

"fcm_tq_send_wait_time - FCM table queue send wait time monitor element" on page 917

"fcm_tq_sends_total - FCM table queue send total monitor element" on page 919

"lock_escals - Number of lock escalations monitor element" on page 989

“lock_timeouts - Number of lock timeouts monitor element” on page 1005

“lock_wait_time - Time waited on locks monitor element” on page 1009

“lock_waits - Lock waits monitor element” on page 1014

“log_buffer_wait_time - Log buffer wait time monitor element” on page 1019

“log_disk_wait_time - Log disk wait time monitor element” on page 1021

“log_disk_waits_total - Total log disk waits monitor element” on page 1022

“num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element” on page 1063

“num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element” on page 1067

“pool_data_l_reads - Buffer pool data logical reads monitor element” on page 1139

“pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142

“pool_data_writes - Buffer pool data writes monitor element” on page 1144

“pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173

“pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175

“pool_index_writes - Buffer pool index writes monitor element” on page 1177

“pool_read_time - Total buffer pool physical read time monitor element” on page 1207

“pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element” on page 1210

“pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element” on page 1212

“pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element” on page 1214

“pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element” on page 1216

“pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218

“pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220

“pool_write_time - Total buffer pool physical write time monitor element” on page 1223

“pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232

“pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236

“pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238

“post_shrthreshold_sorts - Post shared threshold sorts monitor element” on page 1241

“post_threshold_sorts - Post threshold sorts monitor element” on page 1248

“rows_modified - Rows modified monitor element” on page 1290

“rows_read - Rows read monitor element” on page 1292

“rows_returned - Rows returned monitor element” on page 1294

“sort_overflows - Sort overflows monitor element” on page 1326

“stmt_exec_time - Statement execution time monitor element” on page 1348
“thresh_violations - Number of threshold violations monitor element” on page 1408
“total_act_time - Total activity time monitor element” on page 1415
“total_act_wait_time - Total activity wait time monitor element” on page 1417
“total_app_section_executions - Total application section executions monitor element” on page 1422
“total_cpu_time - Total CPU time monitor element” on page 1436
“total_routine_invocations - Total routine invocations monitor elements” on page 1465
“total_routine_non_sect_proc_time - Non-section processing time monitor element” on page 1467
“total_routine_non_sect_time - Non-section routine execution time monitor elements” on page 1467
“total_routine_time - Total routine time monitor element” on page 1468
“total_routine_user_code_proc_time - Total routine user code processing time monitor element” on page 1470
“total_routine_user_code_time - Total routine user code time monitor element” on page 1471
“total_section_proc_time - Total section processing time monitor element” on page 1479
“total_section_sort_proc_time - Total section sort processing time monitor element” on page 1480
“total_section_sort_time - Total section sort time monitor element” on page 1482
“total_section_sorts - Total section sorts monitor element” on page 1484
“total_section_time - Total section time monitor element” on page 1485
“total_sorts - Total sorts monitor element” on page 1488
“tq_tot_send_spills - Total number of table queue buffers overflowed monitor element” on page 1511
“wlm_queue_assignments_total - Workload manager total queue assignments monitor element” on page 1537
“wlm_queue_time_total - Workload manager total queue time monitor element” on page 1538

event_activitystmt logical data group

“activate_timestamp - Activate timestamp monitor element” on page 704
“activity_id - Activity ID monitor element” on page 706
“activity_secondary_id - Activity secondary ID monitor element” on page 706
“appl_id - Application ID monitor element” on page 727
“comp_env_desc - Compilation environment monitor element” on page 786
“creator - Application Creator” on page 829
“eff_stmt_text - Effective statement text monitor element” on page 874
“executable_id - Executable ID monitor element” on page 888
“intra_parallel_state - Current state of intrapartition parallelism monitor element” on page 969
“package_name - Package name monitor element” on page 1095
“num_routines - Number of routines monitor element” on page 1070
“package_version_id - Package version monitor element” on page 1096

"query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element" on page 1261

"routine_id - Routine ID monitor element" on page 1286

"section_env - Section environment monitor element" on page 1302

"section_number - Section number monitor element" on page 1303

"stmt_first_use_time - Statement first use timestamp monitor element" on page 1349

"stmt_invocation_id - Statement invocation identifier monitor element" on page 1350

"stmt_isolation - Statement isolation" on page 1351

"stmt_last_use_time - Statement last use timestamp monitor element" on page 1351

"stmt_lock_timeout - Statement lock timeout monitor element" on page 1352

"stmt_nest_level - Statement nesting level monitor element" on page 1352

"stmt_pkgcache_id - Statement package cache identifier monitor element" on page 1354

"stmt_query_id - Statement query identifier monitor element" on page 1355

"stmt_source_id - Statement source identifier" on page 1356

"stmt_text - SQL statement text monitor element" on page 1358

"stmt_type - Statement type monitor element" on page 1359

"stmtno - Statement number monitor element" on page 1365

"uow_id - Unit of work ID monitor element" on page 1517

event_activityvals logical data group

"activate_timestamp - Activate timestamp monitor element" on page 704

"activity_id - Activity ID monitor element" on page 706

"activity_secondary_id - Activity secondary ID monitor element" on page 706

"appl_id - Application ID monitor element" on page 727

"intra_parallel_state - Current state of intrapartition parallelism monitor element" on page 969

"query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element" on page 1261

"stmt_value_data - Value data" on page 1362

"stmt_value_index - Value index" on page 1362

"stmt_value_isnull - Value has null value monitor element" on page 1363

"stmt_value_isreopt - Variable used for statement reoptimization monitor element" on page 1363

"stmt_value_type - Value type monitor element" on page 1364

"uow_id - Unit of work ID monitor element" on page 1517

event_bufferpool logical data group

"bp_id - Buffer pool identifier monitor element" on page 755

"bp_name - Buffer pool name monitor element" on page 756

"db_name - Database name monitor element" on page 839

"db_path - Database Path" on page 840

"direct_read_reqs - Direct read requests monitor element" on page 858

"direct_read_time - Direct read time monitor element" on page 860

"direct_reads - Direct reads from database monitor element" on page 862
"direct_write_reqs - Direct write requests monitor element" on page 864
"direct_write_time - Direct write time monitor element" on page 866
"direct_writes - Direct writes to database monitor element" on page 868
"event_time - Event Time" on page 880
"evmon_activates - Number of event monitor activations" on page 882
"evmon_flushes - Number of Event Monitor Flushes" on page 889
"files_closed - Database files closed monitor element" on page 921
"partial_record - Partial Record monitor element" on page 1103
"pool_async_data_read_reqs - Buffer pool asynchronous read requests monitor element" on page 1116
"pool_async_data_reads - Buffer pool asynchronous data reads monitor element" on page 1117
"pool_async_data_writes - Buffer pool asynchronous data writes monitor element" on page 1118
"pool_async_index_reads - Buffer pool asynchronous index reads monitor element" on page 1122
"pool_async_index_writes - Buffer pool asynchronous index writes monitor element" on page 1123
"pool_async_read_time - Buffer Pool Asynchronous Read Time" on page 1123
"pool_async_write_time - Buffer pool asynchronous write time monitor element" on page 1124
"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139
"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142
"pool_data_writes - Buffer pool data writes monitor element" on page 1144
"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173
"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175
"pool_index_writes - Buffer pool index writes monitor element" on page 1177
"pool_read_time - Total buffer pool physical read time monitor element" on page 1207
"pool_write_time - Total buffer pool physical write time monitor element" on page 1223
"block_ios - Number of block I/O requests monitor element" on page 753
"pages_from_block_ios - Total number of pages read by block I/O monitor element" on page 1100
"pages_from_vectorized_ios - Total number of pages read by vectored I/O monitor element" on page 1101
"pool_async_index_read_reqs - Buffer pool asynchronous index read requests monitor element" on page 1121
"pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests monitor element" on page 1128
"pool_async_xda_reads - Buffer pool asynchronous XDA data reads monitor element" on page 1128

"pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element" on page 1129
"pool_no_victim_buffer - Buffer pool no victim buffers monitor element" on page 1180
"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238
"unread_prefetch_pages - Unread prefetch pages monitor element" on page 1514
"vectored_ios - Number of vectored I/O requests monitor element" on page 1534

event_conn logical data group

"acc_curs_blk - Accepted Block Cursor Requests" on page 696
"agent_id - Application handle (agent ID) monitor element" on page 710
"appl_id - Application ID monitor element" on page 727
"appl_priority - Application Agent Priority" on page 732
"appl_priority_type - Application Priority Type" on page 733
"appl_section_inserts - Section Inserts monitor element" on page 733
"appl_section_lookups - Section Lookups" on page 734
"authority_bitmap - User authorization level monitor element" on page 749
"authority_lvl - User authorization level monitor element" on page 750
"binds_precompiles - Binds/Precompiles Attempted" on page 752
"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
"cat_cache_overflows - Catalog Cache Overflows" on page 764
"commit_sql_stmts - Commit Statements Attempted" on page 786
"ddl_sql_stmts - Data Definition Language (DDL) SQL Statements" on page 847
"deadlocks - Deadlocks detected monitor element" on page 849
"direct_read_reqs - Direct read requests monitor element" on page 858
"direct_read_time - Direct read time monitor element" on page 860
"direct_reads - Direct reads from database monitor element" on page 862
"direct_write_reqs - Direct write requests monitor element" on page 864
"direct_write_time - Direct write time monitor element" on page 866
"direct_writes - Direct writes to database monitor element" on page 868
"disconn_time - Database Deactivation Timestamp" on page 872
"dynamic_sql_stmts - Dynamic SQL Statements Attempted" on page 873
"failed_sql_stmts - Failed Statement Operations" on page 891
"hash_join_overflows - Hash Join Overflows" on page 940
"hash_join_small_overflows - Hash Join Small Overflows" on page 940
"int_auto_rebinds - Internal Automatic Rebinds" on page 962
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"lock_timeouts - Number of lock timeouts monitor element" on page 1005
"lock_wait_time - Time waited on locks monitor element" on page 1009
"lock_waits - Lock waits monitor element" on page 1014
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- "appl_id - Application ID monitor element" on page 727*
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- "client_db_alias - Database Alias Used by Application" on page 775*
- "client_pid - Client process ID monitor element" on page 778*
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- "client_prdid - Client product and version ID monitor element" on page 780*
- "client_protocol - Client communication protocol monitor element" on page 780*
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- "corr_token - DRDA Correlation Token" on page 816*
- "execution_id - User Login ID" on page 890*
- "node_number - Node Number" on page 1058*
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- "pool_id - Memory Pool Identifier" on page 1164*
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- "pool_watermark - Memory Pool Watermark" on page 1222*
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- "stmt_value_data - Value data" on page 1362*
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- "appl_section_lookups - Section Lookups" on page 734
- "async_runstats - Total number of asynchronous RUNSTATS requests monitor element" on page 739
- "binds_precompiles - Binds/Precompiles Attempted" on page 752
- "blocks_pending_cleanup - Pending cleanup rolled-out blocks monitor element" on page 754
- "cat_cache_inserts - Catalog cache inserts monitor element" on page 761
- "cat_cache_lookups - Catalog cache lookups monitor element" on page 763
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- "catalog_node - Catalog Node Number" on page 766
- "catalog_node_name - Catalog Node Network Name" on page 766
- "commit_sql_stmts - Commit Statements Attempted" on page 786
- "connections_top - Maximum Number of Concurrent Connections" on page 802
- "db_heap_top - Maximum Database Heap Allocated" on page 838
- "ddl_sql_stmts - Data Definition Language (DDL) SQL Statements" on page 847
- "deadlocks - Deadlocks detected monitor element" on page 849
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- "direct_read_time - Direct read time monitor element" on page 860
- "direct_reads - Direct reads from database monitor element" on page 862
- "direct_write_reqs - Direct write requests monitor element" on page 864
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- "lock_escals - Number of lock escalations monitor element" on page 989
- "lock_timeouts - Number of lock timeouts monitor element" on page 1005
- "lock_wait_time - Time waited on locks monitor element" on page 1009
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“log_held_by_dirty_pages - Amount of Log Space Accounted for by Dirty Pages” on page 1023

“log_read_time - Log Read Time” on page 1024

“log_reads - Number of Log Pages Read” on page 1025

“log_to_redo_for_recovery - Amount of Log to be Redone for Recovery” on page 1025

“log_write_time - Log Write Time” on page 1026

“log_writes - Number of Log Pages Written” on page 1026

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“num_threshold_violations - Number of threshold violations monitor element” on page 1070

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“pkg_cache_inserts - Package cache inserts monitor element” on page 1109

“pkg_cache_lookups - Package cache lookups monitor element” on page 1111

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“pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142

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“pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173

“pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175

“pool_index_writes - Buffer pool index writes monitor element” on page 1177

"pool_lsn_gap_cls - Buffer pool log space cleaners triggered monitor element" on page 1179

"pool_no_victim_buffer - Buffer pool no victim buffers monitor element" on page 1180

"pool_read_time - Total buffer pool physical read time monitor element" on page 1207

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212

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"post_shrthreshold_hash_joins - Post threshold hash joins" on page 1240

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"priv_workspace_size_top - Maximum Private Workspace Size" on page 1257

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"rows_inserted - Rows inserted monitor element" on page 1290

"rows_read - Rows read monitor element" on page 1292

"rows_selected - Rows Selected" on page 1296

"rows_updated - Rows updated monitor element" on page 1297

"sec_log_used_top - Maximum Secondary Log Space Used" on page 1301

"select_sql_stmts - Select SQL Statements Executed" on page 1304

"server_platform - Server Operating System" on page 1307

"shr_workspace_num_overflows - Shared Workspace Overflows" on page 1313

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"sort_overflows - Sort overflows monitor element" on page 1326

"static_sql_stmts - Static SQL Statements Attempted" on page 1344

"stats_cache_size - Size of statistics cache monitor element" on page 1345

"stats_fabricate_time - Total time spent on statistics fabrication activities monitor element" on page 1345

"stats_fabrications - Total number of statistics fabrications monitor elements" on page 1346

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 “total_hash_loops - Total Hash Loops” on page 1446
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 “total_sort_time - Total sort time monitor element” on page 1487
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 “uid_sql_stmts - Update/Insert/Delete SQL Statements Executed” on page 1514
 “unread_prefetch_pages - Unread prefetch pages monitor element” on page 1514
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 “xquery_stmts - XQuery Statements Attempted” on page 1548
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 “num_log_part_page_io - Number of Partial Log Page Writes” on page 1065
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 “pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element” on page 1129
 “pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218
 “pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220
 “pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232
 “pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236
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 LOG_FILE_NUM_CURR
 LOG_FILE_NUM_FIRST
 LOG_FILE_NUM_LAST
 NUM_LOG_BUFF_FULL
 NUM_LOG_DATA_IN_BUFF

event_dbheader logical data group

“conn_time - Time of database connection monitor element” on page 801
 “db_name - Database name monitor element” on page 839
 “db_path - Database Path” on page 840

event_dbmemuse logical data group

“node_number - Node Number” on page 1058
“pool_config_size - Configured Size of Memory Pool” on page 1130
“pool_cur_size - Current Size of Memory Pool” on page 1131
“pool_id - Memory Pool Identifier” on page 1164
“pool_watermark - Memory Pool Watermark” on page 1222
“evmon_activates - Number of event monitor activations” on page 882
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“pool_secondary_id - Memory Pool Secondary Identifier” on page 1209
POOL_MAX_SIZE

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“deadlock_node - Partition Number Where Deadlock Occurred” on page 848
“dl_conns - Connections involved in deadlock monitor element” on page 873
“evmon_activates - Number of event monitor activations” on page 882
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“rolled_back_appl_id - Rolled Back Application” on page 1285
“rolled_back_participant_no - Rolled back application participant monitor element” on page 1285
“rolled_back_sequence_no - Rolled Back Sequence Number” on page 1285
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event_detailed_dlconn logical data group

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“appl_id - Application ID monitor element” on page 727
“appl_id_holding_lk - Application ID Holding Lock” on page 729
“blocking_cursor - Blocking Cursor” on page 754
“consistency_token - Package consistency token monitor element” on page 803
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“deadlock_node - Partition Number Where Deadlock Occurred” on page 848
“evmon_activates - Number of event monitor activations” on page 882
“lock_escalation - Lock escalation monitor element” on page 988
“lock_mode - Lock mode monitor element” on page 996
“lock_mode_requested - Lock mode requested monitor element” on page 998
“lock_node - Lock Node” on page 999
“lock_object_name - Lock Object Name” on page 1000
“lock_object_type - Lock object type waited on monitor element” on page 1000
“lock_wait_start_time - Lock wait start timestamp monitor element” on page 1008
“locks_held - Locks held monitor element” on page 1017
“locks_in_list - Number of Locks Reported” on page 1018
“package_name - Package name monitor element” on page 1095

"package_version_id - Package version monitor element" on page 1096
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 "participant_no_holding_lk - Participant Holding a Lock on the Object Required by Application" on page 1104
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 "sequence_no - Sequence number monitor element" on page 1306
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 "stmt_operation/operation - Statement operation monitor element" on page 1353
 "stmt_text - SQL statement text monitor element" on page 1358
 "stmt_type - Statement type monitor element" on page 1359
 "table_name - Table name monitor element" on page 1373
 "table_schema - Table schema name monitor element" on page 1375
 "tablespace_name - Table space name monitor element" on page 1383
 "lock_attributes - Lock attributes monitor element" on page 985
 "lock_count - Lock count monitor element" on page 986
 "lock_current_mode - Original lock mode before conversion monitor element" on page 987
 "lock_hold_count - Lock hold count monitor element" on page 995
 "lock_name - Lock name monitor element" on page 999
 "lock_release_flags - Lock release flags monitor element" on page 1002
 "tpmon_acc_str - TP monitor client accounting string monitor element" on page 1502
 "tpmon_client_app - TP monitor client application name monitor element" on page 1503
 "tpmon_client_userid - TP monitor client user ID monitor element" on page 1503
 "tpmon_client_wkstn - TP monitor client workstation name monitor element" on page 1504

event_dlconn logical data group

"agent_id - Application handle (agent ID) monitor element" on page 710
 "appl_id - Application ID monitor element" on page 727
 "appl_id_holding_lk - Application ID Holding Lock" on page 729
 "data_partition_id - Data partition identifier monitor element" on page 833
 "deadlock_id - Deadlock Event Identifier" on page 848
 "deadlock_node - Partition Number Where Deadlock Occurred" on page 848
 "evmon_activates - Number of event monitor activations" on page 882
 "lock_attributes - Lock attributes monitor element" on page 985
 "lock_count - Lock count monitor element" on page 986
 "lock_current_mode - Original lock mode before conversion monitor element" on page 987
 "lock_escalation - Lock escalation monitor element" on page 988
 "lock_hold_count - Lock hold count monitor element" on page 995
 "lock_mode - Lock mode monitor element" on page 996
 "lock_mode_requested - Lock mode requested monitor element" on page 998

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"participant_no - Participant within Deadlock" on page 1104
"participant_no_holding_lk - Participant Holding a Lock on the Object Required by Application" on page 1104
"sequence_no - Sequence number monitor element" on page 1306
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"tpmon_acc_str - TP monitor client accounting string monitor element" on page 1502
"tpmon_client_app - TP monitor client application name monitor element" on page 1503
"tpmon_client_userid - TP monitor client user ID monitor element" on page 1503
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event_histogrambin logical data group

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"histogram_type - Histogram type monitor element" on page 941
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"statistics_timestamp - Statistics timestamp monitor element" on page 1344
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"work_action_set_id - Work action set ID monitor element" on page 1540
"work_class_id - Work class ID monitor element" on page 1541
"workload_id - Workload ID monitor element" on page 1542
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"byte_order - Byte Order of Event Data" on page 759
"codepage_id - ID of Code Page Used by Application" on page 783
"event_monitor_name - Event Monitor Name" on page 880
"num_nodes_in_db2_instance - Number of Nodes in Partition" on page 1068
"server_instance_name - Server Instance Name" on page 1307
"server_prdid - Server Product/Version ID" on page 1308
"territory_code - Database Territory Code" on page 1407

“version - Version of Monitor Data” on page 1535

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“count - Number of Event Monitor Overflows” on page 817

“first_overflow_time - Time of First Event Overflow” on page 922

“last_overflow_time - Time of Last Event Overflow” on page 978

“node_number - Node Number” on page 1058

event_qstats logical data group

“last_wlm_reset - Time of last reset monitor element” on page 980

“queue_assignments_total - Queue assignments total monitor element” on page 1263

“queue_size_top - Queue size top monitor element” on page 1264

“queue_time_total - Queue time total monitor element” on page 1264

“service_subclass_name - Service subclass name monitor element” on page 1310

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“statistics_timestamp - Statistics timestamp monitor element” on page 1344

“threshold_domain - Threshold domain monitor element” on page 1410

“threshold_name - Threshold name monitor element” on page 1411

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“thresholdid - Threshold ID monitor element” on page 1412

“work_action_set_name - Work action set name monitor element” on page 1540

“work_class_name - Work class name monitor element” on page 1541

“mon_interval_id - Monitor interval identifier monitor element” on page 1055

“member - Database member monitor element” on page 1044

event_scmetrics logical data group

“partition_key - Partitioning key monitor element” on page 1105

“partition_number - Partition Number” on page 1106

“service_class_id - Service class ID monitor element” on page 1309

“service_subclass_name - Service subclass name monitor element” on page 1310

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“statistics_timestamp - Statistics timestamp monitor element” on page 1344

“wlm_queue_time_total - Workload manager total queue time monitor element” on page 1538

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“fcm_message_rcv_wait_time - FCM message received wait time monitor element” on page 894

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“fcm_message_send_wait_time - FCM message send wait time monitor element” on page 899

“agent_wait_time - Agent wait time monitor element” on page 715

"agent_waits_total - Total agent waits monitor element" on page 716

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pkgcache_metrics logical data group

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"direct_read_reqs - Direct read requests monitor element" on page 858

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“pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element” on page 1168

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txncompletion logical data group

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"member - Database member monitor element" on page 1044

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"txn_completion_status - Transaction completion status" on page 1513

uow logical data group

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"application_handle - Application handle monitor element" on page 736

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 service_class_id - Service class ID
 service_subclass_name - Service subclass name
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 "session_auth_id - Session authorization ID monitor element" on page 1312
 start_time - Event start time
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 "system_auth_id - System authorization identifier monitor element" on page 1371
 UOW_CLIENT_PLATFORM
 UOW_CLIENT_PROTOCOL
 uow_id - Unit of work ID
 "uow_log_space_used - Unit of work log space used monitor element" on page 1519
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uow_executable_list logical data group

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"appl_id - Application ID monitor element" on page 727
"executable_id - Executable ID monitor element" on page 888
"lock_wait_time - Time waited on locks monitor element" on page 1009
"lock_waits - Lock waits monitor element" on page 1014
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"member - Database member monitor element" on page 1044
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"rows_read - Rows read monitor element" on page 1292
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"total_act_time - Total activity time monitor element" on page 1415
"total_act_wait_time - Total activity wait time monitor element" on page 1417
"total_cpu_time - Total CPU time monitor element" on page 1436
"total_sorts - Total sorts monitor element" on page 1488
uow_id - Unit of work ID

uow_metrics logical data group

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"direct_write_reqs - Direct write requests monitor element" on page 864
"log_buffer_wait_time - Log buffer wait time monitor element" on page 1019
"num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element" on page 1063

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"ipc_send_wait_time - Interprocess communication send wait time monitor element" on page 974
"ipc_sends_total - Interprocess communication send total monitor element" on page 975
"tcpip_send_wait_time - TCP/IP send wait time monitor element" on page 1405
"tcpip_sends_total - TCP/IP sends total monitor element" on page 1406
"pool_write_time - Total buffer pool physical write time monitor element" on page 1223
"pool_read_time - Total buffer pool physical read time monitor element" on page 1207
"audit_file_write_wait_time - Audit file write wait time monitor element" on page 741
"audit_file_writes_total - Total audit files written monitor element" on page 743
"audit_subsystem_wait_time - Audit subsystem wait time monitor element" on page 745
"audit_subsystem_waits_total - Total audit subsystem waits monitor element" on page 747
"diaglog_write_wait_time - Diagnostic log file write wait time monitor element" on page 854
"diaglog_writes_total - Total diagnostic log file writes monitor element" on page 856
"fcm_send_wait_time - FCM send wait time monitor element" on page 908
"fcm_rcv_wait_time - FCM received wait time monitor element" on page 904
"total_wait_time - Total wait time monitor element" on page 1501
"rqsts_completed_total - Total requests completed monitor element" on page 1298
"total_rqst_time - Total request time monitor element" on page 1474
"app_rqsts_completed_total - Total application requests completed monitor element" on page 726
"total_app_rqst_time - Total application request time monitor element" on page 1420
"total_section_sort_proc_time - Total section sort processing time monitor element" on page 1480
"total_section_sorts - Total section sorts monitor element" on page 1484
"total_section_sort_time - Total section sort time monitor element" on page 1482
"rows_read - Rows read monitor element" on page 1292
"rows_modified - Rows modified monitor element" on page 1290

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214

"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232

"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218

"total_cpu_time - Total CPU time monitor element" on page 1436

"act_completed_total - Total completed activities monitor element" on page 698

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212

"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236

"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216

"pool_data_writes - Buffer pool data writes monitor element" on page 1144

"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238

"pool_index_writes - Buffer pool index writes monitor element" on page 1177

"direct_reads - Direct reads from database monitor element" on page 862

"direct_writes - Direct writes to database monitor element" on page 868

"rows_returned - Rows returned monitor element" on page 1294

"deadlocks - Deadlocks detected monitor element" on page 849

"lock_timeouts - Number of lock timeouts monitor element" on page 1005

"lock_escals - Number of lock escalations monitor element" on page 989

"fcm_sends_total - FCM sends total monitor element" on page 910

"fcm_recvs_total - FCM receives total monitor element" on page 905

"fcm_send_volume - FCM send volume monitor element" on page 907

"fcm_rcv_volume - FCM received volume monitor element" on page 902

"fcm_message_sends_total - Total FCM message sends monitor element" on page 901

"fcm_message_recvs_total - Total FCM message receives monitor element" on page 896

"fcm_message_send_volume - FCM message send volume monitor element" on page 898

"fcm_message_rcv_volume - FCM message received volume monitor element" on page 893

"fcm_tq_sends_total - FCM table queue send total monitor element" on page 919

"fcm_tq_recvs_total - FCM table queue receives total monitor element" on page 914

"fcm_tq_send_volume - FCM table queue send volume monitor element" on page 916

"fcm_tq_rcv_volume - FCM table queue received volume monitor element" on page 911

"tq_tot_send_spills - Total number of table queue buffers overflowed monitor element" on page 1511

"tcpip_send_volume - TCP/IP send volume monitor element" on page 1404

"tcpip_rcv_volume - TCP/IP received volume monitor element" on page 1401

"ipc_send_volume - Interprocess communication send volume monitor element" on page 973

"ipc_rcv_volume - Interprocess communication received volume monitor element" on page 970

"post_threshold_sorts - Post threshold sorts monitor element" on page 1248

"post_shrthreshold_sorts - Post shared threshold sorts monitor element" on page 1241

"sort_overflows - Sort overflows monitor element" on page 1326

"audit_events_total - Total audit events monitor element" on page 740

"act_rejected_total - Total rejected activities monitor element" on page 700

"act_aborted_total - Total aborted activities monitor element" on page 696

"total_sorts - Total sorts monitor element" on page 1488

"total_routine_time - Total routine time monitor element" on page 1468

"total_compile_proc_time - Total compile processing time monitor element" on page 1428

"total_compilations - Total compilations monitor element" on page 1427

"total_compile_time - Total compile time monitor element" on page 1429

"total_implicit_compile_proc_time - Total implicit compile processing time monitor element" on page 1448

"total_implicit_compilations - Total implicit complications monitor element" on page 1446

"total_implicit_compile_time - Total implicit compile time monitor element" on page 1449

"total_runstats_proc_time - Total runtime statistics processing time monitor element" on page 1476

"total_runstats - Total runtime statistics monitor element" on page 1475

"total_runstats_time - Total runtime statistics time monitor element" on page 1477

"total_reorg_proc_time - Total reorganization processing time monitor element" on page 1460

"total_reorgs - Total reorganizations monitor element" on page 1462

"total_reorg_time - Total reorganization time monitor element" on page 1461

"total_load_proc_time - Total load processing time monitor element" on page 1450

"total_loads - Total loads monitor element" on page 1452

"total_load_time - Total load time monitor element" on page 1451

"total_section_proc_time - Total section processing time monitor element" on page 1479

"total_app_section_executions - Total application section executions monitor element" on page 1422

"total_section_time - Total section time monitor element" on page 1485

"total_commit_proc_time - Total commits processing time monitor element" on page 1424

"total_app_commits - Total application commits monitor elements" on page 1418

"total_commit_time - Total commit time monitor element" on page 1426

"total_rollback_proc_time - Total rollback processing time monitor element" on page 1463

"total_app_rollbacks - Total application rollbacks monitor element" on page 1419

"total_rollback_time - Total rollback time monitor element" on page 1464

"total_routine_user_code_proc_time - Total routine user code processing time monitor element" on page 1470

"total_routine_user_code_time - Total routine user code time monitor element" on page 1471

"thresh_violations - Number of threshold violations monitor element" on page 1408

"num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element" on page 1067

"total_routine_invocations - Total routine invocations monitor elements" on page 1465

"int_commits - Internal commits monitor element" on page 962

"int_rollbacks - Internal rollbacks monitor element" on page 965

"cat_cache_inserts - Catalog cache inserts monitor element" on page 761

"cat_cache_lookups - Catalog cache lookups monitor element" on page 763

"pkg_cache_inserts - Package cache inserts monitor element" on page 1109

"pkg_cache_lookups - Package cache lookups monitor element" on page 1111

"act_rqsts_total - Total activity requests monitor elements" on page 702

"total_act_wait_time - Total activity wait time monitor element" on page 1417

"total_act_time - Total activity time monitor element" on page 1415

"lock_wait_time_global - Lock wait time global monitor element" on page 1011

"lock_waits_global - Lock waits global monitor element" on page 1016

"reclaim_wait_time - Reclaim wait time monitor element" on page 1269

"spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element" on page 1339

"lock_timeouts_global - Lock timeouts global monitor element" on page 1006

"lock_escal_maxlocks - Number of maxlocks lock escalations monitor element" on page 994

"lock_escal_locklist - Number of locklist lock escalations monitor element" on page 993

"lock_escal_global - Number of global lock escalations monitor element" on page 991

"cf_wait_time - cluster caching facility wait time monitor element" on page 767

"cf_waits - Number of cluster caching facility waits monitor element" on page 767

"pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element" on page 1134

"pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element" on page 1136

"pool_data_lbp_pages_found - Local buffer pool found data pages monitor element" on page 1138

"pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element" on page 1133

"pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element" on page 1168

"pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements" on page 1169

"pool_index_lbp_pages_found - Local buffer pool index pages found monitor element" on page 1171

"pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element" on page 1166

"pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element" on page 1228

"pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element" on page 1230

"pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element" on page 1234

"pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element" on page 1226

"evmon_wait_time - Event monitor wait time monitor element" on page 883

"evmon_waits_total - Event monitor total waits monitor element" on page 885

"total_extended_latch_wait_time - Total extended latch wait time monitor element" on page 1441

"total_extended_latch_waits - Total extended latch waits monitor element" on page 1443

"total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element" on page 1490

"total_stats_fabrications - Total statistics fabrications monitor elements" on page 1492

"total_stats_fabrication_time - Total statistics fabrication time monitor element" on page 1491

"total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element" on page 1495

"total_sync_runstats - Total synchronous RUNSTATS activities monitor element" on page 1496

"total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements" on page 1494

"total_disp_run_queue_time - Total dispatcher run queue time monitor element" on page 1439

"pool_queued_async_data_reqs - Data prefetch requests monitor element" on page 1183

"pool_queued_async_index_reqs - Index prefetch requests monitor element" on page 1187

"pool_queued_async_xda_reqs - XDA prefetch requests monitor element" on page 1205

"pool_queued_async_data_pages - Data pages prefetch requests monitor element" on page 1181

"pool_queued_async_index_pages - Index pages prefetch requests monitor element" on page 1185

"pool_queued_async_xda_pages - XDA pages prefetch requests monitor element" on page 1203

"app_act_completed_total - Total successful external coordinator activities monitor element" on page 723

"app_act_aborted_total - Total failed external coordinator activities monitor element" on page 722

"app_act_rejected_total - Total rejected external coordinator activities monitor element" on page 724

uow_package_list logical data group

"partition_key - Partitioning key monitor element" on page 1105

"appl_id - Application ID monitor element" on page 727

"invocation_id - Invocation ID monitor element" on page 969

"nesting_level - Nesting level monitor element" on page 1055

"package_elapsed_time - Package elapsed time monitor element" on page 1094

"package_id - Package identifier monitor element" on page 1094

"routine_id - Routine ID monitor element" on page 1286

"uow_id - Unit of work ID monitor element" on page 1517

"member - Database member monitor element" on page 1044

utillocation logical data group

"event_id - Event ID monitor element" on page 879

"event_timestamp - Event timestamp monitor element" on page 880

"member - Database member monitor element" on page 1044

"event_type - Event Type monitor element" on page 881

"utility_invocation_id - Utility invocation ID" on page 1528

"utility_type - Utility Type" on page 1533

"device_type - Device type" on page 854

"location_type - Location type" on page 984

"location - Location" on page 984

utilphase logical data group

"event_id - Event ID monitor element" on page 879

"event_timestamp - Event timestamp monitor element" on page 880

"member - Database member monitor element" on page 1044

"event_type - Event Type monitor element" on page 881

"utility_invocation_id - Utility invocation ID" on page 1528

"utility_type - Utility Type" on page 1533

"utility_phase_type - Utility phase type" on page 1531

"phase_start_event_id - Phase start event ID" on page 1107

"phase_start_event_timestamp - Phase start event timestamp" on page 1108

“objtype - Object type monitor element” on page 1085
“object_schema - Object schema monitor element” on page 1081
“object_name - Object name monitor element” on page 1080
“utility_phase_detail - Utility phase detail” on page 1531

utilstart logical data group

“event_id - Event ID monitor element” on page 879
“event_timestamp - Event timestamp monitor element” on page 880
“member - Database member monitor element” on page 1044
“event_type - Event Type monitor element” on page 881
“utility_invocation_id - Utility invocation ID” on page 1528
“utility_type - Utility Type” on page 1533
“utility_operation_type - Utility operation type” on page 1529
“utility_invoker_type - Utility Invoker Type” on page 1529
“utility_priority - Utility Priority” on page 1531
“utility_start_type - Utility start type” on page 1532
“objtype - Object type monitor element” on page 1085
“object_schema - Object schema monitor element” on page 1081
“object_name - Object name monitor element” on page 1080
“num_tbsps - Number of table spaces monitor element” on page 1070
“tbsp_names - Table space names” on page 1400
“utility_detail - Utility detail” on page 1528

utilstop logical data group

“event_id - Event ID monitor element” on page 879
“event_timestamp - Event timestamp monitor element” on page 880
“member - Database member monitor element” on page 1044
“event_type - Event Type monitor element” on page 881
“utility_invocation_id - Utility invocation ID” on page 1528
“utility_type - Utility Type” on page 1533
“utility_stop_type - Utility stop type” on page 1533
“start_event_id - Start event ID” on page 1343
“start_event_timestamp - Start event timestamp” on page 1343
“sqlca - SQL Communications Area (SQLCA)” on page 1332

Event type mappings to logical data groups

For file and pipe event monitors, event monitor output consists of an ordered series of logical data groupings. Regardless of the event monitor type, the output records always contain the same starting logical data groups.

These frame the logical data groups whose presence varies depending on the event types recorded by the event monitor.

For file and pipe event monitors, event records may be generated for any connection and may therefore appear in mixed order in the stream. This means that you may get a transaction event for Connection 1, immediately followed by a connection event for Connection 2. However, records belonging to a single connection or a single event will appear in their logical order. For example, a

statement record (end of statement) always precedes a transaction record (end of UOW), if any. Similarly, a deadlock event record always precedes the deadlocked connection event records for each connection involved in the deadlock. The **application id** or **application handle (agent_id)** can be used to match records with a connection.

Connection header events are normally written for each connection to the database. For deadlocks with details event monitors, they are only written when the deadlock occurs. In this case, connection header events are only written for participants in the deadlock and not for all connections to the database.

The logical data groupings are ordered according to four different levels: Monitor, Prolog, Contents, and Epilog. Following are detailed descriptions for each level, including the corresponding event types and logical data groups.

Monitor

Information at the Monitor level is generated for all event monitors. It consists of event monitor metadata.

Table 146. Event Monitor Data Stream: Monitor Section

Event type	Logical data group	Available information
Monitor Level	event_log_stream_header	Identifies the version level and byte order of the event monitor. Applications can use this header to determine whether they can handle the evmon output stream.

Prolog

The Prolog information is generated when the event monitor is activated.

Table 147. Event Monitor Data Stream: Prolog Section

Event type	Logical data group	Available information
Log Header	event_log_header	Characteristics of the trace, for example server type and memory layout.
Database Header	event_db_header	Database name, path and activation time.
Event Monitor Start	event_start	Time when the monitor was started or restarted.
Connection Header	event_connheader	One for each current connection, includes connection time and application name. Event connection headers are only generated for connection, statement, transaction, and deadlock event monitors. Deadlocks with details event monitors produce connection headers only when a deadlock occurs.

Contents

Information specific to the event monitor's specified event types is presented in the Contents section.

Table 148. Event Monitor Data Stream: Contents Section

Event type	Logical data group	Available information
Statement Event	event_stmt	Statement level data, including text for dynamic statements. Statement event monitors do not log fetches.
Subsection Event	event_subsection	Subsection level data.
Transaction Event ¹	event_xact	Transaction level data.
Connection Event	event_conn	Connection level data.
Deadlock Event	event_deadlock	Deadlock level data.
Deadlocked Connection Event	event_dlconn	One for each connection involved in the deadlock, includes applications involved and locks in contention.
Deadlocked Connection Event with Details	event_detailed_dlconn, lock	One for each connection involved in the deadlock, includes applications involved, locks in contention, current statement information, and other locks held by the application contention.
Overflow	event_overflow	Number of records lost - generated when writer cannot keep up with a (non-blocked) event monitor.
Deadlocks with details history ²	event_stmt_history	List of statements executed in any unit of work that was involved in a deadlock.
Deadlocks with details history values ²	event_data_value	Parameter markers for a statement in the event_stmt_history list.
Activities	event_activity	List of activities that completed executing on the system or were captured before completion.
	event_activitystmt	Information about the statement the activity was executing if the activity type was a statement.
	event_activityvals	The data values used as input variables for each activity that is an SQL statement. These data values do not include LOB data, long data, or structured type data.
Statistics	event_scstats	Statistics computed from the activities that executed within each service class, work class, or workload in the system, as well as statistics computed from the threshold queues.
	event_wcstats	
	event_wlstats	
	event_qstats	
	event_histogrambin	

Table 148. Event Monitor Data Stream: Contents Section (continued)

Event type	Logical data group	Available information
Threshold violations	event_thresholdviolations	Information identifying the threshold violated and the time of violation.

- ¹ This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR UNIT OF WORK statement to monitor transaction events.
- ² This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Epilog

The Epilog information is generated during database deactivation (last application finished disconnecting):

Table 149. Event Monitor Data Stream: Epilog Section

Event type	Logical data group	Available information
Database Event	event_db	Database manager level data.
Buffer Pool Event	event_bufferpool	Buffer pool level data.
Table Space Event	event_tablespace	Table space level data.
Table Event	event_table	Table level data.

Logical data groups affected by COLLECT ACTIVITY DATA settings

The following table shows what logical data groups are collected when different COLLECT ACTIVITY DATA options are specified all types of WLM objects, including Service Subclass, Workload, Work Class (via a Work Action), and Threshold.

Table 150. COLLECT ACTIVITY DATA settings

Setting for COLLECT ACTIVITY DATA	Logical data groups collected
NONE	none
WITHOUT DETAILS	event_activity event_activitymetrics
WITH DETAILS	event_activity event_activitymetrics event_activitystmt
WITH DETAILS AND VALUES	event_activity event_activitymetrics event_activitystmt event_activityvals

Snapshot monitor interface mappings to logical data groups

Each individual API request type, CLP command, and SQL administrative view only captures monitor data from a subset of all the logical data groups.

The following table lists several ways of accessing snapshot monitor data. All snapshot monitor data is stored in monitor elements, which are categorized by logical data groups.

Each individual API request type, CLP command, and SQL administrative view listed in this table returns monitor elements from the logical data groups listed in the right-most column.

Note:

1. There are a number of API request types and CLP commands for which there are no corresponding SQL administrative view. For other API request types and CLP commands, individual SQL administrative views capture subsets of the associated logical data groups.
2. Some monitor elements are returned only if the associated monitor switch is set ON. See the individual monitor elements to determine if a required element is under switch control.

Table 151. Snapshot Monitor Interface Mappings to Logical Data Groups

db2GetSnapshot API request type	CLP command	SQL administrative view	Logical data groups
SQLMA_APPLINFO_ALL	list applications [show detail]	APPLICATIONS	appl_info
SQLMA_DBASE_APPLINFO	list applications for database <i>dbname</i> [show detail]	APPLICATIONS	appl_info
SQLMA_DCS_APPLINFO_ALL	list dcs applications [show detail]		dcs_appl_info
SQLMA_DB2	get snapshot for dbm	SNAPDBM	db2
		SNAPFCM	fcm
		SNAPFCMPART	fcm_node
		SNAPUTIL	utility_info
		SNAPUTIL_PROGRESS	progress, progress_info
		SNAPDBM_MEMORY_POOL	memory_pool
	get dbm monitor switches	SNAPSWITCHES	switch_list
SQLMA_DBASE	get snapshot for database on <i>dbname</i>	SNAPDB	dbase
		SNAPDETAILLOG	detail_log
		ADMIN_GET_STORAGE_PATHS	db_storage_group
			rollforward
			db_sto_path_info
		SNAPTbsp	tablespace
	SNAPDB_MEMORY_POOL	memory_pool	

Table 151. Snapshot Monitor Interface Mappings to Logical Data Groups (continued)

db2GetSnapshot API request type	CLP command	SQL administrative view	Logical data groups
SQLMA_DBASE_ALL	get snapshot for all databases	SNAPDB	dbase
		ADMIN_GET_STORAGE_PATHS	db_storage_group
			rollforward
			db_sto_path_info
		SNAPTbsp	tablespace
		SNAPDB_MEMORY_POOL	memory_pool
	list active databases		dbase
SQLMA_DCS_DBASE	get snapshot for dcs database on <i>dbname</i>		dcs_dbase, stmt_transmissions
SQLMA_DCS_DBASE_ALL	get snapshot for all dcs databases		dcs_dbase, stmt_transmissions
SQLMA_DBASE_REMOTE	get snapshot for remote database on <i>dbname</i>		dbase_remote
SQLMA_DBASE_REMOTE_ALL	get snapshot for all remote databases		dbase_remote
SQLMA_APPL	get snapshot for application applid <i>appl-id</i>	SNAPAPPL	appl
		SNAPAGENT	agent
		SNAPAPPL_INFO	appl_info
		SNAPLOCKWAIT	lock_wait
		SNAPSTMT	stmt
		SNAPSUBSECTION	subsection
		SNAPAGENT_MEMORY_POOL	memory_pool
SQLMA_AGENT_ID	get snapshot for application agentid <i>appl-handle</i>	SNAPAGENT	appl
		SNAPAGENT	agent
		SNAPAPPL_INFO	appl_info
		SNAPLOCKWAIT	lock_wait
		SNAPSTMT	stmt
		SNAPSUBSECTION	subsection
		SNAPAGENT_MEMORY_POOL	memory pool
SQLMA_DBASE_APPLS	get snapshot for applications on <i>dbname</i>	SNAPAPPL	appl
		SNAPAGENT	agent
		SNAPAPPL_INFO	appl_info
		SNAPLOCKWAIT	lock_wait
		SNAPSTMT	stmt
		SNAPSUBSECTION	subsection
		SNAPAGENT_MEMORY_POOL	memory_pool

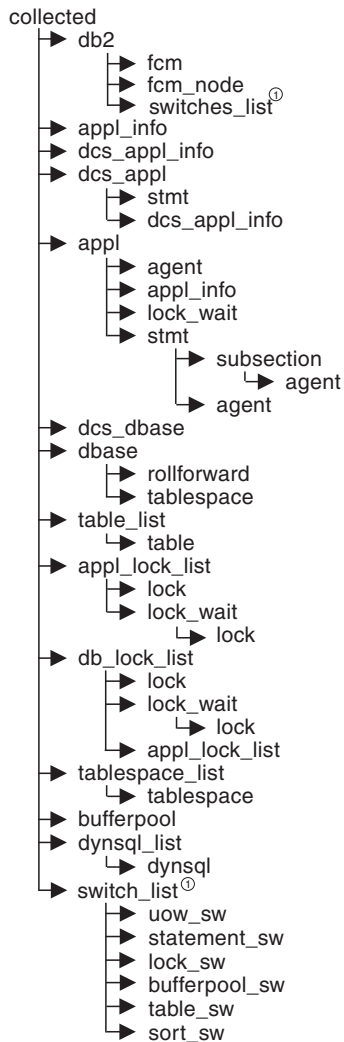
Table 151. Snapshot Monitor Interface Mappings to Logical Data Groups (continued)

db2GetSnapshot API request type	CLP command	SQL administrative view	Logical data groups	
SQLMA_APPL_ALL	get snapshot for all applications	SNAPAPPL	appl	
		SNAPAPPL_INFO	appl_info	
		SNAPLOCKWAIT	lock_wait	
		SNAPSTATEMENT	stmt	
		SNAPAGENT	agent	
		SNAPSUBSECTION	subsection	
SQLMA_DCS_APPL	get snapshot for dcs application applid <i>appl-id</i>	SNAPAGENT_MEMORY_POOL	memory_pool	
		dc_s_appl, dcs_stmt, dcs_appl_info, stmt_transmissions		
		SQLMA_DCS_APPL_ALL	get snapshot for all dcs applications	dc_s_appl, dcs_stmt, dcs_appl_info, stmt_transmissions
		SQLMA_DCS_APPL_HANDLE	get snapshot for dcs application agentid <i>appl-handle</i>	dc_s_appl, dcs_stmt, dcs_appl_info, stmt_transmissions
		SQLMA_DCS_DBASE_APPLS	get snapshot for dcs applications on <i>dbname</i>	dc_s_appl, dcs_stmt, dcs_appl_info, stmt_transmissions
		SQLMA_DBASE_APPLS_REMOTE	get snapshot for remote applications on <i>dbname</i>	dbase_appl
		SQLMA_APPL_REMOTE_ALL	get snapshot for all remote applications	dbase_appl
SQLMA_DBASE_TABLES	get snapshot for tables on <i>dbname</i>	SNAPTAB	table	
		SNAPTAB_REORG	table_reorg	
		table_list		
SQLMA_APPL_LOCKS	get snapshot for locks for application applid <i>appl-id</i>	SNAPLOCK, SNAPAPPL, SNAPLOCKWAIT	appl_lock_list, lock_wait, lock	
SQLMA_APPL_LOCKS_AGENT_ID	get snapshot for locks for application agentid <i>appl-handle</i>	SNAPLOCK, SNAPAPPL, SNAPLOCKWAIT	appl_lock_list, lock_wait, lock	
SQLMA_DBASE_LOCKS	get snapshot for locks on <i>dbname</i>	SNAPLOCK	appl_lock_list, lock	
		SNAPLOCK, SNAPLOCKWAIT	db_lock_list, lock_wait	

Table 151. Snapshot Monitor Interface Mappings to Logical Data Groups (continued)

db2GetSnapshot API request type	CLP command	SQL administrative view	Logical data groups
SQLMA_DBASE_TABLESPACES	get snapshot for tablespaces on <i>dbname</i>	SNAPTbsp	tablespace
		SNAPTbspPART	tablespace, tablespace_nodeinfo
		SNAPTbsp_QUIESCER	tablespace_quiescer, tablespace_nodeinfo
		SNAPCONTAINER	tablespace_container, tablespace_nodeinfo
		SNAPTbsp_RANGE	tablespace_ranges, tablespace_nodeinfo
			tablespace_list, tablespace_nodeinfo
SQLMA_BUFFERPOOLS_ALL	get snapshot for all bufferpools	SNAPBP	bufferpool
SQLMA_DBASE_BUFFERPOOLS	get snapshot for bufferpools on <i>dbname</i>	SNAPBP	bufferpool
SQLMA_DYNAMIC_SQL	get snapshot for dynamic sql on <i>dbname</i>	SNAPDYN_SQL	dynsql
			dynsql_list

The following figure shows the order that logical data groupings may appear in a snapshot data stream.



^①Similar structures (lower level_sw items are returned by db2, but are not shown in the figure)

Figure 18. Data Stream Hierarchy

Note: Times may be returned as part of any logical data grouping.

Snapshot monitor logical data groups and monitor elements

The following sections list the logical data groupings and monitor elements that can be returned by snapshot monitoring.

- “agent logical data group” on page 664
- “appl logical data group” on page 664
- “appl_id_info logical data group” on page 667
- “appl_info logical data group” on page 668
- “appl_lock_list logical data group” on page 668
- “appl_remote logical data group” on page 669
- “bufferpool logical data group” on page 669
- “bufferpool_nodeinfo logical data group” on page 671
- “collected logical data group” on page 671
- “db2 logical data group” on page 671

- “db_lock_list logical data group” on page 672
- “dbase logical data group” on page 672
- “dbase_remote logical data group” on page 677
- “db_storage_group logical data group” on page 677
- “dcs_appl logical data group” on page 678
- “dcs_appl_info logical data group” on page 680
- “dcs_dbase logical data group” on page 680
- “dcs_stmt logical data group” on page 682
- “detail_log logical data group” on page 682
- “dynsql logical data group” on page 683
- “dynsql_list logical data group” on page 684
- “fcm logical data group” on page 684
- “fcm_node logical data group” on page 684
- “hadr logical data group” on page 684
- “lock logical data group” on page 685
- “lock_wait logical data group” on page 685
- “memory_pool logical data group” on page 686
- “progress logical data group” on page 686
- “progress_list logical data group” on page 686
- “rollforward logical data group” on page 686
- “stmt logical data group” on page 686
- “stmt_transmissions logical data group” on page 687
- “subsection logical data group” on page 689
- “table logical data group” on page 689
- “table_list logical data group” on page 690
- “table_reorg logical data group” on page 690
- “tablespace logical data group” on page 691
- “tablespace_container logical data group” on page 692
- “tablespace_list logical data group” on page 692
- “tablespace_nodeinfo logical data group” on page 693
- “tablespace_quiescer logical data group” on page 694
- “tablespace_range logical data group” on page 694
- “utility_info logical data group” on page 694

agent logical data group

“agent_pid - Engine dispatchable unit (EDU) identifier monitor element” on page 712

“lock_timeout_val - Lock timeout value monitor element” on page 1004

appl logical data group

“acc_curs_blk - Accepted Block Cursor Requests” on page 696

“agent_sys_cpu_time - System CPU Time used by Agent” on page 713

“agent_usr_cpu_time - User CPU Time used by Agent” on page 714

“agents_stolen - Stolen Agents” on page 718

“appl_con_time - Connection Request Start Timestamp” on page 727

“appl_idle_time - Application Idle Time” on page 731

"appl_priority - Application Agent Priority" on page 732
"appl_priority_type - Application Priority Type" on page 733
"associated_agents_top - Maximum Number of Associated Agents" on page 739
"authority_bitmap - User authorization level monitor element" on page 749
"authority_lvl - User authorization level monitor element" on page 750
"binds_precompiles - Binds/Precompiles Attempted" on page 752
"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
"cat_cache_overflows - Catalog Cache Overflows" on page 764
"commit_sql_stmts - Commit Statements Attempted" on page 786
"conn_complete_time - Connection Request Completion Timestamp" on page 800
"ddl_sql_stmts - Data Definition Language (DDL) SQL Statements" on page 847
"deadlocks - Deadlocks detected monitor element" on page 849
"direct_read_reqs - Direct read requests monitor element" on page 858
"direct_read_time - Direct read time monitor element" on page 860
"direct_reads - Direct reads from database monitor element" on page 862
"direct_write_reqs - Direct write requests monitor element" on page 864
"direct_write_time - Direct write time monitor element" on page 866
"direct_writes - Direct writes to database monitor element" on page 868
"dynamic_sql_stmts - Dynamic SQL Statements Attempted" on page 873
"failed_sql_stmts - Failed Statement Operations" on page 891
"hash_join_overflows - Hash Join Overflows" on page 940
"hash_join_small_overflows - Hash Join Small Overflows" on page 940
"inbound_comm_address - Inbound Communication Address" on page 956
"int_auto_rebinds - Internal Automatic Rebinds" on page 962
"int_commits - Internal commits monitor element" on page 962
"int_deadlock_rollbacks - Internal Rollbacks Due To Deadlock" on page 964
"int_rollbacks - Internal rollbacks monitor element" on page 965
"int_rows_deleted - Internal Rows Deleted" on page 967
"int_rows_inserted - Internal Rows Inserted" on page 967
"int_rows_updated - Internal Rows Updated" on page 968
"last_reset - Last Reset Timestamp" on page 979
"lock_escalation - Lock escalation monitor element" on page 988
"lock_timeout_val - Lock timeout value monitor element" on page 1004
"lock_timeouts - Number of lock timeouts monitor element" on page 1005
"lock_wait_time - Time waited on locks monitor element" on page 1009
"lock_waits - Lock waits monitor element" on page 1014
"locks_held - Locks held monitor element" on page 1017
"locks_waiting - Current agents waiting on locks monitor element" on page 1019
"num_agents - Number of Agents Working on a Statement" on page 1059
"olap_func_overflows - OLAP Function Overflows monitor element" on page 1086
"open_loc_curs - Open Local Cursors" on page 1087

"open_loc_curs_blk - Open Local Cursors with Blocking" on page 1087

"open_rem_curs - Open Remote Cursors" on page 1088

"open_rem_curs_blk - Open Remote Cursors with Blocking" on page 1088

"pkg_cache_inserts - Package cache inserts monitor element" on page 1109

"pkg_cache_lookups - Package cache lookups monitor element" on page 1111

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"pool_data_writes - Buffer pool data writes monitor element" on page 1144

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_index_writes - Buffer pool index writes monitor element" on page 1177

"pool_read_time - Total buffer pool physical read time monitor element" on page 1207

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212

"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214

"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216

"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218

"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220

"pool_write_time - Total buffer pool physical write time monitor element" on page 1223

"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232

"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236

"pool_xda_writes - Buffer pool XDA data writes monitor element" on page 1238

"prefetch_wait_time - Time waited for prefetch monitor element" on page 1249

"prev_uow_stop_time - Previous Unit of Work Completion Timestamp" on page 1254

"priv_workspace_num_overflows - Private Workspace Overflows" on page 1255

"priv_workspace_section_inserts - Private Workspace Section Inserts" on page 1255

"priv_workspace_section_lookups - Private Workspace Section Lookups" on page 1256

"priv_workspace_size_top - Maximum Private Workspace Size" on page 1257

"rej_curs_blk - Rejected Block Cursor Requests" on page 1272

"rollback_sql_stmts - Rollback Statements Attempted" on page 1283

"rows_deleted - Rows deleted monitor element" on page 1289

"rows_inserted - Rows inserted monitor element" on page 1290
"rows_read - Rows read monitor element" on page 1292
"rows_selected - Rows Selected" on page 1296
"rows_updated - Rows updated monitor element" on page 1297
"rows_written - Rows Written" on page 1298
"select_sql_stmts - Select SQL Statements Executed" on page 1304
"shr_workspace_num_overflows - Shared Workspace Overflows" on page 1313
"shr_workspace_section_inserts - Shared Workspace Section Inserts" on page 1314
"shr_workspace_section_lookups - Shared Workspace Section Lookups" on page 1314
"shr_workspace_size_top - Maximum Shared Workspace Size" on page 1315
"sort_overflows - Sort overflows monitor element" on page 1326
"sql_reqs_since_commit - SQL Requests Since Last Commit" on page 1331
"static_sql_stmts - Static SQL Statements Attempted" on page 1344
"total_hash_joins - Total Hash Joins" on page 1445
"total_hash_loops - Total Hash Loops" on page 1446
"total_olap_funcs - Total OLAP Functions monitor element" on page 1455
"total_sort_time - Total sort time monitor element" on page 1487
"total_sorts - Total sorts monitor element" on page 1488
"uid_sql_stmts - Update/Insert/Delete SQL Statements Executed" on page 1514
"unread_prefetch_pages - Unread prefetch pages monitor element" on page 1514
"uow_comp_status - Unit of Work Completion Status" on page 1515
"uow_elapsed_time - Most Recent Unit of Work Elapsed Time" on page 1516
"uow_lock_wait_time - Total time unit of work waited on locks monitor element" on page 1518
"uow_log_space_used - Unit of work log space used monitor element" on page 1519
"uow_start_time - Unit of work start timestamp monitor element" on page 1519
"uow_stop_time - Unit of work stop timestamp monitor element" on page 1521
"x_lock_escals - Exclusive lock escalations monitor element" on page 1545
"xquery_stmts - XQuery Statements Attempted" on page 1548

appl_id_info logical data group

"agent_id - Application handle (agent ID) monitor element" on page 710
"appl_id - Application ID monitor element" on page 727
"appl_name - Application name monitor element" on page 731
"appl_status - Application status monitor element" on page 734
"auth_id - Authorization ID" on page 748
"client_db_alias - Database Alias Used by Application" on page 775
"client_prdid - Client product and version ID monitor element" on page 780
"codepage_id - ID of Code Page Used by Application" on page 783
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840
"input_db_alias - Input Database Alias" on page 959

"sequence_no - Sequence number monitor element" on page 1306
"status_change_time - Application Status Change Time" on page 1347

appl_info logical data group

"agent_id - Application handle (agent ID) monitor element" on page 710
"appl_id - Application ID monitor element" on page 727
"appl_name - Application name monitor element" on page 731
"appl_section_inserts - Section Inserts monitor element" on page 733
"appl_section_lookups - Section Lookups" on page 734
"appl_status - Application status monitor element" on page 734
"auth_id - Authorization ID" on page 748
"authority_bitmap - User authorization level monitor element" on page 749
"authority_lvl - User authorization level monitor element" on page 750
"client_db_alias - Database Alias Used by Application" on page 775
"client_pid - Client process ID monitor element" on page 778
"client_platform - Client operating platform monitor element" on page 778
"client_prdid - Client product and version ID monitor element" on page 780
"client_protocol - Client communication protocol monitor element" on page 780
"codepage_id - ID of Code Page Used by Application" on page 783
"coord_agent_pid - Coordinator agent identifier monitor element" on page 813
"coord_node - Coordinating Node" on page 815
"corr_token - DRDA Correlation Token" on page 816
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840
"execution_id - User Login ID" on page 890
"input_db_alias - Input Database Alias" on page 959
"is_system_appl - Is System Application monitor element" on page 976
"num_assoc_agents - Number of Associated Agents" on page 1059
"sequence_no - Sequence number monitor element" on page 1306
"session_auth_id - Session authorization ID monitor element" on page 1312
"status_change_time - Application Status Change Time" on page 1347
"territory_code - Database Territory Code" on page 1407
"tpmon_acc_str - TP monitor client accounting string monitor element" on page 1502
"tpmon_client_app - TP monitor client application name monitor element" on page 1503
"tpmon_client_userid - TP monitor client user ID monitor element" on page 1503
"tpmon_client_wkstn - TP monitor client workstation name monitor element" on page 1504
"workload_id - Workload ID monitor element" on page 1542

appl_lock_list logical data group

"agent_id - Application handle (agent ID) monitor element" on page 710
"appl_id - Application ID monitor element" on page 727
"appl_name - Application name monitor element" on page 731

"appl_status - Application status monitor element" on page 734
"auth_id - Authorization ID" on page 748
"client_db_alias - Database Alias Used by Application" on page 775
"codepage_id - ID of Code Page Used by Application" on page 783
"lock_wait_time - Time waited on locks monitor element" on page 1009
"locks_held - Locks held monitor element" on page 1017
"locks_waiting - Current agents waiting on locks monitor element" on page 1019
"sequence_no - Sequence number monitor element" on page 1306
"session_auth_id - Session authorization ID monitor element" on page 1312
"status_change_time - Application Status Change Time" on page 1347

appl_remote logical data group

"commit_sql_stmts - Commit Statements Attempted" on page 786
"create_nickname - Create Nicknames" on page 828
"create_nickname_time - Create Nickname Response Time" on page 828
"datasource_name - Data Source Name" on page 834
"db_name - Database name monitor element" on page 839
"delete_sql_stmts - Deletes" on page 852
"delete_time - Delete Response Time" on page 852
"failed_sql_stmts - Failed Statement Operations" on page 891
"insert_sql_stmts - Inserts" on page 960
"insert_time - Insert Response Time" on page 960
"passthru_time - Pass-Through Time" on page 1106
"passthru - Pass-Through" on page 1107
"remote_lock_time - Remote Lock Time" on page 1273
"remote_locks - Remote Locks" on page 1274
"rollback_sql_stmts - Rollback Statements Attempted" on page 1283
"rows_deleted - Rows deleted monitor element" on page 1289
"rows_inserted - Rows inserted monitor element" on page 1290
"rows_selected - Rows Selected" on page 1296
"rows_updated - Rows updated monitor element" on page 1297
"select_sql_stmts - Select SQL Statements Executed" on page 1304
"select_time - Query Response Time" on page 1305
"sp_rows_selected - Rows Returned by Stored Procedures" on page 1329
"stored_proc_time - Stored Procedure Time" on page 1367
"stored_procs - Stored Procedures" on page 1367
"update_sql_stmts - Updates" on page 1523
"update_time - Update Response Time" on page 1523

bufferpool logical data group

"block_ios - Number of block I/O requests monitor element" on page 753
"bp_id - Buffer pool identifier monitor element" on page 755
"bp_name - Buffer pool name monitor element" on page 756
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840

"direct_read_reqs - Direct read requests monitor element" on page 858

"direct_read_time - Direct read time monitor element" on page 860

"direct_reads - Direct reads from database monitor element" on page 862

"direct_write_reqs - Direct write requests monitor element" on page 864

"direct_write_time - Direct write time monitor element" on page 866

"direct_writes - Direct writes to database monitor element" on page 868

"files_closed - Database files closed monitor element" on page 921

"input_db_alias - Input Database Alias" on page 959

"pages_from_block_ios - Total number of pages read by block I/O monitor element" on page 1100

"pages_from_vectorized_ios - Total number of pages read by vectored I/O monitor element" on page 1101

"pool_async_data_read_reqs - Buffer pool asynchronous read requests monitor element" on page 1116

"pool_async_data_reads - Buffer pool asynchronous data reads monitor element" on page 1117

"pool_async_data_writes - Buffer pool asynchronous data writes monitor element" on page 1118

"pool_async_index_read_reqs - Buffer pool asynchronous index read requests monitor element" on page 1121

"pool_async_index_reads - Buffer pool asynchronous index reads monitor element" on page 1122

"pool_async_index_writes - Buffer pool asynchronous index writes monitor element" on page 1123

"pool_async_read_time - Buffer Pool Asynchronous Read Time" on page 1123

"pool_async_write_time - Buffer pool asynchronous write time monitor element" on page 1124

"pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests monitor element" on page 1128

"pool_async_xda_reads - Buffer pool asynchronous XDA data reads monitor element" on page 1128

"pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element" on page 1129

"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139

"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142

"pool_data_writes - Buffer pool data writes monitor element" on page 1144

"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173

"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175

"pool_index_writes - Buffer pool index writes monitor element" on page 1177

"pool_no_victim_buffer - Buffer pool no victim buffers monitor element" on page 1180

"pool_read_time - Total buffer pool physical read time monitor element" on page 1207

"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210

“pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element” on page 1212

“pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element” on page 1214

“pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element” on page 1216

“pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218

“pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220

“pool_write_time - Total buffer pool physical write time monitor element” on page 1223

“pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232

“pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236

“pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238

“vectored_ios - Number of vectored I/O requests monitor element” on page 1534

bufferpool_nodeinfo logical data group

“bp_cur_buffsz - Current Size of Buffer Pool” on page 755

“bp_new_buffsz - New Buffer Pool Size” on page 756

“bp_pages_left_to_remove - Number of Pages Left to Remove” on page 756

“bp_tbsp_use_count - Number of Table Spaces Mapped to Buffer Pool” on page 757

“node_number - Node Number” on page 1058

collected logical data group

“node_number - Node Number” on page 1058

“server_db2_type - Database Manager Type at Monitored (Server) Node” on page 1307

“server_instance_name - Server Instance Name” on page 1307

“server_prdid - Server Product/Version ID” on page 1308

“server_version - Server Version” on page 1308

“time_stamp - Snapshot Time” on page 1414

“time_zone_disp - Time Zone Displacement” on page 1414

db2 logical data group

“agents_created_empty_pool - Agents Created Due to Empty Agent Pool” on page 717

“agents_from_pool - Agents Assigned From Pool” on page 717

“agents_registered - Agents Registered” on page 718

“agents_registered_top - Maximum Number of Agents Registered” on page 718

“agents_stolen - Stolen Agents” on page 718

“agents_waiting_on_token - Agents Waiting for a Token” on page 719

“agents_waiting_top - Maximum Number of Agents Waiting monitor element” on page 720

“comm_private_mem - Committed Private Memory” on page 785

"con_local_dbases - Local Databases with Current Connects" on page 789
"coord_agents_top - Maximum Number of Coordinating Agents" on page 814
"db2start_time - Start Database Manager Timestamp" on page 837
"db_status - Status of database monitor element" on page 840
"gw_cons_wait_client - Number of Connections Waiting for the Client to Send Request" on page 926
"gw_cons_wait_host - Number of Connections Waiting for the Host to Reply" on page 927
"gw_cur_cons - Current Number of Connections for DB2 Connect" on page 927
"gw_total_cons - Total Number of Attempted Connections for DB2 Connect" on page 928
"idle_agents - Number of Idle Agents" on page 955
"last_reset - Last Reset Timestamp" on page 979
"local_cons - Local Connections" on page 982
"local_cons_in_exec - Local Connections Executing in the Database Manager" on page 983
"max_agent_overflows - Maximum Agent Overflows" on page 1028
"num_gw_conn_switches - Connection Switches" on page 1062
"num_nodes_in_db2_instance - Number of Nodes in Partition" on page 1068
"piped_sorts_accepted - Piped Sorts Accepted" on page 1108
"piped_sorts_requested - Piped Sorts Requested" on page 1109
"post_threshold_hash_joins - Hash Join Threshold" on page 1242
"post_threshold_olap_funcs - OLAP Function Threshold monitor element" on page 1243
"post_threshold_sorts - Post threshold sorts monitor element" on page 1248
"product_name - Product Name" on page 1257
"rem_cons_in - Remote Connections To Database Manager" on page 1272
"rem_cons_in_exec - Remote Connections Executing in the Database Manager" on page 1273
"service_level - Service Level" on page 1310
"smallest_log_avail_node - Node with Least Available Log Space" on page 1325
"sort_heap_allocated - Total Sort Heap Allocated" on page 1325
"sort_heap_top - Sort private heap high watermark" on page 1326

db_lock_list logical data group

"appls_cur_cons - Applications Connected Currently" on page 738
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840
"input_db_alias - Input Database Alias" on page 959
"locks_held - Locks held monitor element" on page 1017
"locks_waiting - Current agents waiting on locks monitor element" on page 1019

dbase logical data group

"active_hash_joins - Active hash joins" on page 705
"active_olap_funcs - Active OLAP Functions monitor element" on page 705
"active_sorts - Active Sorts" on page 705

"agents_top - Number of Agents Created" on page 719
"appl_id_oldest_xact - Application with Oldest Transaction" on page 730
"appl_section_inserts - Section Inserts monitor element" on page 733
"appl_section_lookups - Section Lookups" on page 734
"appls_cur_cons - Applications Connected Currently" on page 738
"appls_in_db2 - Applications Executing in the Database Currently" on page 738
"async_runstats - Total number of asynchronous RUNSTATS requests monitor element" on page 739
"binds_precompiles - Binds/Precompiles Attempted" on page 752
"blocks_pending_cleanup - Pending cleanup rolled-out blocks monitor element" on page 754
"cat_cache_inserts - Catalog cache inserts monitor element" on page 761
"cat_cache_lookups - Catalog cache lookups monitor element" on page 763
"cat_cache_overflows - Catalog Cache Overflows" on page 764
"cat_cache_size_top - Catalog cache high watermark monitor element" on page 765
"catalog_node - Catalog Node Number" on page 766
"catalog_node_name - Catalog Node Network Name" on page 766
"commit_sql_stmts - Commit Statements Attempted" on page 786
"connections_top - Maximum Number of Concurrent Connections" on page 802
"coord_agents_top - Maximum Number of Coordinating Agents" on page 814
"db_conn_time - Database activation timestamp monitor element" on page 838
"db_heap_top - Maximum Database Heap Allocated" on page 838
"db_location - Database Location" on page 839
"db_name - Database name monitor element" on page 839
"db_path - Database Path" on page 840
"db_status - Status of database monitor element" on page 840
"ddl_sql_stmts - Data Definition Language (DDL) SQL Statements" on page 847
"deadlocks - Deadlocks detected monitor element" on page 849
"direct_read_reqs - Direct read requests monitor element" on page 858
"direct_read_time - Direct read time monitor element" on page 860
"direct_reads - Direct reads from database monitor element" on page 862
"direct_write_reqs - Direct write requests monitor element" on page 864
"direct_write_time - Direct write time monitor element" on page 866
"direct_writes - Direct writes to database monitor element" on page 868
"dynamic_sql_stmts - Dynamic SQL Statements Attempted" on page 873
"failed_sql_stmts - Failed Statement Operations" on page 891
"files_closed - Database files closed monitor element" on page 921
"hash_join_overflows - Hash Join Overflows" on page 940
"hash_join_small_overflows - Hash Join Small Overflows" on page 940
"input_db_alias - Input Database Alias" on page 959
"int_auto_rebinds - Internal Automatic Rebinds" on page 962
"int_commits - Internal commits monitor element" on page 962
"int_deadlock_rollbacks - Internal Rollbacks Due To Deadlock" on page 964
"int_rollbacks - Internal rollbacks monitor element" on page 965

"int_rows_deleted - Internal Rows Deleted" on page 967
"int_rows_inserted - Internal Rows Inserted" on page 967
"int_rows_updated - Internal Rows Updated" on page 968
"last_backup - Last Backup Timestamp" on page 977
"last_reset - Last Reset Timestamp" on page 979
"lock_escals - Number of lock escalations monitor element" on page 989
"lock_list_in_use - Total lock list memory in use monitor element" on page 996
"lock_timeouts - Number of lock timeouts monitor element" on page 1005
"lock_wait_time - Time waited on locks monitor element" on page 1009
"lock_waits - Lock waits monitor element" on page 1014
"locks_held - Locks held monitor element" on page 1017
"locks_waiting - Current agents waiting on locks monitor element" on page 1019
"log_held_by_dirty_pages - Amount of Log Space Accounted for by Dirty Pages" on page 1023
"log_read_time - Log Read Time" on page 1024
"log_reads - Number of Log Pages Read" on page 1025
"log_to_redo_for_recovery - Amount of Log to be Redone for Recovery" on page 1025
"log_write_time - Log Write Time" on page 1026
"log_writes - Number of Log Pages Written" on page 1026
"num_assoc_agents - Number of Associated Agents" on page 1059
"num_db_storage_paths - Number of automatic storage paths" on page 1060
"num_indoubt_trans - Number of Indoubt Transactions" on page 1063
"num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element" on page 1063
"num_log_data_found_in_buffer - Number of Log Data Found In Buffer" on page 1065
"num_log_part_page_io - Number of Partial Log Page Writes" on page 1065
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“lock_status - Lock status monitor element” on page 1003
“node_number - Node Number” on page 1058
“table_file_id - Table file ID monitor element” on page 1372
“table_name - Table name monitor element” on page 1373
“table_schema - Table schema name monitor element” on page 1375
“tablespace_name - Table space name monitor element” on page 1383

lock_wait logical data group

“agent_id_holding_lock - Agent ID Holding Lock” on page 712
“appl_id_holding_lk - Application ID Holding Lock” on page 729
“data_partition_id - Data partition identifier monitor element” on page 833
“lock_attributes - Lock attributes monitor element” on page 985
“lock_current_mode - Original lock mode before conversion monitor element” on page 987
“lock_escalation - Lock escalation monitor element” on page 988
“lock_mode - Lock mode monitor element” on page 996
“lock_mode_requested - Lock mode requested monitor element” on page 998
“lock_name - Lock name monitor element” on page 999
“lock_object_type - Lock object type waited on monitor element” on page 1000
“lock_release_flags - Lock release flags monitor element” on page 1002
“lock_wait_start_time - Lock wait start timestamp monitor element” on page 1008

- “node_number - Node Number” on page 1058
- “ss_number - Subsection number monitor element” on page 1341
- “table_name - Table name monitor element” on page 1373
- “table_schema - Table schema name monitor element” on page 1375
- “tablespace_name - Table space name monitor element” on page 1383

memory_pool logical data group

- “node_number - Node Number” on page 1058
- “pool_config_size - Configured Size of Memory Pool” on page 1130
- “pool_cur_size - Current Size of Memory Pool” on page 1131
- “pool_id - Memory Pool Identifier” on page 1164
- “pool_secondary_id - Memory Pool Secondary Identifier” on page 1209
- “pool_watermark - Memory Pool Watermark” on page 1222

progress logical data group

- “progress_completed_units - Completed Progress Work Units” on page 1257
- “progress_description - Progress Description” on page 1258
- “progress_seq_num - Progress Sequence Number” on page 1259
- “progress_start_time - Progress Start Time” on page 1259
- “progress_total_units - Total Progress Work Units” on page 1259
- “progress_work_metric - Progress Work Metric” on page 1260

progress_list logical data group

- “progress_list_attr - Current Progress List Attributes” on page 1258
- “progress_list_cur_seq_num - Current Progress List Sequence Number” on page 1259

rollforward logical data group

- “node_number - Node Number” on page 1058
- “rf_log_num - Log being rolled forward monitor element” on page 1282
- “rf_status - Log Phase” on page 1283
- “rf_timestamp - Rollforward Timestamp” on page 1283
- “rf_type - Rollforward Type” on page 1283
- “ts_name - Table space being rolled forward monitor element” on page 1513

stmt logical data group

- “agents_top - Number of Agents Created” on page 719
- “blocking_cursor - Blocking Cursor” on page 754
- “consistency_token - Package consistency token monitor element” on page 803
- “creator - Application Creator” on page 829
- “cursor_name - Cursor Name” on page 831
- “degree_parallelism - Degree of Parallelism” on page 851
- “fetch_count - Number of Successful Fetches” on page 920
- “int_rows_deleted - Internal Rows Deleted” on page 967
- “int_rows_inserted - Internal Rows Inserted” on page 967
- “int_rows_updated - Internal Rows Updated” on page 968
- “num_agents - Number of Agents Working on a Statement” on page 1059

"package_name - Package name monitor element" on page 1095
"package_version_id - Package version monitor element" on page 1096
"pool_data_l_reads - Buffer pool data logical reads monitor element" on page 1139
"pool_data_p_reads - Buffer pool data physical reads monitor element" on page 1142
"pool_index_l_reads - Buffer pool index logical reads monitor element" on page 1173
"pool_index_p_reads - Buffer pool index physical reads monitor element" on page 1175
"pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element" on page 1210
"pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element" on page 1212
"pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element" on page 1214
"pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element" on page 1216
"pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element" on page 1218
"pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element" on page 1220
"pool_xda_l_reads - Buffer pool XDA data logical reads monitor element" on page 1232
"pool_xda_p_reads - Buffer pool XDA data physical reads monitor element" on page 1236
"query_card_estimate - Query Number of Rows Estimate" on page 1261
"query_cost_estimate - Query cost estimate monitor element" on page 1262
"rows_read - Rows read monitor element" on page 1292
"rows_written - Rows Written" on page 1298
"section_number - Section number monitor element" on page 1303
"sort_overflows - Sort overflows monitor element" on page 1326
"stmt_elapsed_time - Most Recent Statement Elapsed Time" on page 1348
"stmt_node_number - Statement Node" on page 1353
"stmt_operation/operation - Statement operation monitor element" on page 1353
"stmt_sorts - Statement Sorts" on page 1356
"stmt_start - Statement Operation Start Timestamp" on page 1357
"stmt_stop - Statement Operation Stop Timestamp" on page 1357
"stmt_sys_cpu_time - System CPU Time used by Statement" on page 1357
"stmt_text - SQL statement text monitor element" on page 1358
"stmt_type - Statement type monitor element" on page 1359
"stmt_usr_cpu_time - User CPU Time used by Statement" on page 1361
"total_sort_time - Total sort time monitor element" on page 1487

stmt_transmissions logical data group

"elapsed_exec_time - Statement Execution Elapsed Time" on page 876
"host_response_time - Host Response Time" on page 944

“max_data_received_1024 - Number of Statements with Outbound Bytes Received Between 513 and 1024 Bytes” on page 1032

“max_data_received_128 - Number of Statements with Outbound Bytes Received Between 1 and 128 Bytes” on page 1033

“max_data_received_16384 - Number of Statements with Outbound Bytes Received Between 8193 and 16384 Bytes” on page 1033

“max_data_received_2048 - Number of Statements with Outbound Bytes Received Between 1025 and 2048 Bytes” on page 1034

“max_data_received_256 - Number of Statements with Outbound Bytes Received Between 129 and 256 Bytes” on page 1034

“max_data_received_31999 - Number of Statements with Outbound Bytes Received Between 16385 and 31999 Bytes monitor element” on page 1035

“max_data_received_4096 - Number of Statements with Outbound Bytes Received Between 2049 and 4096 Bytes” on page 1035

“max_data_received_512 - Number of Statements with Outbound Bytes Received Between 257 and 512 Bytes” on page 1035

“max_data_received_64000 - Number of Statements with Outbound Bytes Received Between 32000 and 64000 Bytes monitor element” on page 1036

“max_data_received_8192 - Number of Statements with Outbound Bytes Received Between 4097 and 8192 Bytes” on page 1036

“max_data_received_gt64000 - Number of Statements with Outbound Bytes Received Greater than 64000 Bytes” on page 1037

“max_data_sent_1024 - Number of Statements with Outbound Bytes Sent Between 513 and 1024 Bytes” on page 1037

“max_data_sent_128 - Number of Statements with Outbound Bytes Sent Between 1 and 128 Bytes” on page 1037

“max_data_sent_16384 - Number of Statements with Outbound Bytes Sent Between 8193 and 16384 Bytes” on page 1038

“max_data_sent_2048 - Number of Statements with Outbound Bytes Sent Between 1025 and 2048 Bytes” on page 1038

“max_data_sent_256 - Number of Statements with Outbound Bytes Sent Between 129 and 256 Bytes” on page 1039

“max_data_sent_31999 - Number of Statements with Outbound Bytes Sent Between 16385 and 31999 Bytes” on page 1039

“max_data_sent_4096 - Number of Statements with Outbound Bytes Sent Between 2049 and 4096 Bytes” on page 1040

“max_data_sent_512 - Number of Statements with Outbound Bytes Sent Between 257 and 512 Bytes” on page 1040

“max_data_sent_64000 - Number of Statements with Outbound Bytes Sent Between 32000 and 64000 Bytes” on page 1040

“max_data_sent_8192 - Number of Statements with Outbound Bytes Sent Between 4097 and 8192 Bytes” on page 1041

“max_data_sent_gt64000 - Number of Statements with Outbound Bytes Sent Greater than 64000 Bytes” on page 1041

“max_network_time_100_ms - Number of Statements with Network Time between 16 and 100 ms” on page 1042

“max_network_time_16_ms - Number of Statements with Network Time between 4 and 16 ms” on page 1042

“max_network_time_1_ms - Number of Statements with Network Time of up to 1 ms” on page 1043

“max_network_time_4_ms - Number of Statements with Network Time between 1 and 4 ms” on page 1043
“max_network_time_500_ms - Number of Statements with Network Time between 100 and 500 ms” on page 1043
“max_network_time_gt500_ms - Number of Statements with Network Time greater than 500 ms” on page 1044
“network_time_bottom - Minimum Network Time for Statement” on page 1056
“network_time_top - Maximum Network Time for Statement” on page 1056
“outbound_bytes_received - Outbound Number of Bytes Received” on page 1090
“outbound_bytes_received_bottom - Minimum Outbound Number of Bytes Received” on page 1091
“outbound_bytes_received_top - Maximum Outbound Number of Bytes Received” on page 1091
“outbound_bytes_sent - Outbound Number of Bytes Sent” on page 1091
“outbound_bytes_sent_bottom - Minimum Outbound Number of Bytes Sent” on page 1092
“outbound_bytes_sent_top - Maximum Outbound Number of Bytes Sent” on page 1092
“sql_chains - Number of SQL Chains Attempted” on page 1330
“sql_stmts - Number of SQL Statements Attempted” on page 1331

subsection logical data group

“rows_read - Rows read monitor element” on page 1292
“rows_written - Rows Written” on page 1298
“ss_exec_time - Subsection Execution Elapsed Time” on page 1340
“ss_node_number - Subsection Node Number” on page 1340
“ss_number - Subsection number monitor element” on page 1341
“ss_status - Subsection status monitor element” on page 1341
“ss_sys_cpu_time - System CPU Time used by Subsection” on page 1342
“ss_usr_cpu_time - User CPU Time used by Subsection” on page 1342
“tq_cur_send_spills - Current number of table queue buffers overflowed monitor element” on page 1504
“tq_id_waiting_on - Waited on node on a table queue monitor element” on page 1505
“tq_max_send_spills - Maximum number of table queue buffers overflows” on page 1505
“tq_node_waited_for - Waited for node on a table queue” on page 1506
“tq_rows_read - Number of Rows Read from table queues” on page 1506
“tq_rows_written - Number of rows written to table queues” on page 1506
“tq_tot_send_spills - Total number of table queue buffers overflowed monitor element” on page 1511
“tq_wait_for_any - Waiting for any node to send on a table queue” on page 1512

table logical data group

“data_object_pages - Data Object Pages” on page 832
“data_partition_id - Data partition identifier monitor element” on page 833

“index_object_pages - Index Object Pages” on page 958
“lob_object_pages - LOB Object Pages” on page 981
“long_object_pages - Long Object Pages” on page 1027
“overflow_accesses - Accesses to overflowed records monitor element” on page 1093
“page_reorgs - Page reorganizations monitor element” on page 1098
“rows_read - Rows read monitor element” on page 1292
“rows_written - Rows Written” on page 1298
“table_file_id - Table file ID monitor element” on page 1372
“table_name - Table name monitor element” on page 1373
“table_schema - Table schema name monitor element” on page 1375
“table_type - Table type monitor element” on page 1377
“tablespace_id - Table space identification monitor element” on page 1380
“xda_object_pages - XDA Object Pages” on page 1546

table_list logical data group

“db_conn_time - Database activation timestamp monitor element” on page 838
“db_name - Database name monitor element” on page 839
“db_path - Database Path” on page 840
“input_db_alias - Input Database Alias” on page 959
“last_reset - Last Reset Timestamp” on page 979

table_reorg logical data group

“data_partition_id - Data partition identifier monitor element” on page 833
“reorg_completion - Reorganization Completion Flag” on page 1275
“reorg_current_counter - Reorganize Progress” on page 1275
“reorg_end - Table Reorganize End Time” on page 1276
“reorg_index_id - Index Used to Reorganize the Table” on page 1276
“reorg_max_counter - Total Amount of Reorganization” on page 1276
“reorg_max_phase - Maximum Reorganize Phase” on page 1276
“reorg_phase - Table reorganization phase monitor element” on page 1277
“reorg_phase_start - Reorganize Phase Start Time” on page 1278
“reorg_rows_compressed - Rows Compressed” on page 1278
“reorg_rows_rejected_for_compression - Rows Rejected for Compression” on page 1278
“reorg_start - Table Reorganize Start Time” on page 1278
“reorg_status - Table Reorganize Status” on page 1279
“reorg_tbspc_id - Table Space Where Table or Data partition is Reorganized” on page 1279
“reorg_type - Table Reorganize Attributes” on page 1279
“reorg_xml_regions_compressed - XML regions compressed monitor element” on page 1280
“reorg_xml_regions_rejected_for_compression - XML regions rejected for compression monitor element” on page 1280

tablespace logical data group

- “direct_read_reqs - Direct read requests monitor element” on page 858
- “direct_read_time - Direct read time monitor element” on page 860
- “direct_reads - Direct reads from database monitor element” on page 862
- “direct_write_reqs - Direct write requests monitor element” on page 864
- “direct_write_time - Direct write time monitor element” on page 866
- “direct_writes - Direct writes to database monitor element” on page 868
- “files_closed - Database files closed monitor element” on page 921
- “fs_caching - File system caching monitor element” on page 923
- “pool_async_data_read_reqs - Buffer pool asynchronous read requests monitor element” on page 1116
- “pool_async_data_reads - Buffer pool asynchronous data reads monitor element” on page 1117
- “pool_async_data_writes - Buffer pool asynchronous data writes monitor element” on page 1118
- “pool_async_index_read_reqs - Buffer pool asynchronous index read requests monitor element” on page 1121
- “pool_async_index_reads - Buffer pool asynchronous index reads monitor element” on page 1122
- “pool_async_index_writes - Buffer pool asynchronous index writes monitor element” on page 1123
- “pool_async_read_time - Buffer Pool Asynchronous Read Time” on page 1123
- “pool_async_write_time - Buffer pool asynchronous write time monitor element” on page 1124
- “pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests monitor element” on page 1128
- “pool_async_xda_reads - Buffer pool asynchronous XDA data reads monitor element” on page 1128
- “pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element” on page 1129
- “pool_data_l_reads - Buffer pool data logical reads monitor element” on page 1139
- “pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142
- “pool_data_writes - Buffer pool data writes monitor element” on page 1144
- “pool_index_l_reads - Buffer pool index logical reads monitor element” on page 1173
- “pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175
- “pool_index_writes - Buffer pool index writes monitor element” on page 1177
- “pool_no_victim_buffer - Buffer pool no victim buffers monitor element” on page 1180
- “pool_read_time - Total buffer pool physical read time monitor element” on page 1207
- “pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element” on page 1210
- “pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element” on page 1212

“pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element” on page 1214

“pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element” on page 1216

“pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element” on page 1218

“pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element” on page 1220

“pool_write_time - Total buffer pool physical write time monitor element” on page 1223

“pool_xda_l_reads - Buffer pool XDA data logical reads monitor element” on page 1232

“pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236

“pool_xda_writes - Buffer pool XDA data writes monitor element” on page 1238

“tablespace_auto_resize_enabled - Table space automatic resizing enabled monitor element” on page 1377

“tablespace_content_type - Table space content type monitor element” on page 1378

“tablespace_cur_pool_id - Buffer pool currently being used monitor element” on page 1378

“tablespace_extent_size - Table space extent size monitor element” on page 1379

“tablespace_id - Table space identification monitor element” on page 1380

“tablespace_name - Table space name monitor element” on page 1383

“tablespace_next_pool_id - Buffer pool that will be used at next startup monitor element” on page 1384

“tablespace_page_size - Table space page size monitor element” on page 1385

“tablespace_prefetch_size - Table space prefetch size monitor element” on page 1387

“tablespace_rebalancer_mode - Rebalancer mode monitor element” on page 1389

“tablespace_type - Table space type monitor element” on page 1396

“tablespace_using_auto_storage - Table space enabled for automatic storage monitor element” on page 1398

tablespace_container logical data group

“container_accessible - Accessibility of container monitor element” on page 803

“container_id - Container identification monitor element” on page 804

“container_name - Container name monitor element” on page 804

“container_stripe_set - Container stripe set monitor element” on page 804

“container_total_pages - Total pages in container monitor element” on page 805

“container_type - Container type monitor element” on page 805

“container_usable_pages - Usable pages in container monitor element” on page 806

tablespace_list logical data group

“db_conn_time - Database activation timestamp monitor element” on page 838

“db_name - Database name monitor element” on page 839

“db_path - Database Path” on page 840

“input_db_alias - Input Database Alias” on page 959

“last_reset - Last Reset Timestamp” on page 979

tablespace_nodeinfo logical data group

“tablespace_current_size - Current table space size” on page 1379

“tablespace_free_pages - Free pages in table space monitor element” on page 1379

“tablespace_increase_size - Increase size in bytes” on page 1381

“tablespace_increase_size_percent - Increase size by percent monitor element” on page 1381

“tablespace_initial_size - Initial table space size” on page 1381

“tablespace_last_resize_failed - Last resize attempt failed” on page 1382

“tablespace_last_resize_time - Time of last successful resize” on page 1382

“tablespace_max_size - Maximum table space size” on page 1382

“tablespace_min_recovery_time - Minimum recovery time for rollforward monitor element” on page 1383

“tablespace_num_containers - Number of Containers in Table Space” on page 1385

“tablespace_num_quiescers - Number of Quiescers” on page 1385

“tablespace_num_ranges - Number of Ranges in the Table Space Map” on page 1385

“tablespace_page_top - Table space high watermark monitor element” on page 1386

“tablespace_paths_dropped - Table space using dropped path monitor element” on page 1386

“tablespace_pending_free_pages - Pending free pages in table space monitor element” on page 1387

“tablespace_prefetch_size - Table space prefetch size monitor element” on page 1387

“tablespace_rebalancer_extents_processed - Number of extents the rebalancer has processed” on page 1388

“tablespace_rebalancer_extents_remaining - Total number of extents to be processed by the rebalancer” on page 1388

“tablespace_rebalancer_last_extent_moved - Last extent moved by the rebalancer” on page 1389

“tablespace_rebalancer_priority - Current rebalancer priority” on page 1390

“tablespace_rebalancer_restart_time - Rebalancer restart time” on page 1391

“tablespace_rebalancer_start_time - Rebalancer start time” on page 1392

“tablespace_state - Table space state monitor element” on page 1393

“tablespace_state_change_object_id - State Change Object Identification” on page 1395

“tablespace_state_change_ts_id - State Change Table Space Identification” on page 1395

“tablespace_total_pages - Total pages in table space monitor element” on page 1396

“tablespace_usable_pages - Usable pages in table space monitor element” on page 1397

“tablespace_used_pages - Used pages in table space monitor element” on page 1397

tablespace_quiescer logical data group

- “quiescer_agent_id - Quiescer Agent Identification” on page 1265
- “quiescer_auth_id - Quiescer User Authorization Identification” on page 1265
- “quiescer_obj_id - Quiescer Object Identification” on page 1265
- “quiescer_state - Quiescer State” on page 1266
- “quiescer_ts_id - Quiescer Table Space Identification” on page 1266

tablespace_range logical data group

- “range_adjustment - Range Adjustment” on page 1266
- “range_container_id - Range Container” on page 1267
- “range_end_stripe - End Stripe” on page 1267
- “range_max_extent - Maximum Extent in Range” on page 1267
- “range_max_page_number - Maximum Page in Range” on page 1267
- “range_num_containers - Number of Containers in Range” on page 1267
- “range_number - Range Number” on page 1268
- “range_offset - Range Offset” on page 1268
- “range_start_stripe - Start Stripe” on page 1268
- “range_stripe_set_number - Stripe Set Number” on page 1268

utility_info logical data group

- “node_number - Node Number” on page 1058
- “utility_dbname - Database Operated on by Utility” on page 1527
- “utility_description - Utility Description” on page 1527
- “utility_id - Utility ID” on page 1528
- “utility_invoker_type - Utility Invoker Type” on page 1529
- “utility_priority - Utility Priority” on page 1531
- “utility_start_time - Utility Start Time” on page 1532
- “utility_state - Utility State” on page 1532
- “utility_type - Utility Type” on page 1533

Chapter 11. Monitor element reference

A description of the data collected by the monitor element.

The monitor elements returned by the system monitor fall into the following categories:

- **Identification** for the database manager, an application, or a database connection being monitored.
- Data primarily intended to help you to **configure** the system.
- Database **activity** at various levels including database, application, table, or statement. This information can be used for activity monitoring, problem determination, and performance analysis. It can also be used for configuration.
- information about **DB2 Connect** applications. Including information about DCS applications running at the gateway, SQL statements being executed, and database connections.
- information about **Federated Database Systems**. This includes information about the total access to a data source by applications running in a DB2 federated system and information about access to a data source by a given application running in a federated server instance.

Monitor elements are described in a standard format as follows:

Element identifier

The name of the element. If parsing the data stream directly, the element identifier is uppercase and prefixed with SQLM_ELM_.

Element type

The type of information the monitor element returns. For example, the db2start_time monitor element returns a timestamp.

Table function monitoring information

If a monitor element is returned by a table function, a table with the following fields is shown.

- *Table Function*: The name of the table function that returns the monitor element.
- *Monitor Element Collection Level*: For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.

Snapshot monitoring information

If a monitor element returns snapshot monitoring information, a table with the following fields is shown.

- *Snapshot level*: The level of information that can be captured by the snapshot monitor. For example, the appl_status monitor element returns information at the Application level and at the Lock level.
- *Logical data grouping*: The logical data group where captured snapshot information is returned. If parsing the data stream directly, the logical data group identifier is uppercase and prefixed with SQLM_ELM_. For example, the appl_status monitor element returns information for the appl_id_info grouping and for the appl_lock_list grouping.
- *Monitor switch*: The system monitor switch that must be set to obtain this information. If the switch is Basic, data will always be collected for the monitor element.

Event monitoring information

If a monitor element is collected by event monitors, a table with the following fields is shown.

- *Event type*: The level of information that can be collected by the event monitor. The event monitor must be created with this event type to collect this information. For example, the `appl_status` monitor element is collected for CONNECTIONS event monitors.
- *Logical data grouping*: The logical data group where captured event information is returned. If parsing the data stream directly, the logical data group identifier is uppercase and prefixed with `SQLM_ELM_`. For example, the `appl_status` monitor element returns information for the `event_conn` grouping.
- *Monitor switch*: The system monitor switch that must be set to obtain this information. For event monitors, the `TIMESTAMP` switch is the only monitor switch that can restrict the collection of event data. If there is a dash shown for this field, data will always be collected for the monitor element.

Usage information about how you can use the information collected by the monitor element when monitoring your database system.

acc_curs_blk - Accepted Block Cursor Requests

The number of times that a request for an I/O block was accepted.

Element identifier

`acc_curs_blk`

Element type

counter

Table 152. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Table 153. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage You can use this element in conjunction with `rej_curs_blk` to calculate the percentage of blocking requests that are accepted, rejected, or both.

See `rej_curs_blk` for suggestions on how to use this information to tune your configuration parameters.

act_aborted_total - Total aborted activities monitor element

The total number of coordinator activities at any nesting level that completed with errors. For service classes, if an activity is remapped to a different service subclass with a `REMAP ACTIVITY` action before it aborts, then this activity counts only toward the total of the subclass it aborts in.

Table 154. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 155. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

Usage

Use this element to understand if activities on the system are completing successfully. Activities may be aborted due to cancellation, errors, or reactive thresholds.

act_completed_total - Total completed activities monitor element

The total number of coordinator activities at any nesting level that completed successfully. For service classes, if an activity is remapped to a different subclass with a REMAP ACTIVITY action before it completes, then this activity counts only toward the total of the subclass it completes in.

Table 156. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample	REQUEST METRICS BASE

Table 157. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE

Table 157. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	-

Usage

Use this element to determine the throughput of activities in the system.

act_cpu_time_top - Activity CPU time top monitor element

The high watermark for processor time used by activities at all nesting levels in a service class, workload, or work class. This value is reported in microseconds.

The monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class or workload in which the activity runs is set to NONE. Activities contribute toward this high watermark only when request metrics are enabled. If the collection of activity metrics is not enabled, a value of 0 is returned.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action, only the act_cpu_time_top high watermark of the service subclass where an activity completes is updated, provided that a new high watermark is reached. The act_cpu_time_top high watermarks of other service subclasses an activity is mapped to but does not complete in are unaffected.

Table 158. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	Always collected
Statistics	event_wcstats	Always collected
Statistics	event_wlstats	Always collected

Usage

Use this element to determine the highest amount of processor time used by an activity on a member for a service class, workload, or work class during the time interval collected.

act_exec_time - Activity execution time monitor element

The act_exec_time element stores the time spent executing at this member, in microseconds.

For cursors, the execution time is the combined time for the open, the fetches, and the close. The time when the cursor is idle is not counted toward execution time. For routines, execution time is the start to end of routine invocation. The lifetimes of any cursors left open by routine (to return a result set) after the routine finishes are not counted toward the routine execution time. For all other activities, execution time is the difference between start time and stop time. In all cases, execution time does not include time spent initializing or queued.

Table 159. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

This element can be used alone to know the elapsed time spent executing the activity by DB2 on each member. This element can also be used together with **time_started** and **time_completed** monitor elements on the coordinator member to compute the idle time for cursor activities. You can use the following formula:

Cursor idle time = (time_completed - time_started) - act_exec_time

act_rejected_total - Total rejected activities monitor element

The total number of coordinator activities at any nesting level that were rejected instead of being allowed to execute.

Table 160. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 161. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

Usage

Use this element to help determine whether predictive thresholds and work actions that prevent execution are effective and whether they are too restrictive.

act_remapped_in - Activities remapped in monitor element

Count of the number of activities to be remapped into this service subclass since the last reset.

Table 162. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Usage

Use this count to determine whether the remapping of activities into the service subclass is occurring as desired.

act_remapped_out - Activities remapped out monitor element

Count of the number of activities to be remapped out of this service subclass since the last reset.

Table 163. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Usage

Use this count to determine whether the remapping of activities out of the service subclass is occurring as desired.

act_rows_read_top - Activity rows read top monitor element

The high watermark for the number of rows read by activities at all nesting levels in a service class, workload, or work class.

The monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class or workload in which the activity runs is set to NONE. Activities contribute toward this high watermark only when request metrics are enabled. If the collection of activity metrics is not enabled, a value of 0 is returned.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action only the act_rows_read_top high watermark of the service subclass where an activity completes is updated, provided that a new high watermark is reached. The act_rows_read_top high watermarks of service subclasses an activity is mapped to but does not complete in are unaffected.

Table 164. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	Always collected
Statistics	event_wcstats	Always collected
Statistics	event_wlstats	Always collected

Usage

Use this element to determine the highest number of rows read by an activity on a member for a service class, workload, or work class during the time interval collected.

act_rqsts_total - Total activity requests monitor elements

The number of individual coordinator and subagent requests completed as part of an activity. For example, a fetch on a cursor activity.

Table 165. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 165. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 166. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

act_throughput - Activity throughput monitor element

The rate at which coordinator activities are completed at any nesting level. Measured in coordinator activities per second.

Table 167. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 168. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	Always collected
Statistics	event_wlstats (reported in the metrics document)	Always collected

Usage

When returned by the `WLM_GET_SERVICE_SUBCLASS_STATS` or the `WLM_GET_WORKLOAD_STATS` function, this monitor element represents the activity throughput since the last reset of the statistics.

When returned by the `MON_SAMPLE_SERVICE_CLASS_METRICS` or the `MON_SAMPLE_WORKLOAD_METRICS` function, this monitor element represents the activity throughput since the function was executed.

act_total - Activities total monitor element

Total number of activities at any nesting level that had work actions corresponding to the specified work class applied to them since the last reset.

Table 169. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
<code>WLM_GET_WORK_ACTION_SET_STATS</code> table function - Return work action set statistics	ACTIVITY METRICS BASE

Table 170. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wcstats	-

Usage

Every time an activity has one or more work actions associated with a work class applied to it, a counter for the work class is updated. This counter is exposed using the **act_total** monitor element. The counter can be used to judge the effectiveness of the work action set (for example, how many activities have a actions applied). It can also be used to understand the different types of activities on the system.

activate_timestamp - Activate timestamp monitor element

The time when an event monitor was activated.

Table 171. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity	-
Activity	event_activitystmt	-
Activity	event_activityvals	-
Threshold Violations	event_thresholdviolations	-

Usage

Use this element to correlate information returned by the previously mentioned event types.

active_hash_joins - Active hash joins

The total number of hash joins that are currently running and consuming memory.

Table 172. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	-

active_olap_funcs - Active OLAP Functions monitor element

The total number of OLAP functions that are currently running and consuming sort heap memory.

Table 173. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	-

For snapshot monitoring, this counter can be reset.

active_sorts - Active Sorts

The number of sorts in the database that currently have a sort heap allocated.

Table 174. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage Use this value in conjunction with *sort_heap_allocated* to determine the average sort heap space used by each sort. If the *sortheap* configuration parameter is substantially larger than the average sort heap used, you may be able to lower the value of this parameter.

This value includes heaps for sorts of temporary tables that were created during relational operations.

activity_collected - Activity collected monitor element

This element indicates whether or not activity event monitor records are to be collected for a violated threshold.

Table 175. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element to determine whether to expect an activity event for the activity that violated the threshold to be written to the activity event monitor.

When an activity finishes or aborts and the activity event monitor is active at the time, if the value of this monitor element is 'Y', the activity that violated this

threshold will be collected. If the value of this monitor element is 'N', it will not be collected.

activity_id - Activity ID monitor element

Counter which uniquely identifies an activity for an application within a given unit of work.

Table 176. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 177. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Activities	event_activity	Always collected
Activities	event_activitystmt	Always collected
Activities	event_activityvals	Always collected
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Threshold violations	event_thresholdviolations	Always collected

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity.

To uniquely identify an activity outside its unit of work, use the combination of **activity_id** and **uow_id** plus one of the following monitor elements: **appl_id** or **agent_id**.

activity_secondary_id - Activity secondary ID monitor element

The value for this element is incremented each time an activity record is written for the same activity.

For example, if an activity record is written once as a result of having called the WLM_CAPTURE_ACTIVITY_IN_PROGRESS procedure and a second time when the activity ends, the element would have a value of 0 for the first record and 1 for the second record.

Table 178. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-

Table 178. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitystmt	-
Activities	event_activityvals	-
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Usage

Use this element with **activity_id**, **uow_id**, and **appl_id** monitor elements to uniquely identify activity records when information about the same activity has been written to the activities event monitor multiple times.

For example, information about an activity would be sent to the activities event monitor twice in the following case:

- the WLM_CAPTURE_ACTIVITY_IN_PROGRESS stored procedure was used to capture information about the activity while it was running
- information about the activity was collected when the activity completed, because the COLLECT ACTIVITY DATA clause was specified on the service class with which the activity is associated

activity_state - Activity state monitor element

The current state of the activity.

Table 179. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE _ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Usage

Use this monitor element to understand what the activity is currently doing (for example, is the activity stuck in a queue or waiting for input from the client).

Possible values include:

- CANCEL_PENDING
- EXECUTING
- IDLE
- INITIALIZING
- QP_CANCEL_PENDING
- QP_QUEUED
- QUEUED
- TERMINATING
- UNKNOWN

activity_type - Activity type monitor element

The type of the activity.

Table 180. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE _ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 181. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

The possible values are:

- LOAD
- READ_DML
- WRITE_DML
- DDL
- CALL
- OTHER

The value OTHER is returned for SET statements that do not perform SQL (for example, SET special register, or SET EVENT MONITOR STATE) and the LOCK TABLE statement.

activitytotaltime_threshold_id - Activity total time threshold ID monitor element

The ID of the ACTIVITYTOTALTIME threshold that was applied to the activity.

Table 182. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which ACTIVITYTOTALTIME threshold, if any, was applied to the activity.

activitytotaltime_threshold_value - Activity total time threshold value monitor element

A timestamp that is computed by adding the ACTIVITYTOTALTIME threshold duration to the activity entry time. If the activity is still executing when this timestamp is reached, the threshold will be violated.

Table 183. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the ACTIVITYTOTALTIME threshold applied to the activity, if any.

activitytotaltime_threshold_violated - Activity total time threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the ACTIVITYTOTALTIME threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 184. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the ACTIVITYTOTALTIME threshold that was applied to the activity.

adapter_name - Adapter name monitor element

Name of the network adapter on this host.

Table 185. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

address - IP address from which the connection was initiated

The IP address from which the activity connection was initiated.

Table 186. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 187. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-

Usage

Use this to identify the IP address from which the activity connection was initiated. Secure domain names are shown converted to an IP address.

agent_id - Application handle (agent ID) monitor element

A system-wide unique ID for the application. In a single-member database configuration, this identifier consists of a 16-bit counter. In a multi-member configuration, this identifier consists of the coordinating member number concatenated with a 16-bit counter. In addition, this identifier is the same on every member where the application may make a secondary connection.

Table 188. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 189. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic

Table 189. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	appl_lock_list	Basic
DCS Application	dcs_appl_info	Basic
Transaction	event_xact	-

Table 190. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	Always collected
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Statements	event_stmt	Always collected
Statements	event_subsection	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected
Threshold violations	event_thresholdviolations	Always collected
Activities	event_activity	Always collected
Change history	changesummary	Always collected

- 1** This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The application handle, also known as the agent ID, can be used to uniquely identify an active application.

Note: The **agent_id** monitor element has different behavior depending on your version of DB2. When taking snapshots from DB2 with version SQLM_DBMON_VERSION1 or SQLM_DBMON_VERSION2 to a DB2 (Version 5 or greater) database, the **agent_id** returned is not usable as an application identifier, rather it is the **agent_pid** of the agent serving the application. In these cases an **agent_id** is still returned for compatibility with earlier releases, but internally the DB2 database server will not recognize the value as an **agent_id**.

This value can be used as input to GET SNAPSHOT commands that require an agent ID or to the monitor table functions that require an application handle.

When reading event traces, it can be used to match event records with a given application.

It can also be used as input to the FORCE APPLICATION command or API. On multi-node systems this command can be issued from any node where the application has a connection. Its effect is global.

agent_id_holding_lock - Agent ID Holding Lock

The application handle of the agent holding a lock for which this application is waiting. The lock monitor group must be turned on to obtain this information.

Table 191. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock_wait	Lock

Usage This element can help you determine which applications are in contention for resources.

If this element is 0 (zero) and the application is waiting for a lock, this indicates that the lock is held by an indoubt transaction. You can use either `appl_id_holding_lk` or the command line processor `LIST INDOUBT TRANSACTIONS` command (which displays the application ID of the CICS® agent that was processing the transaction when it became indoubt) to determine the indoubt transaction, and then either commit it or roll it back.

Note that more than one application can hold a shared lock on an object for which this application is waiting. See `lock_mode` for information about the type of lock that the application holds. If you are taking an application snapshot, only one of the agent IDs holding a lock on the object will be returned. If you are taking a lock snapshot, all of the agent IDs holding a lock on the object will be identified.

agent_pid - Engine dispatchable unit (EDU) identifier monitor element

The unique identifier for the engine dispatchable unit (EDU) for the agent. Except on the Linux operating system, the EDU ID is mapped to the thread ID. On the Linux operating system, the EDU ID is a DB2 generated unique identifier.

Table 192. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	agent	Statement

Table 193. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-

Usage

You can use this element to link database system monitor information to other sources of diagnostic information, such as system traces. You can also use it to monitor how agents working for a database application use system resources.

agent_status - DCS Application Agents

In a connection concentrator environment, this value shows which applications currently have associated agents.

Element identifier
agent_status

Element type
information

Table 194. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage Values are:

- SQLM_AGENT_ASSOCIATED
The agent working on behalf of this application is associated with it.
- SQLM_AGENT_NOT_ASSOCIATED
The agent that was working on behalf of this application is no longer associated with it and is being used by another application. The next time work is done for this application without an associated agent, an agent will be re-associated.

agent_sys_cpu_time - System CPU Time used by Agent

The total *system* CPU time (in seconds and microseconds) used by the database manager agent process.

Element identifier
agent_sys_cpu_time

Element type
time

Table 195. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Timestamp

For snapshot monitoring at the application level, this counter can be reset. This counter cannot be reset at other levels.

Usage This element along with the other related CPU-time elements can help you understand the level of activity within an application, and may help you identify applications that could benefit from additional tuning.

This element includes CPU time for both SQL and non-SQL statements, as well as CPU time for any unfenced user-defined functions (UDFs)

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

Note: If this information is not available for your operating system, this element will be set to 0.

agent_tid - Agent thread ID monitor element

The thread ID of the agent or system entity. If this ID is unavailable, the value of the column is null.

Table 196. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - Get information about locks for which an application is waiting	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE

Table 197. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

agent_usr_cpu_time - User CPU Time used by Agent

The total CPU time (in seconds and microseconds) used by database manager agent process.

Element identifier

agent_usr_cpu_time

Element type

time

Table 198. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Timestamp

For snapshot monitoring, this counter can be reset.

Usage This element along with the other CPU-time related elements can help you identify applications or queries that consume large amounts of CPU.

This counter includes time spent on both SQL and non-SQL statements, as well as any unfenced user-defined functions (UDFs) or stored procedures executed by the application.

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

Note: If this information is not available for your operating system, this element will be returned as 0.

agent_wait_time - Agent wait time monitor element

Time spent by an application queued to wait for an agent under concentrator configurations. The value is given in milliseconds.

Table 199. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 200. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	Always collected

Usage

The **agent_wait_time** monitor element can be used to help evaluate how efficiently your system is running in a concentrator environment. A high agent wait relative to the **total_request_time** monitor element value indicates that requests are spending a lot of time queued waiting for agents, which may be indicative of one or more of the following events:

- The **max_coordagents** configuration parameter has been configured too small for your workload. You may need to increase the value of **max_coordagents** configuration parameter, or the ratio of **max_coordagents** configuration parameter to **max_connections** configuration parameter if you are running with both parameters set to AUTOMATIC, to ensure that enough coordinator agents are available to service your application requests in a timely manner.
- Your workload is not committing frequently enough. For the concentrator to work efficiently, applications should issue commits relatively frequently to ensure that their agents can be freed up to serve requests on other applications. If your applications do not do frequent commits you may need to configure a proportionally higher number of coordinator agents to reduce the time spent waiting for agents to become available.

agent_waits_total - Total agent waits monitor element

Number of times an application had to wait for an agent to be assigned under concentrator configurations.

Table 201. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 202. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

Usage

Use this element in conjunction with the **agent_wait_time** monitor element to determine the average amount of time an application request spends waiting for an agent in a concentrator environment.

agents_created_empty_pool - Agents Created Due to Empty Agent Pool

The number of agents created because the agent pool was empty. It includes the number of agents started at **db2start** time. (*num_initagents*).

Table 203. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage In conjunction with `agents_from_pool`, you can calculate the ratio of
 Agents Created Due to Empty Agent Pool / Agents Assigned From Pool

See `agents_from_pool` for information about using this element.

agents_from_pool - Agents Assigned From Pool

The number of agents assigned from the agent pool.

Table 204. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

This element can be used with the **agents_created_empty_pool** monitor element to determine how often an agent must be created because the pool is empty.

The following ratio

Agents Created Due to Empty Agent Pool / Agents Assigned From Pool

can be used to help set an appropriate value for the **num_poolagents** configuration parameter.

For most users, the default value of 100 with AUTOMATIC will ensure optimal performance.

This ratio may fluctuate somewhat with the workload. At times of low activity on the system, additional agent creation and termination may occur. At times of high activity on the system, more agent reuse will occur. A low ratio indicates that there is a high amount of agent reuse, which is expected on systems with high activity. A high ratio indicates a higher amount of agent creation than reuse is occurring. If this is a concern, increase the value for the **num_poolagents** configuration parameter to lower the ratio. However, this will cause additional resources consumption on the system.

agents_registered - Agents Registered

The number of agents registered in the database manager instance that is being monitored (coordinator agents and subagents).

Table 205. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

Use this element to help evaluate your settings for the **max_coordagents** and **max_connections** configuration parameters, as well as the intraquery parallelism settings.

agents_registered_top - Maximum Number of Agents Registered

The maximum number of agents that the database manager has ever registered, at the same time, since it was started (coordinator agents and subagents).

Table 206. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

You may use this element to help you evaluate your settings for the **max_coordagents** and **max_connections** configuration parameters, as well as the intraquery parallelism settings.

The number of agents registered at the time the snapshot was taken is recorded by the **agents_registered** monitor element.

agents_stolen - Stolen Agents

At the database manager snapshot level, this monitor element represents the number of idle agents associated with an application which get reassigned to work on a different application.

At the application snapshot level, this monitor element represents the number of idle agents associated with a different application which get reassigned to work on this application.

Table 207. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Usage

The `num_poolagents` configuration parameter is set to AUTOMATIC by default. This means that DB2 automatically manages the pooling of idle agents, which includes assigning work to idle agents associated with another application.

agents_top - Number of Agents Created

At the application level, this is the maximum number of agents that were used when executing the statement. At the database level, it is the maximum number of agents for all applications.

Element identifier

agents_top

Element type

watermark

Table 208. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement
Application	stmt	Statement

Usage An indicator how well intra-query parallelism was realized.

agents_waiting_on_token - Agents Waiting for a Token

The number of agents waiting for a token so they can execute a transaction in the database manager.

Note: The `agents_waiting_on_token` monitor element is deprecated starting with DB2 Version 9.5. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 209. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

You can use this element to help evaluate your setting for the **maxcagents** configuration parameter.

Each application has a dedicated coordinator agent to process database requests within the database manager. Each agent has to get a token before it can execute a transaction. The maximum number of agents that can execute database manager transactions is limited by the configuration parameter **maxcagents**.

agents_waiting_top - Maximum Number of Agents Waiting monitor element

The maximum number of agents that have ever been waiting for a token, at the same time, since the database manager was started.

Note: The **agents_waiting_top** monitor element is deprecated starting with DB2 Version 9.5. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 210. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

Use this element to help you evaluate your setting of the **maxcagents** configuration parameter.

The number of agents waiting for a token at the time the snapshot was taken is recorded by the **agents_waiting_on_token** monitor element.

If the **maxcagents** parameter is set to its default value (-1), no agents should wait for a token and the value of this monitor element should be zero.

agg_temp_tablespace_top - Aggregate temporary table space top monitor element

The **agg_temp_tablespace_top** monitor element stores the high watermark, in KB, for the aggregate temporary table space usage of DML activities at all nesting levels in a service class.

The aggregate is computed by summing the temporary table space usage across all activities in the service subclass, and this high watermark represents the highest value reached by this aggregate since the last reset. The monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class is set to NONE. An AGGSQLTEMPSPACE threshold must be defined and enabled for at least one service subclass in the same superclass as the subclass to which this record belongs, otherwise a value of 0 is returned.

Table 211. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	Always collected

Usage

Use this element to determine the highest aggregate DML activity system temporary table space usage reached on a member for a service subclass in the time interval collected.

aggsqtempespace_threshold_id - Aggregate SQL temporary space threshold ID monitor element

The numeric ID of the AGGSQLEMPSPACE threshold that was applied to the activity.

Table 212. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which AGGSQLEMPSPACE threshold, if any, was applied to the activity.

aggsqtempespace_threshold_value - AggSQL temporary space threshold value monitor element

The upper bound of the AGGSQLEMPSPACE threshold that was applied to the activity.

Table 213. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the AGGSQLEMPSPACE threshold applied to the activity, if any.

aggsqltempespace_threshold_violated - AggSQL temporary space threshold violated monitor element

The optional monitor element when set to 'Yes' indicates that the activity violated the AGGSQLTEMPSPACE threshold that was applied to it. 'No' indicates that the activity has not yet violated the threshold.

Table 214. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the AGGSQLTEMPSPACE threshold that was applied to the activity.

app_act_aborted_total - Total failed external coordinator activities monitor element

The total number of external, non-nested coordinator activities that completed with errors. For service classes, if an activity is remapped to a different service subclass with a REMAP ACTIVITY action before it aborts, the activity counts only toward the total of the subclass in which it aborts.

Table 215. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 215. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 216. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

app_act_completed_total - Total successful external coordinator activities monitor element

The total number of external, non-nested coordinator activities that completed successfully.

For service classes, if an activity is remapped to a different subclass with a REMAP ACTIVITY action before it completes, this activity counts only toward the total of the subclass it completes in.

Table 217. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 217. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 218. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

app_act_rejected_total - Total rejected external coordinator activities monitor element

The total number of external, non-nested coordinator activities at any nesting level that were rejected instead of being allowed to execute.

Table 219. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 219. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 220. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

appl_action - Application action monitor element

The action or request that the client application is performing.

Table 221. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

app_rqsts_completed_total - Total application requests completed monitor element

Total number of external (application) requests executed by the coordinator. For service subclasses, this monitor element is updated only for the subclass where the application request completes.

Table 222. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 223. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this monitor element to understand how many requests are being submitted into the system from applications.

appl_con_time - Connection Request Start Timestamp

The date and time that an application started a connection request.

Element identifier

appl_con_time

Element type

timestamp

Table 224. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Timestamp

Usage Use this element to determine when the application started its connection request to the database.

appl_id - Application ID monitor element

This identifier is generated when the application connects to the database at the database manager or when DB2 Connect receives a request to connect to a DRDA database.

Table 225. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE
PDLOGMSGs_LAST24HOURS administrative view and PD_GET_LOG_MSGS table function - Retrieve problem determination messages	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD _OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 226. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
DCS Application	dcs_appl_info	Basic
Lock	appl_lock_list	Basic

Table 227. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking ¹	lock_participants	Always collected
Unit of work ¹	uow, uow_executable_list, uow_metrics	Always collected
Connection	event_conn	Always collected
Connections	event_connheader	Always collected
Statements	event_stmt	Always collected
Transactions ²	event_xact	Always collected
Deadlocks ³	event_dlconn	Always collected
Deadlocks with Details ³	event_detailed_dlconn	Always collected
Activities	event_activitystmt	Always collected
Activities	event_activity	Always collected
Activities	event_activityvals	Always collected
Activities	event_activitymetrics	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

1. For this event monitor, this monitor element is returned in the column APPLICATION_ID.
2. This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR UNIT OF WORK statement to monitor transaction events.
3. This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This ID is known on both the client and server, so you can use it to correlate the client and server parts of the application. For DB2 Connect applications, you will also need to use **outbound_appl_id** monitor element to correlate the client and server parts of the application.

This identifier is unique across the network. There are different formats for the application ID, which are dependent on the communication protocol between the client and the server machine on which the database manager, DB2 Connect, or both are running. Each of the formats consists of three parts separated by periods.

1. TCP/IP

Format

IPAddr.Port.Timestamp

IPv4

Example

9.26.120.63.43538.090924175700

Details

In IPv4, a TCP/IP-generated application ID is composed of three sections. The first section is the IP address. It is represented as four decimal numbers of the form a.b.c.d. The second section is the port number, which is represented as 5 decimal characters. The third section is the approximate timestamp, represented as 12 decimal characters.

IPv6

Example

2002:91a:519:13:20d:60ff:feef:cc64.5309.090924175700

Details

In IPv6, a TCP/IP-generated application ID is composed of three sections. The first section contains the IPv6 address of the form a:b:c:d:e:f:g:h, where each of a-h is up to 4 hexadecimal digits. The second section is the port number. The third section is the approximate timestamp identifier for the instance of this application.

2. Local Applications

Format

*LOCAL.DB2 instance.Application instance

Example

*LOCAL.DB2INST1.930131235945

Details

The application ID generated for a local application is made up by concatenating the string *LOCAL, the name of the DB2 instance, and a unique identifier for the instance of this application.

For multiple database partition instances, LOCAL is replaced with Nx, where x is the partition number from which the client connected to the database. For example, *N2.DB2INST1.0B5A12222841.

Use the **client_protocol** monitor element to determine which communications protocol the connection is using and, as a result, the format of the **appl_id** monitor element.

appl_id_holding_lk - Application ID Holding Lock

The application ID of the application that is holding a lock on the object that this application is waiting to obtain.

Element identifier

appl_id_holding_lk

Element type

information

Table 228. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock

Table 228. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	appl_lock_list	Lock
Lock	lock_wait	Lock

Table 229. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage This element can help you determine which applications are in contention for resources. Specifically, it can help you identify the application handle (agent ID) and table ID that are holding the lock. Note that you may use the LIST APPLICATIONS command to obtain information to relate the application ID with an agent ID. However, it is a good idea to collect this type of information when you take the snapshot, as it could be unavailable if the application ends before you run the LIST APPLICATIONS command.

Note that more than one application can hold a shared lock on an object for which this application is waiting to obtain a lock. See lock_mode for information about the type of lock that the application holds. If you are taking an application snapshot, only one of the application IDs holding a lock on the object will be returned. If you are taking a lock snapshot, all of the application IDs holding a lock on the object will be returned.

appl_id_oldest_xact - Application with Oldest Transaction

The application ID (which corresponds to the *agent_id* value from the application snapshot) of the application that has the oldest transaction.

Element identifier

appl_id_oldest_xact

Element type

information

Table 230. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage This element can help you determine which application has the oldest active transaction. This application can be forced to free up log space. If it is taking up a great deal of log space, you should examine the application to determine if it can be modified to commit more frequently.

There are times when there is not a transaction holding up logging, or the oldest transaction does not have an application ID (for example, indoubt transaction or inactive transaction). In these cases, this application's ID is not returned in the data stream.

appl_idle_time - Application Idle Time

Number of seconds since an application has issued any requests to the server. This includes applications that have not terminated a transaction, for example not issued a commit or rollback.

Element identifier
appl_idle_time

Element type
information

Table 231. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Statement
DCS Application	dcs_appl	Statement

Usage This information can be used to implement applications that force users that have been idle for a specified number of seconds.

appl_name - Application name monitor element

The name of the application running at the client, as known to the database or DB2 Connect server.

Table 232. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMINTEMPCOLUMNS administrative view and ADMIN_GET_TEMP_COLUMNS table function - Retrieve column information for temporary tables	ACTIVITY METRICS BASE
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 233. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic
DCS Application	dcs_appl_info	Basic

Table 234. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Activities	event_activity	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

This element can be used with **appl_id** to relate data items with your application.

In a client-server environment, this name is passed from the client to the server when establishing the database connection. Any non-English characters in the application name will be removed. A CLI application can set the `SQL_ATTR_INFO_PROGRAMNAME` attribute with a call to `SQLSetConnectAttr`. When `SQL_ATTR_INFO_PROGRAMNAME` is set before the connection to the server is established, the value specified overrides the actual client application name and will be the value that is displayed in the **appl_name** monitor element.

In situations where the client application code page is different from the code page under which the database system monitor is running, you can use **codepage_id** to help translate **appl_name**.

appl_priority - Application Agent Priority

The priority of the agents working for this application.

Element identifier

appl_priority

Element type

information

Table 235. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Table 236. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage You can use this element to check if applications are running with the expected priorities. Application priorities can be set by an administrator. They can be changed by the governor utility (**db2gov**).

The governor is used by DB2 to monitor and change the behavior of applications running against a database. This information is used to schedule applications and balance system resources.

A governor daemon collects statistics about the applications by taking snapshots. It checks these statistics against the rules governing applications

running on that database. If the governor detects a rule violation, it takes the appropriate action. These rules and actions were specified by you in the governor configuration file.

If the action associated with a rule is to change an application's priority, the governor changes the priority of the agents in the partition where the violation was detected.

appl_priority_type - Application Priority Type

Operating system priority type for the agent working on behalf of the application.

Element identifier

appl_priority_type

Element type

information

Table 237. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Table 238. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage Dynamic priority is recalculated by the operating system based on usage. Static priority does not change.

appl_section_inserts - Section Inserts monitor element

Inserts of SQL sections by an application from its shared SQL workspace.

Table 239. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

Table 240. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage

The working copy of any executable section is stored in a shared SQL workspace. This is a count of when a copy was not available and had to be inserted.

appl_section_lookups - Section Lookups

Lookups of SQL sections by an application from its shared SQL workspace.

Table 241. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 242. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage

Each agent has access to a shared SQL workspace where the working copy of any executable section is kept. This counter indicates how many times the SQL work area was accessed by agents for an application.

appl_status - Application status monitor element

The current status of the application.

Table 243. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic

Table 244. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Connection	event_conn	Always collected

Usage

For a locking event monitor's lock wait, lock timeout, or deadlock event, the lock requester reports the appl_status value that was in effect before entering lock wait status rather than the current lock wait status.

This element can help you diagnose potential application problems. Values for this field are listed in the following table.

API Constant	Description
SQLM_AUTONOMOUS_WAIT	Autonomous Wait: The application is waiting for an autonomous routine to complete.

API Constant	Description
SQLM_BACKUP	Backing Up Database: The application is performing a backup of the database.
SQLM_COMMIT_ACT	Commit Active: The unit of work is committing its database changes.
SQLM_COMP	Compiling: The database manager is compiling an SQL statement or precompiling a plan on behalf of the application.
SQLM_CONNECTED	Database Connect Completed: The application has initiated a database connection and the request has completed.
SQLM_CONNECTPEND	Database Connect Pending: The application has initiated a database connection but the request has not yet completed.
SQLM_CREATE_DB	Creating Database: The agent has initiated a request to create a database and that request has not yet completed.
SQLM_DECOUPLED	Decoupled from Agent: There are no agents currently associated with the application. This is a normal state. When the Connection Concentrator is enabled, there is no dedicated coordinator agent, so an application can be decoupled on the coordinator partition. In non-concentrator environments, an application cannot be decoupled on the coordinator partition as there will always be a dedicated coordinator agent .
SQLM_DISCONNECTPEND	Database Disconnect Pending: The application has initiated a database disconnect but the command has not yet completed executing. The application may not have explicitly executed the database disconnect command. The database manager will disconnect from a database if the application ends without disconnecting.
SQLM_INTR	Request Interrupted: An interrupt of a request is in progress.
SQLM_IOERROR_WAIT	Wait to Disable Table space: The application has detected an I/O error and is attempting to disable a particular table space. The application has to wait for all other active transactions on the table space to complete before it can disable the table space.
SQLM_LOAD	Data Fast Load: The application is performing a "fast load" of data into the database.
SQLM_LOCKWAIT	Lock Wait: The unit of work is waiting for a lock. After the lock is granted, the status is restored to its previous value.
SQLM_QUIESCE_TABLESPACE	Quiescing a Table space: The application is performing a quiesce table space request.
SQLM_RECOMP	Recompiling: The database manager is recompiling (that is, rebinding) a plan on behalf of the application.
SQLM_REMOTE_RQST	Federated request pending: The application is waiting for results from a federated data source.

API Constant	Description
SQLM_RESTART	Restarting Database: The application is restarting a database in order to perform crash recovery.
SQLM_RESTORE	Restoring Database: The application is restoring a backup image to the database.
SQLM_ROLLBACK_ACT	Rollback Active: The unit of work is rolling back its database changes.
SQLM_ROLLBACK_TO_SAVEPOINT	Rollback to savepoint: The application is rolling back to a savepoint.
SQLM_TEND	Transaction Ended: The unit of work is part of a global transaction that has ended but has not yet entered the prepared phase of the two-phase commit protocol.
SQLM_THABRT	Transaction Heuristically Rolled Back: The unit of work is part of a global transaction that has been heuristically rolled-back.
SQLM_THCOMT	Transaction Heuristically Committed: The unit of work is part of a global transaction that has been heuristically committed.
SQLM_TPREP	Transaction Prepared: The unit of work is part of a global transaction that has entered the prepared phase of the two-phase commit protocol.
SQLM_UNLOAD	Data Fast Unload: The application is performing a "fast unload" of data from the database.
SQLM_UOWEXEC	Unit of Work Executing: The database manager is executing requests on behalf of the unit of work.
SQLM_UOWQUEUED	Unit of Work queued: The unit of work is queued, waiting for another activity to complete execution. The unit of work is queued because the threshold for the number of concurrently executing activities has been reached.
SQLM_UOWWAIT	Unit of Work waiting: The database manager is waiting on behalf of the unit of work in the application. This status typically means that the system is executing in the application's code.
SQLM_WAITFOR_REMOTE	Pending remote request: The application is waiting for a response from a remote partition in a partitioned database instance.

application_handle - Application handle monitor element

A system-wide unique ID for the application. In a single-member database configuration, this identifier consists of a 16-bit counter. In a multi-member configuration, this identifier consists of the coordinating member number concatenated with a 16-bit counter. In addition, this identifier is the same on every member where the application may make a secondary connection.

Table 245. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 245. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 246. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic
DCS Application	dcs_appl_info	Basic
Transaction	event_xact	-

Table 247. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	Always collected
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Statements	event_stmt	Always collected
Statements	event_subsection	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected
Threshold violations	event_thresholdviolations	Always collected
Activities	event_activity	Always collected
Change history	changesummary	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This monitor element is an alias of the **agent_id** monitor element.

When returned by MON_GET_MEMORY_POOL, this monitor element is NULL except when the memory pool being described is one of the following types:

- APPLICATION
- STATISTICS
- STATEMENT
- SORT_PRIVATE.

appls_cur_cons - Applications Connected Currently

Indicates the number of applications that are currently connected to the database.

Table 248. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Lock	db_lock_list	Basic

Usage You may use this element to help you understand the level of activity within a database and the amount of system resource being used.

It can help you adjust the setting of the *maxappls* and *max_coordagents* configuration parameters. For example, its value is always the same as *maxappls*, you may want to increase the value of *maxappls*. See the *rem_cons_in* and the *local_cons* monitor elements for more information.

appls_in_db2 - Applications Executing in the Database Currently

Indicates the number of applications that are currently connected to the database, and for which the database manager is currently processing a request.

Table 249. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

arm_correlator - Application response measurement correlator monitor element

Identifier of a transaction in the Application Response Measurement (ARM) standard.

Table 250. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-

Usage

This element can be used to link an activity collected by the activities event monitor to the applications associated with the activity, if such applications also support the Application Response Measurement (ARM) standard.

associated_agents_top - Maximum Number of Associated Agents

The maximum number of subagents associated with this application.

Table 251. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

async_read_time - Asynchronous read time monitor element

The total amount of time that asynchronous engine dispatchable units (EDUs) spent reading from the buffer pool or table space. This value is reported in milliseconds.

Table 252. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

async_write_time - Asynchronous write time monitor element

The total amount of time that asynchronous engine dispatchable units (EDUs) spent writing to the buffer pool or table space. This value is reported in milliseconds.

Table 253. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

async_runstats - Total number of asynchronous RUNSTATS requests monitor element

The total number of successful asynchronous RUNSTATS activities performed by real-time statistics gathering for all the applications in the database. Values reported by all the database partitions are aggregated together.

Table 254. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 255. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement

For snapshot monitoring, this counter can be reset.

Table 256. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Use this element to determine how many successful asynchronous RUNSTATS activities have been performed by real-time statistics gathering. This value changes frequently. In order to get a better view of the system usage, take a snapshot at specific intervals over an extended period of time. When used in conjunction with **sync_runstats** and **stats_fabrications** monitor elements, this element can help you to track the different types of statistics collection activities related to real-time statistics gathering and analyze their performance impact.

audit_events_total - Total audit events monitor element

The total number of audit events generated.

Table 257. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 257. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 258. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

audit_file_write_wait_time - Audit file write wait time monitor element

Time spent waiting to write an audit record. The value is given in milliseconds.

Table 259. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 259. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 260. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE

Table 260. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the amount of time an agent spends waiting to open and write an audit event synchronously to disk.

In a typical scenario, only one agent attempts to open the audit log file at a time, as the other agents wait for access to the audit common subsystem before opening the file. Therefore, the wait time usually represents the time spent waiting to write the file to disk by the operating system. Audit utilities might lock the audit log file during execution, which causes a longer than normal wait time for agents to open and write to the audit log file. If asynchronous auditing is enabled, audit events that are larger than the asynchronous audit buffer are written directly to disk, instead of to the buffer, and contribute to the wait time.

Outside of the special audit utility scenario, the wait time depends on the speed of the disks and how quickly the operating system can write the data to them. In order to reduce this wait time for a given application and audit configuration, you might tune the operating system or use faster disks.

audit_file_writes_total - Total audit files written monitor element

The total number of times an agent has had to wait to write an audit event directly to disk.

Table 261. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 261. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 262. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element in conjunction with the `audit_file_write_wait_time` monitor element to determine the average time an application request spends waiting to open and write an audit event synchronously to disk.

audit_subsystem_wait_time - Audit subsystem wait time monitor element

Time spent waiting for space in audit buffer. Waiting occurs when audit buffer is full and agent must wait for audit daemon to write buffer to disk. The value is given in milliseconds.

Table 263. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 263. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 264. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the amount of time an agent spends waiting to access the audit common subsystem, while the audit common subsystem is busy handling events for other agents.

Certain common portions of the audit subsystem can only be accessed by a single agent at a time. The value of this monitor element indicates the amount of time that an agent must wait to access the audit common subsystem. This includes time spent by an agent that has filled the current asynchronous buffer waiting for the audit daemon to finish writing out a previous asynchronous buffer to disk. Other agents that are waiting while writing to the audit log file or waiting to make a request of the audit daemon have also accessed the audit common subsystem and wait times there will be reflected in this value.

To reduce this wait time, you might change the value of the **audit_buf_sz** configuration parameter if asynchronous auditing is in use. You can increase the value of the **audit_buf_sz** configuration parameter until further increases no longer show any reductions in the audit common subsystem wait time. At this point, the asynchronous buffers are large enough such that the daemon is able to write one full buffer to disk before the next buffer is full, and then the daemon is no longer a

bottleneck. If the value of the `audit_buf_sz` configuration parameter must be increased to such an extent that too many audit records could be lost if a system failure were to occur, then you might reduce the wait time by tuning the operating system or using faster disks. If further reduction in the wait time is necessary, then use audit policies to reduce the number of audit events generated.

audit_subsystem_waits_total - Total audit subsystem waits monitor element

Number of times audit has waited for a buffer write.

Table 265. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 265. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 266. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the total number of times an agent has had to access the audit common subsystem. The generation of one audit event may need to access the audit common subsystem none, one, or more times to record the event. Use the **audit_events_total** monitor element to determine the exact number of audit events generated.

auth_id - Authorization ID

The authorization ID of the user who invoked the application that is being monitored. On a DB2 Connect gateway node, this is the user's authorization ID on the host.

Table 267. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE

Table 268. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic
DCS Application	dcs_appl_info	Basic

Table 269. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Unit of work	-	Always collected
Connections	event_connheader	Always collected

Usage

In an explicit trusted connection, the **auth_id** value does not change immediately when you switch users. Rather, the **auth_id** is updated the first time you access the database after switching users. This is because the switch user operation is always chained to the subsequent operation.

You can use this element to determine who invoked the application.

authority_bitmap - User authorization level monitor element

The authorities granted to the user and to the groups to which the user belongs. These include authorities granted to roles that are granted to the user and to the groups to which the user belongs.

Authorities granted to a user or to roles granted to the user are considered user authorities. Authorities granted to a group to which the user belongs or to roles granted to the group to which the user belongs are considered group authorities.

Table 270. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic
Application	appl_info	Basic

Table 271. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage

The **authority_bitmap** monitor element has the format of an array. Each array element is a single character that represents whether or not the user ID has been granted a specific authority and how the user has received that authority.

Individual array elements are indexed through an index value defined in the `sql.h` file. The value of an index in the **authority_bitmap** array is called an *authority index*. For example, `SQL_DBAUTH_SYSADM` is the index to determine if the user has `SYSADM` authority.

The value of one element in the **authority_bitmap** array identified by an authority index represents whether the authority is held by an authorization ID. To determine how the authorization ID is held, for each array element identified by the authority index, use the following defines from `sql.h`:

SQL_AUTH_ORIGIN_USER

If this bit is on, then the authorization ID has the authority granted to the user or to a role granted to the user.

SQL_AUTH_ORIGIN_GROUP

If this bit is on, then the authorization ID has the authority granted to the group or to a role granted to the group.

For example, to determine if a user holds DBADM authority, verify the following value:

```
authority_bitmap[SQL_DBAUTH_DBADM]
```

To determine if the DBADM authority is held directly by the user, verify the following:

```
authority_bitmap[SQL_DBAUTH_DBADM] & SQL_AUTH_ORIGIN_USER
```

authority_lvl - User authorization level monitor element

The highest authority level granted to an application.

Note: The authority_lvl monitor element is deprecated starting with DB2 database Version 9.5. Use the authority_bitmap monitor element instead. See “authority_bitmap - User authorization level monitor element” on page 749.

Table 272. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic
Application	appl_info	Basic

Table 273. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage The operations allowed by an application are granted either directly or indirectly.

The following defines from sql.h may be used to determine the authorizations granted explicitly to a user:

- SQL_SYSADM
- SQL_DBADM
- SQL_CREATETAB
- SQL_BINDADD
- SQL_CONNECT
- SQL_CREATE_EXT_RT
- SQL_CREATE_NOT_FENC
- SQL_SYSCTRL
- SQL_SYSMANT

The following defines from sql.h may be used to determine indirect authorizations inherited from group or public:

- SQL_SYSADM_GRP
- SQL_DBADM_GRP

- SQL_CREATETAB_GRP
- SQL_BINDADD_GRP
- SQL_CONNECT_GRP
- SQL_CREATE_EXT_RT_GRP
- SQL_CREATE_NOT_FENC_GRP
- SQL_SYSCtrl_GRP
- SQL_SYSMaint_GRP

auto_storage_hybrid - Hybrid automatic storage table space indicator monitor element

If the table space is an automatic storage table space with some non-automatic storage containers, this monitor element returns a value of 1. Otherwise, it returns a value of 0.

Table 274. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Usage

A hybrid automatic storage table space is a table space that has been converted to be managed by automatic storage using the ALTER TABLESPACE command, but has not yet been rebalanced. This table space still has non-automatic storage containers. After the table space is rebalanced, it contains only automatic storage containers, and is no longer considered a hybrid table space.

automatic - Buffer pool automatic monitor element

Indicates whether a particular buffer pool has self-tuning enabled. This element is set to 1 if self-tuning is enabled for the buffer pool; and 0 otherwise.

Table 275. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE

backup_timestamp - Backup timestamp

Timestamp of the backup image.

Table 276. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary	Always collected

Usage

For the change history event monitor:

- If UTILITY_TYPE is BACKUP and EVENT_TYPE is UTILSTART, the BACKUP_TIMESTAMP value is the timestamp of the backup image. If UTILITY_TYPE is RESTORE and EVENT_TYPE is UTILSTOP, the BACKUP_TIMESTAMP value is the timestamp of the backup image. For all other cases, the BACKUP_TIMESTAMP is an empty string.
- For RESTORE, the image timestamp is not always known at the start time of the utility.

A BACKUP_TIMESTAMP can be correlated with information stored in the database history file (for example, Lookup sequence information) using the SYSIBMADM.DB_HISTORY administration view

bin_id - Histogram bin identifier monitor element

The identifier of a histogram bin. The **bin_id** is unique within a histogram.

Table 277. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	-

Usage

Use this element to distinguish bins within the same histogram.

binds_precompiles - Binds/Precompiles Attempted

The number of binds and pre-compiles attempted.

Element identifier

binds_precompiles

Element type

counter

Table 278. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 279. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gain insight into the current level of activity within the database manager.

This value does not include the count of *int_auto_rebinds*, but it does include binds that occur as a result of the REBIND PACKAGE command.

block_ios - Number of block I/O requests monitor element

The number of block I/O requests. More specifically, the number of times DB2 performs sequential prefetching of pages into the block area of the buffer pool.

Table 280. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 281. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Buffer Pool

Usage

If block-based buffer pool is enabled, this monitor element will report how often block I/O is being done. Otherwise, this monitor element will return 0. The number of block I/O requests is monitored only during sequential prefetching when using block-based buffer pools.

If block-based buffer pool is enabled and this number is very low, or close to the number of vectored I/Os (the value of the **vectored_ios** monitor element), consider changing the block size. This state can be an indication of the following occurrences:

- The extent size of one or more table spaces bound to the buffer pool is smaller than the block size specified for the buffer pool.
- Some pages requested in the prefetch request are already present in the page area of the buffer pool.

The prefetcher allows some wasted pages in each buffer pool block, but if too many pages are wasted, then the prefetcher will decide to perform vectored I/O into the page area of the buffer pool.

To take full advantage of the sequential prefetch performance improvements that block-based buffer pools provide, it is essential to choose an appropriate value for the block size. This can, however, be difficult because multiple table spaces with different extent sizes can be bound to the same block-based buffer pool. For optimal performance, it is recommended that you bind table spaces with the same extent size to a block-based buffer pool with a block size equal to the extent size. Good performance can be achieved when the extent size of the table spaces are greater than the block size, but not when the extent size is smaller than the block size.

For example, if the extent size is 2 and the block size is 8, vectored I/O would be used instead of block I/O (block I/O would have wasted 6 pages). A reduction of the block size to 2 would solve this problem.

blocking_cursor - Blocking Cursor

This element indicates if the statement being executed is using a blocking cursor.

Element identifier

blocking_cursor

Element type

information

Table 282. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement

Table 283. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details	event_detailed_dlconn	Always collected
Statements	event_stmt	Always collected

Usage Using blocking for data transfer for a query can improve its performance. The SQL used for a query can affect the use of blocking and might require some modification.

blocks_pending_cleanup - Pending cleanup rolled-out blocks monitor element

The total number of MDC table blocks in the database that are pending asynchronous cleanup following a roll out delete.

Table 284. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE

Table 285. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	-
Database	event_db	-

Usage

Use this element to determine the number of MDC table blocks that, following the deletion of a defer cleanup roll out, have not been released back to the system as available storage.

bottom - Histogram bin bottom monitor element

The exclusive bottom end of the range of a histogram bin. The value of this monitor element is also the top inclusive end of the range of the previous histogram bin, if there is one.

Table 286. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	-

Usage

Use this element with the corresponding **top** element to determine the range of a bin within a histogram.

boundary_leaf_node_splits - Boundary leaf node splits monitor element

Number of times a boundary leaf node was split during an insert operation.

Table 287. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

bp_cur_buffsz - Current Size of Buffer Pool

The current buffer pool size, in pages.

Table 288. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	ACTIVITY METRICS BASE

Table 289. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool_nodeinfo	Buffer Pool

bp_id - Buffer pool identifier monitor element

This element contains the buffer pool identifier for the buffer pool that is being monitored.

Table 290. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Basic

bp_name - Buffer pool name monitor element

The name of the buffer pool.

Table 291. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	ACTIVITY METRICS BASE

Table 292. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Basic

Usage Each database requires at least one buffer pool. Depending on your needs, you may choose to create several buffer pools, each of a different size, for a single database. The CREATE, ALTER, and DROP BUFFERPOOL statements allow you to create, change, or remove a buffer pool.

When a database is created, it has a default buffer pool called IBMDEFAULTBP with a size determined by the platform. It also has a set of system buffer pools, each corresponding to a different page size:

- IBMSYSTEMBP4K
- IBMSYSTEMBP8K
- IBMSYSTEMBP16K
- IBMSYSTEMBP32K

These system buffer pools cannot be altered.

bp_new_buffsz - New Buffer Pool Size

The size the buffer pool will be changed to once the database is restarted. When the ALTER BUFFERPOOL statement is executed as DEFERRED, the buffer pool size is not changed until the database is stopped and restarted.

Table 293. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool_nodeinfo	Buffer Pool

bp_pages_left_to_remove - Number of Pages Left to Remove

The number of pages left to remove from the buffer pool before the buffer pool resize is completed. This applies only to buffer pool resize operations invoked by ALTER BUFFERPOOL statements executed as IMMEDIATE.

Table 294. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool_nodeinfo	Buffer Pool

bp_tbsp_use_count - Number of Table Spaces Mapped to Buffer Pool

The number of table spaces using this buffer pool.

Table 295. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool_nodeinfo	Buffer Pool

buff_auto_tuning - FCM buffer auto-tuning indicator monitor element

Indicates whether the number of fast communication manager (FCM) buffers is set and tuned automatically. A value of 1 means "Yes"; a value of 0 means "No".

Table 296. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Usage

FCM buffer auto-tuning is enabled by setting the **fcm_num_buffers** configuration parameter to AUTOMATIC.

buff_free - FCM Buffers Currently Free

This element indicates the number of FCM buffers currently free.

Element identifier

buff_free

Element type

gauge

Table 297. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 298. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm	Basic

Usage

To calculate the percentage of free FCM buffers, use the following formula:

$$(\text{buff_free}/\text{buff_total}) * 100$$

If the percentage of free FCM buffers falls below 20% and if the FCM buffer auto-tuning is enabled, then DB2 database manager will adjust the FCM buffer numbers.

If the percentage of free FCM buffers falls below 20% and if the FCM buffer auto-tuning is not enabled, then you need to tune the **fcm_num_buffers** configuration parameter.

buff_free_bottom - Minimum FCM Buffers Free

The lowest number of free FCM buffers reached during processing.

Table 299. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 300. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm	Basic

Usage

Use this element along with the **fcm_num_buffers** configuration parameter to determine the maximum FCM buffer pool utilization. If the value of the **buff_free_bottom** monitor element is low, increase the value of the **fcm_num_buffers** configuration parameter to ensure that operations do not run out of FCM buffers. If the value of the **buff_free_bottom** monitor element is high, decrease the value of the **fcm_num_buffers** configuration parameter to conserve system resources.

buff_max - Maximum possible number of FCM buffers monitor element

Maximum number of fast communication manager (FCM) buffers that can be allocated, based on the amount of virtual memory reserved when the instance was started.

Table 301. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 302. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm	Basic

Usage

This internal monitor element is used by IBM Support only.

buff_total - Number of currently allocated FCM buffers monitor element

Number of fast communication manager (FCM) buffers currently allocated. This number includes both in-use buffers and free buffers.

Table 303. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 304. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm	Basic

Usage

If the **buff_auto_tuning** monitor element indicates that FCM is being tuned automatically, then the value of the **buff_total** monitor element is adjusted based on the demand for FCM buffers.

To determine the number of FCM buffers currently in use, use the following formula:

$\text{buff_total} - \text{buff_free}$

To calculate the percentage of free FCM buffers, use the following formula:

$(\text{buff_free}/\text{buff_total}) * 100$

If the percentage of free FCM buffers falls below 20% and if the FCM buffer auto-tuning is enabled, then DB2 database manager will adjust the FCM buffer numbers.

If the percentage of free FCM buffers falls below 20% and if the FCM buffer auto-tuning is not enabled, then you need to tune the **fcm_num_buffers** configuration parameter.

byte_order - Byte Order of Event Data

The byte ordering of numeric data, specifically whether the event data stream was generated on a “big endian” server (for example, a RS/6000®) or “little endian” server (for example, an Intel-based PC running Windows 2000).

Table 305. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	Always collected

Usage This information is needed to allow you to interpret numeric data in the data stream, since the byte order of integers on a “big endian” server is the reverse of the byte order on a “little endian” server.

If the application that processes the data recognizes that it is running on one type of computer hardware (for example, a big endian computer), while the event data was produced on the other type of computer hardware (for example, a little endian computer), then the monitoring application will have to reverse the bytes of numeric data fields before interpreting them. Otherwise, byte reordering is not required.

This element can be set to one of the following API constants:

- SQLM_BIG_ENDIAN
- SQLM_LITTLE_ENDIAN

cached_timestamp - Cached timestamp monitor element

The time when the server list was cached.

Table 306. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_SERVERLIST table function - get member priority details	Always collected

call_stmt_routine_id - Call statement routine identifier monitor element

For CALL statements, this is the routine ID of the procedure being invoked.

The element returns NULL if the row does not correspond to a CALL statement.

Table 307. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected

Usage

This element can be used to recreate the hierarchy of embedded and recursive routine calls.

call_stmt_subroutine_id - Call statement subroutine identifier monitor element

For CALL statements to a subroutine, this is the subroutine ID of the procedure being invoked.

Table 308. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected

Usage

This element can be used to recreate the hierarchy of embedded and recursive routine calls.

cat_cache_heap_full - Catalog cache heap full monitor element monitor element

The number of times that an insert into the catalog cache failed due to a heap-full condition in the database heap.

Table 309. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Connections	event_conn	Always collected

Usage

The catalog cache draws its storage dynamically from the database heap and even if the cache storage has not reached its limit, inserts into the catalog cache may fail due to a lack of space in the database heap. If the catalog cache heap full count is not zero, then this insert failure condition can be corrected by increasing the database heap size or reducing the catalog cache size.

cat_cache_inserts - Catalog cache inserts monitor element

The number of times that the system tried to insert table descriptor or authorization information into the catalog cache.

Table 310. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 310. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 311. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 312. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

In conjunction with "Catalog Cache Lookups", you can calculate the catalog cache hit ratio using the following formula:

$$1 - (\text{Catalog Cache Inserts} / \text{Catalog Cache Lookups})$$

See the **cat_cache_lookups** monitor element for more information about using this element.

cat_cache_lookups - Catalog cache lookups monitor element

The number of times that the catalog cache was referenced to obtain table descriptor information or authorization information.

Table 313. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 314. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 315. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Table 315. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

This element includes both successful and unsuccessful accesses to the catalog cache. The catalog cache is referenced whenever:

- a table, view, or alias name is processed during the compilation of an SQL statement
- database authorization information is accessed
- a routine is processed during the compilation of an SQL statement

To calculate the catalog cache hit ratio use the following formula:

$$(1 - (\text{cat_cache_inserts} / \text{cat_cache_lookups}))$$

indicates how well the catalog cache is avoiding catalog accesses. If the ratio is high (more than 0.8), then the cache is performing well. A smaller ratio might suggest that the **catalogcache_sz** configuration parameter should be increased. You should expect a large ratio immediately following the first connection to the database.

The execution of Data Definition Language (DDL) SQL statements involving a table, view, or alias will evict the table descriptor information for that object from the catalog cache causing it to be re-inserted on the next reference. In addition, GRANT and REVOKE statements for database authorization and execute privilege of routines will evict the subject authorization information from the catalog cache. Therefore, the heavy use of DDL statements and GRANT/REVOKE statements may also increase the ratio.

cat_cache_overflows - Catalog Cache Overflows

The number of times that the catalog cache overflowed the bounds of its allocated memory.

Table 316. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 317. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage

Use this element with the **cat_cache_size_top** monitor element to determine whether the size of the catalog cache needs to be increased to avoid overflowing.

Catalog cache space is reclaimed by evicting table descriptor information for tables, views, or aliases, or authorization information that is not currently in use by any transaction.

If the value of the **cat_cache_overflows** monitor element is large, the catalog cache may be too small for the workload. Enlarging the catalog cache may improve its performance. If the workload includes transactions which compile a large number of SQL statements referencing many tables, views, aliases, user-defined functions, or stored procedures in a single unit of work, then compiling fewer SQL statements in a single transaction may improve the performance of the catalog cache. Or if the workload includes binding of packages containing many SQL statements referencing many tables, views, aliases, user-defined functions, or stored procedures, you can try splitting packages so that they include fewer SQL statements to improve performance.

cat_cache_size_top - Catalog cache high watermark monitor element

The largest logical size reached by the catalog cache.

Table 318. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 319. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

This element indicates the maximum number of bytes the catalog cache required logically for the workload run against the database since it was activated.

The catalog cache is managed by logical size, which does not include memory management usage. The **pool_watermark** element in the database snapshot provides the physical high water mark value for memory used by the catalog cache. The logical size rather than physical size should be used for catalog cache monitoring and tuning efforts.

If the catalog cache overflowed, then this element contains the largest size reached by the catalog cache during the overflow. Check the **cat_cache_overflows** monitor element to determine if such a condition occurred.

You can determine the minimum size of the catalog cache required by your workload by:

maximum catalog cache size / 4096

Rounding the result up to a whole number, indicates the minimum number of 4K pages required by the catalog cache to avoid overflow.

catalog_node - Catalog Node Number

The node number of the node where the database catalog tables are stored.

Element identifier

catalog_node

Element type

information

Table 320. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 321. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage The catalog node is the node where all system catalog tables are stored. All access to system catalog tables must go through this node.

catalog_node_name - Catalog Node Network Name

The network name of the catalog node.

Element identifier

catalog_node_name

Element type

information

Table 322. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 323. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element to determine the location of a database.

cf_waits - Number of cluster caching facility waits monitor element

The number of times that the DB2 database system waited while it communicated with a cluster caching facility.

Table 324. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 325. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

cf_wait_time - cluster caching facility wait time monitor element

The cf_wait_time monitor element stores the amount of time spent communicating with the cluster caching facility.

This time does not include time spent performing any of the processing that may have been requested by, or that may occur as a result of the communications, such as granting locks or performing page reclaims. The unit of measurement is milliseconds.

Table 326. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Usage

This value is an indicator of the amount of time DB2 has spent waiting while communicating with the cluster caching facility.

cfg_collection_type - Configuration collection type

Indicates when the configuration parameter value was collected:

Table 327. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

The change history event monitor collected this value as:

- I The initial value that was captured when the event monitor was activated.
- U Updated value

cfg_name - Configuration name

Name of the configuration parameter.

Table 328. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

For the change history event monitor, this element identifies the configuration parameter that was updated as part of a DBCFG or DBMCFG event, or captured at event monitor startup as part of a DBCFGVALUES or DBMCFGVALUES event. These events represent the following occurrences:

DBCFG

Changing a database configuration parameter

DBMCFG

Changing a database manager configuration parameter

DBCFGVALUES

Capturing database configuration parameter values at event monitor startup, if a database configuration parameter was changed while the event monitor was inactive

DBMCFGVALUES

Capturing database manager configuration parameter values at event monitor startup, if a database manager configuration parameter was changed while the event monitor was inactive

cfg_old_value - Configuration old value

The old value for the configuration parameter or the in memory configuration parameter value.

Table 329. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

For the change history event monitor:

- If the event is a change to a database configuration parameter (DBCFG) or a database manager configuration parameter (DBMCFG), this is the old configuration parameter value.
- If the event is a capture of database configuration parameter values (DBCFGVALUES) or database manager configuration parameter values (DBMCFGVALUES) that changed while the event monitor was inactive, this is the current in-memory configuration parameter value. This is the configuration parameter value currently in use.

cfg_old_value_flags - Configuration old value flags

This flag indicates how the old configuration parameter value was determined.

Table 330. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

For the change history event monitor, this element indicates how the old configuration parameter value was determined:

- AUTOMATIC
- COMPUTED
- NONE

If the event is a capture of database configuration parameter values (DBCFCGVALUES) or database manager configuration parameter values (DBMCFGVALUES) that changed while the event monitor was inactive, the flags represent the current in-memory value for the configuration parameter.

cfg_value - Configuration value

The new value for the configuration parameter or the on-disk configuration parameter value.

Table 331. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

For the change history event monitor:

- If the event is a change to a database configuration parameter (DBCFCG) or a database manager configuration parameter (DBMCFG), this is the new value for the configuration parameter.
- If the event is a capture of database configuration parameter values (DBCFCGVALUES) or database manager configuration parameter values (DBMCFGVALUES) that changed while the event monitor was inactive, this is the on-disk configuration parameter value. The on-disk configuration parameter value is the most current value and might not be in effect yet.

cfg_value_flags - Configuration value flags

This flag indicates how the new configuration parameter value was determined.

Table 332. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

For the change history event monitor, this element indicates how the new configuration parameter value was determined:

- AUTOMATIC
- COMPUTED
- NONE

If the event is a capture of database configuration parameter values (DBCFCGVALUES) or database manager configuration parameter values (DBMFCGVALUES) that changed while the event monitor was inactive, the flags represent the current on-disk value for the configuration parameter.

ch_auto_tuning - FCM channel auto-tuning indicator monitor element

Indicates whether the number of fast communication manager (FCM) channels is set and tuned automatically. A value of 1 means "Yes"; a value of 0 means "No".

Table 333. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Usage

FCM channel auto-tuning is enabled by setting the `fcm_num_channels` configuration parameter to AUTOMATIC.

ch_free - Channels Currently Free

This element indicates the number of FCM communication channels that are currently free.

Table 334. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 335. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcms	Basic

Usage

To calculate the percentage of free FCM channels, use the following formula:

$$(ch_free/ch_total) * 100$$

If the percentage of free FCM channels falls below 20% and if the FCM channel auto-tuning is enabled, then DB2 database manager will adjust the FCM channel numbers.

If the percentage of free FCM channels falls below 20% and if the FCM channel auto-tuning is not enabled, then you need to tune the `fcnum_channels` configuration parameter.

ch_free_bottom - Minimum Channels Free

The lowest number of free FCM communication channels reached during processing.

Table 336. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 337. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fc	Basic

Usage

Use this monitor element in conjunction with the `fcnum_channels` configuration parameter to determine the maximum connection entry utilization.

ch_max - Maximum possible number of FCM channels monitor element

Maximum number of fast communication manager (FCM) channels that can be allocated based on the amount of virtual memory reserved when the instance was started.

Table 338. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 339. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fc	Basic

Usage

This internal monitor element is used by IBM Support only.

ch_total - Number of currently allocated FCM channels monitor element

Number of fast communication manager (FCM) channels currently allocated. This number includes both in-use channels and free channels.

Table 340. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE

Table 341. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm	Basic

Usage

If the **ch_auto_tuning** monitor element indicates that FCM is being tuned automatically, then the value of the **ch_total** monitor element is adjusted based on the demand for FCM channels.

To determine the number of FCM channels currently in use, use the following formula:

$ch_total - ch_free$

To calculate the percentage of free FCM channels, use the following formula:

$(ch_free/ch_total) * 100$

If the percentage of free FCM channels falls below 20% and if the FCM channel auto-tuning is enabled, then DB2 database manager will adjust the FCM channel numbers.

If the percentage of free FCM channels falls below 20% and if the FCM channel auto-tuning is not enabled, then you need to tune the **fcm_num_channels** configuration parameter.

client_acctng - Client accounting string monitor element

The data passed to the target database for logging and diagnostic purposes, if the `sqlseti` API was issued in this connection. The current value of the `CLIENT_ACCTNG` special register for this connection, unit of work, or activity.

Note: This element is reported for the coordinating member only. On remote members, the value reported is a string with a length of 0.

This monitor element is synonymous to the **tpmon_acc_str** monitor element. The **client_acctng** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_acc_str** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 342. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 342. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD _OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 343. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	-
Unit of work	-	-
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

Use this element for problem determination and accounting purposes.

client_applname - Client application name monitor element

Identifies the server transaction program performing the transaction, if the `sqleset` API was issued in this connection. The current value of the `CLIENT_APPLNAME` special register for this connection, unit of work, or activity.

Note: This element is reported for the coordinating member only. On remote members, the value reported is a string with a length of 0.

This monitor element is synonymous to the `tpmon_client_app` monitor element. The `client_applname` monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The `tpmon_client_app` monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 344. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE

Table 344. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 345. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	-
Unit of work	-	-
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

Use this element for problem determination and accounting purposes.

client_db_alias - Database Alias Used by Application

The alias of the database provided by the application to connect to the database.

Element identifier

client_db_alias

Element type

information

Table 346. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic

Table 347. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connections	event_connheader	Always collected

Usage This element can be used to identify the actual database that the application is accessing. The mapping between this name and *db_name* could be done by using the database directories at the client node and the database manager server node.

This is the alias defined within the database manager where the database connection request originated.

This element can also be used to help you determine the authentication type, since different database aliases can have different authentication types.

client_hostname - Client hostname monitor element

The hostname of the machine the client application is connecting from.

Table 348. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 349. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

client_idle_wait_time - Client idle wait time monitor element

This monitor element records time spent waiting for the client to send its next request. The value is given in milliseconds.

Table 350. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 350. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 351. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	Always collected

Usage

Use this monitor element to determine the amount of time spent waiting for requests from a client, as opposed to working on requests. A high client idle time may indicate performance issues that need to be addressed on the client rather than the server.

client_nname - Client name monitor element

This monitor element is deprecated. The value returned is not a valid value.

Table 352. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transaction	event_connheader	
Statement	event_connheader	
Deadlock	event_connheader	
Connections	event_connheader	

client_pid - Client process ID monitor element

The process ID of the client application that made the connection to the database.

Table 353. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE

Table 354. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic
DCS Application	dcs_appl_info	Basic

Table 355. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

You can use this element to correlate monitor information such as CPU and I/O time to your client application.

In the case of a DRDA AS connection, this element will be set to 0.

client_platform - Client operating platform monitor element

The operating system on which the client application is running.

Table 356. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 357. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic
DCS Application	dcs_appl_info	Basic

Table 358. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

This element can be used for problem determination for remote applications. Values for this field can be found in the header file `sqlmon.h`.

client_port_number - Client port number monitor element

For TCP/IP connections, the port number on the client machine the application is using to communicate with the database server.

Table 359. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 360. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

client_prdid - Client product and version ID monitor element

The product and version that is running on the client. This monitor element is a synonym for the client_product_id monitor element.

Table 361. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 362. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
DCS Application	dcs_appl_info	Basic

Table 363. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Threshold violations	event_thresholdviolations	Always collected

Usage

You can use this element to identify the product and code version of the IBM data server client. It is in the form PPPVRRM, where:

- PPP identifies the product, which is “SQL” for the DB2 products
- VV identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version)
- RR identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release)
- M identifies a 1-character modification level (0-9 or A-Z).

client_protocol - Client communication protocol monitor element

The communication protocol that the client application is using to communicate with the server.

Table 364. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 365. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic
DCS Application	dcs_appl_info	Basic

Table 366. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Connections	event_connheader	Always collected
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

This element can be used for problem determination for remote applications. Values for this field are:

SQLM_PROT_UNKNOWN

The client is communicating using an unknown protocol. This value will only be returned if future clients connect with an earlier level of the server.

SQLM_PROT_LOCAL

The client is running on the same node as the server and no communications protocol is in use.

SQLM_PROT_TCPIP

TCP/IP

client_userid - Client user ID monitor element

The client user ID generated by a transaction manager and provided to the server, if the sqleseti API is used. The current value of the CLIENT_USERID special register for this connection, unit of work, or activity.

Note: This element is reported for the coordinating member only. On remote members, the value reported is a string with a length of 0.

This monitor element is synonymous to the **tpmon_client_userid** monitor element. The **client_userid** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_client_userid** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 367. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE

Table 367. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 368. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	-
Unit of work	-	-
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

Use this element in application server or Transaction Processing monitor environments to identify the end-user for whom the transaction is being executed.

client_wrkstname - Client workstation name monitor element

Identifies the client's system or workstation (for example CICS EITERMID), if the sqleseti API was issued in this connection. The current value of the CLIENT_WRKSTNNNAME special register for this connection, unit of work, or activity.

Note: This element is reported for the coordinating member only. On remote members, the value reported is a string with a length of 0.

This monitor element is synonymous to the **tpmon_client_wkstn** monitor element. The **client_wrkstname** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_client_wkstn** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 369. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 369. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD _OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 370. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	-	-
Unit of work	-	-
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

Usage

Use this element to identify the user's machine by node ID, terminal ID, or similar identifiers.

codepage_id - ID of Code Page Used by Application

The code page identifier.

Table 371. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
Lock	appl_lock_list	Basic
DCS Application	dcs_appl_info	Basic

Table 372. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	Always collected
Connections	event_connheader	Always collected

Usage For snapshot monitor data, this is the code page at the partition where the monitored application started. This identifier may be used for problem determination for remote applications. You may use this information to ensure that data conversion is supported between the application code page and the database code page (or for DRDA host databases, the host CCSID). For information about supported code pages, see the *Administration Guide* .

For event monitor data, this is the code page of the database for which event data is collected. You can use this element to determine whether

your event monitor application is running under a different code page from that used by the database. Data written by the event monitor uses the database code page. If your event monitor application uses a different code page, you may need to perform some character conversion to make the data readable.

comm_exit_wait_time - Communication buffer exit wait time monitor element

Time spent waiting for the return from a communication buffer exit library API function. The value is given in milliseconds.

Table 373. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 374. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	Always collected
Statistics	Event_scstats (reported in the details_xml document).	REQUEST METRICS BASE
Statistics	Event_wlstats (reported in the details_xml document).	REQUEST METRICS BASE

comm_exit_waits - Communication buffer exit number of waits monitor element

The number of times a communication buffer exit library API function is called.

Table 375. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 376. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	Always collected
Statistics	Event_scstats (reported in the details_xml document).	REQUEST METRICS BASE
Statistics	Event_wlstats (reported in the details_xml document).	REQUEST METRICS BASE

comm_private_mem - Committed Private Memory

The amount of private memory that the instance of the database manager has currently committed at the time of the snapshot. The comm_private_mem value returned is only relevant on Windows operating systems.

Table 377. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

commit_sql_stmts - Commit Statements Attempted

The total number of SQL COMMIT statements that have been attempted.

Table 378. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl	Basic

For snapshot monitoring, this counter can be reset.

Table 379. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage A small rate of change in this counter during the monitor period may indicate that applications are not doing frequent commits, which may lead to problems with logging and data concurrency.

You can also use this element to calculate the total number of units of work using the following expression:

```
commit_sql_stmts
+ int_commits
+ rollback_sql_stmts
+ int_rollbacks
```

Note: The units of work calculated will only include those since the later of:

- The connection to the database (for database-level information, this is the time of the first connection)
- The last reset of the database monitor counters.

This calculation can be done at a database or application level.

comp_env_desc - Compilation environment monitor element

This element stores information about the compilation environment used when compiling the SQL statement.

Table 380. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 380. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 381. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details History Values	event_stmt_history	Always collected
Deadlocks with Details History	event_stmt_history	Always collected
Activities	event_activitystmt	Always collected
Package cache	-	COLLECT BASE DATA

Table 382. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

Usage

This monitor element stores the compilation environment description in a binary large object. To view this information in readable form, use the `COMPILATION_ENV` table function.

You can provide this element as input to the `COMPILATION_ENV` table function, or to the `SET COMPILATION ENVIRONMENT` SQL statement.

completion_status - Completion status monitor element

The status of the unit of work.

Table 383. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected

Usage

Use this element to determine if the unit of work ended due to a deadlock or abnormal termination. The possible values are listed in the `sqllib/misc/DB2EvmonUOW.xsd` file:

- UNKNOWN
- COMMIT
- ROLLBACK
- GLOBAL_COMMIT
- GLOBAL_ROLLBACK
- XA_END
- XA_PREPARE

configured_cf_gbp_size - Configured cluster caching facility group buffer pool size monitor element

The allocated and reserved group buffer pool memory specified using the **cf_gbp_sz** configuration parameter, in pages with a page size of 4 KB.

Table 384. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_lock_size - Configured cluster caching facility lock size monitor element

Global lock memory configured, in pages with a page size of 4 KB. This value is specified using the **cf_lock_sz** configuration parameter.

Table 385. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_sca_size - Configured cluster caching facility shared communications area size monitor element

Shared communications area memory currently allocated and reserved, in pages with a page size of 4 KB. This value is specified using the **cf_sca_sz** configuration parameter.

Table 386. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_mem_size - Configured cluster caching facility memory size monitor element

Configured total memory size for the cluster caching facility, in pages with a page size of 4 KB. This value is specified using the **cf_mem_sz** configuration parameter.

Table 387. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

con_elapsed_time - Most Recent Connection Elapsed Time

The elapsed time that the DCS application that most recently disconnected from this host database was connected.

Element identifier
con_elapsed_time

Element type
time

Table 388. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Timestamp

Usage

Use this element as an indicator of the length of time that applications are maintaining connections to a host database.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

con_local_databases - Local Databases with Current Connects

The number of local databases that have applications connected.

Table 389. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage This value gives an indication of how many database information records you can expect when gathering data at the database level.

The applications can be running locally or remotely, and may or may not be executing a unit of work within the database manager

con_response_time - Most Recent Response Time for Connect

The elapsed time between the start of connection processing and actual establishment of a connection, for the most recent DCS application that connected to this database.

Element identifier
con_response_time

Element type
time

Table 390. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Timestamp

Usage

Use this element as an indicator of the time it currently takes applications to connect to a particular host database.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

concurrent_act_top - Concurrent activity top monitor element

The high watermark for the concurrent activities (at any nesting level) in a service subclass since the last reset.

Note: This element monitors the highest concurrent execution of all activities, including those activities that do not participate in the CONCURRENTDBCOORDACTIVITIES threshold. For example, although CALL statements do not count toward the concurrency that is enforced by the CONCURRENTDBCOORDACTIVITIES threshold, they are included in the concurrent activity high watermark measurement.

Table 391. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE

Table 392. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Usage

Use this element to know the highest concurrency of activities (including nested activities) reached on a member for a service subclass in the time interval collected.

concurrent_connection_top - Concurrent connection top monitor element

High watermark for concurrent coordinator connections in this service class since the last reset. This field has the same value in every subclass of the same superclass.

Table 393. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE

Table 394. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Usage

This element may be useful in determining where to place thresholds on connection concurrency by showing where the current high watermark is. It is also useful for verifying that such a threshold is configured correctly and doing its job.

concurrent_wlo_act_top - Concurrent WLO activity top monitor element

High watermark for concurrent activities (at any nesting level) of any occurrence of this workload since the last reset.

Table 395. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 396. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	-

Usage

Use this element to know the highest number of concurrent activities reached on a member for any occurrence of this workload in the time interval collected.

concurrent_wlo_top - Concurrent workload occurrences top monitor element

The high watermark for the concurrent occurrences of a workload since the last reset.

Table 397. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 398. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	-
Statistics	event_scstats	-

Usage

Use this element to know the highest concurrency of workload occurrences reached on a member for a workload in the time interval collected.

concurrentdbcoordactivities_db_threshold_id - Concurrent database coordinator activities database threshold ID monitor element

The ID of the CONCURRENTDBCOORDACTIVITIES database threshold that was applied to the activity.

Table 399. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CONCURRENTDBCOORDACTIVITIES database threshold, if any, was applied to the activity.

concurrentdbcoordactivities_db_threshold_queued - Concurrent database coordinator activities database threshold queued monitor element

This monitor element returns 'Yes' to indicate that the activity was queued by the CONCURRENTDBCOORDACTIVITIES database threshold. 'No' indicates that the activity was not queued.

Table 400. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand if the activity was queued by the CONCURRENTDBCOORDACTIVITIES database threshold applied to the activity.

concurrentdbcoordactivities_db_threshold_value - Concurrent database coordinator activities database threshold value monitor element

This monitor element returns the upper bound of the CONCURRENTDBCOORDACTIVITIES database threshold that was applied to the activity.

Table 401. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CONCURRENTDBCOORDACTIVITIES database threshold applied to the activity, if any.

concurrentdbcoordactivities_db_threshold_violated - Concurrent database coordinator activities database threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CONCURRENTDBCOORDACTIVITIES database threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 402. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CONCURRENTDBCOORDACTIVITIES database threshold that was applied to the activity.

concurrentdbcoordactivities_subclass_threshold_id - Concurrent database coordinator activities service subclass threshold ID monitor element

This monitor element returns the ID of the CONCURRENTDBCOORDACTIVITIES service subclass threshold that was applied to the activity.

Table 403. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CONCURRENTDBCOORDACTIVITIES service subclass threshold, if any, was applied to the activity.

concurrentdbcoordactivities_subclass_threshold_queued - Concurrent database coordinator activities service subclass threshold queued monitor element

This monitor element returns 'Yes' to indicate that the activity was queued by the CONCURRENTDBCOORDACTIVITIES service subclass threshold. 'No' indicates that the activity was not queued.

Table 404. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand if the activity was queued by the CONCURRENTDBCOORDACTIVITIES service subclass threshold applied to the activity.

concurrentdbcoordactivities_subclass_threshold_value - Concurrent database coordinator activities service subclass threshold value monitor element

This monitor element returns the upper bound of the CONCURRENTDBCOORDACTIVITIES service subclass threshold that was applied to the activity.

Table 405. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_ACTIVITY_DETAILS table function - Return detailed information about a specific activity	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CONCURRENTDBCOORDACTIVITIES service subclass threshold applied to the activity, if any.

concurrentdbcoordactivities_subclass_threshold_violated - Concurrent database coordinator activities service subclass threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CONCURRENTDBCOORDACTIVITIES service subclass threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 406. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CONCURRENTDBCOORDACTIVITIES service subclass threshold that was applied to the activity.

concurrentdbcoordactivities_superclass_threshold_id - Concurrent database coordinator activities service superclass threshold ID monitor element

The ID of the CONCURRENTDBCOORDACTIVITIES_SUPERCLASS threshold that was applied to the activity.

Table 407. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CONCURRENTDBCOORDACTIVITIES service superclass threshold, if any, was applied to the activity.

concurrentdbcoordactivities_superclass_threshold_queued - Concurrent database coordinator activities service superclass threshold queued monitor element

This monitor element returns 'Yes' to indicate that the activity was queued by the CONCURRENTDBCOORDACTIVITIES service superclass threshold. 'No' indicates that the activity was not queued.

Table 408. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand if the activity was queued by the CONCURRENTDBCOORDACTIVITIES service superclass threshold applied to the activity.

concurrentdbcoordactivities_superclass_threshold_value - Concurrent database coordinator activities service superclass threshold value monitor element

The upper bound of the CONCURRENTDBCOORDACTIVITIES service superclass threshold that was applied to the activity.

Table 409. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CONCURRENTDBCOORDACTIVITIES service superclass threshold applied to the activity, if any.

concurrentdbcoordactivities_superclass_threshold_violated - Concurrent database coordinator activities service superclass threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CONCURRENTDBCOORDACTIVITIES service superclass threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 410. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CONCURRENTDBCOORDACTIVITIES service superclass threshold that was applied to the activity.

concurrentdbcoordactivities_wl_was_threshold_id - Concurrent database coordinator activities workload work action set threshold ID monitor element

The identifier of the CONCURRENTDBCOORDACTIVITIES workload work action set threshold that was applied to the activity.

Table 411. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CONCURRENTDBCOORDACTIVITIES workload work action set threshold, if any, was applied to the activity.

concurrentdbcoordactivities_wl_was_threshold_queued - Concurrent database coordinator activities workload work action set threshold queued monitor element

This monitor element returns 'Yes' to indicate that the activity was queued by the CONCURRENTDBCOORDACTIVITIES workload work action set threshold. 'No' indicates that the activity was not queued.

Table 412. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand if the activity was queued by the CONCURRENTDBCOORDACTIVITIES workload work action set threshold applied to the activity.

concurrentdbcoordactivities_wl_was_threshold_value - Concurrent database coordinator activities workload work action set threshold value monitor element

The upper bound of the CONCURRENTDBCOORDACTIVITIES workload work action set threshold that was applied to the activity.

Table 413. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CONCURRENTDBCOORDACTIVITIES workload work action set threshold applied to the activity.

concurrentdbcoordactivities_wl_was_threshold_violated - Concurrent database coordinator activities workload work action set threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CONCURRENTDBCOORDACTIVITIES workload work action set threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 414. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CONCURRENTDBCOORDACTIVITIES workload work action set threshold that was applied to the activity.

concurrentdbcoordactivities_work_action_set_threshold_id - Concurrent database coordinator activities work action set threshold ID monitor element

The ID of the CONCURRENTDBCOORDACTIVITIES work action set threshold that was applied to the activity.

Table 415. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CONCURRENTDBCOORDACTIVITIES work action set threshold, if any, was applied to the activity.

concurrentdbcoordactivities_work_action_set_threshold_queued - Concurrent database coordinator activities work action set threshold queued monitor element

This monitor element returns 'Yes' to indicate that the activity was queued by the CONCURRENTDBCOORDACTIVITIES_WORK_ACTION_SET threshold. 'No' indicates that the activity was not queued.

Table 416. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand if the activity was queued by the CONCURRENTDBCOORDACTIVITIES_WORK_ACTION_SET threshold applied to the activity.

concurrentdbcoordactivities_work_action_set_threshold_value - Concurrent database coordinator activities work action set threshold value monitor element

The upper bound of the CONCURRENTDBCOORDACTIVITIES_WORK_ACTION_SET threshold that was applied to the activity.

Table 417. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CONCURRENTDBCOORDACTIVITIES_WORK threshold applied to the activity, if any.

concurrentdbcoordactivities_work_action_set_threshold_violated - Concurrent database coordinator activities work action set threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CONCURRENTDBCOORDACTIVITIES_WORK_ACTION_SET threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 418. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CONCURRENTDBCOORDACTIVITIES_WORK_ACTION_SET threshold that was applied to the activity.

conn_complete_time - Connection Request Completion Timestamp

The date and time that a connection request was granted.

Element identifier

conn_complete_time

Element type
timestamp

Table 419. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Timestamp

Usage Use this element to determine when a connection request to the database was granted.

conn_time - Time of database connection monitor element

The date and time of the connection to the database (at the database level, this is the first connection to the database), or when the activate database was issued.

Table 420. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected
Database	event_dbheader	Always collected
Connections	event_connheader	Always collected

Usage

Use this element with the **disconn_time** monitor element to calculate the elapsed time since:

- The database was active (for information at the database level).
- The connection was active (for information at the connection level).

connection_start_time - Connection start time monitor element

The time at which the connection was established with the database server. The connection_time monitor element is an alias of the connection_start_time monitor element.

Table 421. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 422. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	Always collected

connection_status - Connection Status

For snapshot monitor, this monitor element reports the status of the communication connection between the node issuing the GET SNAPSHOT command and other nodes listed in the db2nodes.cfg file. For table function monitor, this monitor element reports the text identifier indicating the FCM connection status.

Table 423. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

Table 424. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm_node	Basic

Usage

For the snapshot monitor, the connection values are :

SQLM_FCM_CONNECT_INACTIVE
No current connection

SQLM_FCM_CONNECT_ACTIVE
Connection is active

For table function monitoring, the available values are:

Active No current connection

Inactive
Connection is active

Two members can be active, but the communication connection between them remains inactive until there is some communication between the members.

connections_top - Maximum Number of Concurrent Connections

The highest number of simultaneous connections to the database since the database was activated.

Element identifier
connections_top

Element type
watermark

Table 425. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 426. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You may use this element to evaluate the setting of the *maxappls* configuration parameter.

If the value of this element is the same as the *maxappls* parameter, it is likely that some database connection requests were rejected, since *maxappls* limits the number of database connections allowed.

The current number of connections at the time the snapshot was taken can be calculated using the following formula:

`rem_cons_in + local_cons`

consistency_token - Package consistency token monitor element

For a given package name and creator, there can exist (starting in DB2 Version 8) multiple versions. The package consistency token helps to identify the version of the package that contains the SQL currently executing.

Table 427. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Table 428. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Statements	event_stmt	Always collected

Usage

You can use this element to help identify the package and the SQL statement that is executing.

container_accessible - Accessibility of container monitor element

This element indicates whether a container is accessible. A value of 1 means "Yes"; a value of 0 means "No".

Table 429. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 430. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic

Usage This element can be used in conjunction with the elements **container_id**, **container_name**, **container_type**, **container_total_pages**, **container_usable_pages**, and **container_stripe_set** to describe the container.

container_id - Container identification monitor element

An integer that uniquely defines a container within a table space.

Table 431. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get container metrics	ACTIVITY METRICS BASE

Table 432. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic

Usage This element can be used in conjunction with the elements container_name, container_type, container_total_pages, container_usable_pages, container_stripe_set, and container_accessible to describe the container.

container_name - Container name monitor element

The name of a container.

Table 433. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get container metrics	ACTIVITY METRICS BASE

Table 434. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic

Usage This element can be used in conjunction with the elements container_id, container_type, container_total_pages, container_usable_pages, container_stripe_set, and container_accessible to describe the container.

container_stripe_set - Container stripe set monitor element

The stripe set that a container belongs to.

Table 435. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 436. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic

Usage

Use this monitor element in conjunction with the elements **container_id**, **container_name**, **container_type**, **container_total_pages**, **container_usable_pages**, and **container_accessible** to describe the container. This is only applicable to a DMS table space.

container_total_pages - Total pages in container monitor element

The total number of pages occupied by the container.

Table 437. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 438. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic (DMS table spaces) Buffer Pool (SMS table spaces)

Usage This element can be used in conjunction with the elements **container_id**, **container_name**, **container_type**, **container_usable_pages**, **container_stripe_set**, and **container_accessible** to describe the container.

container_type - Container type monitor element

The type of the container.

Table 439. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get container metrics	ACTIVITY METRICS BASE

Table 440. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic

Usage

This element returns the type of the container, which can be a directory path (for SMS only), file (for DMS) or a raw device (for DMS). This element can be used in conjunction with the elements **container_id**, **container_name**, **container_total_pages**, **container_usable_pages**, **container_stripe_set**, and **container_accessible** to describe the container.

The valid values for this monitor element are defined in the `sqlutil.h` file.

container_usable_pages - Usable pages in container monitor element

The total number of usable pages in a container.

Table 441. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 442. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_container	Basic (DMS table spaces) Buffer Pool (SMS table spaces)

Usage This element can be used in conjunction with the elements container_id, container_name, container_type, container_total_pages, container_stripe_set, and container_accessible to describe the container. For SMS table spaces, this value is the same as container_total_pages.

coord_act_aborted_total - Coordinator activities aborted total monitor element

The total number of coordinator activities at any nesting level that completed with errors since the last reset. For service classes, the value is updated when the activity completes. For workloads, the value is updated by each workload occurrence at the end of its unit of work.

For service classes, if you remap an activity to a different subclass with a REMAP ACTIVITY action before it aborts, then this activity counts only toward the total of the subclass it aborts in.

Table 443. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 444. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wlstats	-

Usage

Use this element to understand if activities on the system are completing successfully. Activities may be aborted due to cancellation, errors or reactive thresholds.

coord_act_completed_total - Coordinator activities completed total monitor element

The total number of coordinator activities at any nesting level that completed successfully since the last reset. For service classes, the value is updated when the activity completes. For workloads, the value is updated by each workload occurrence at the end of its unit of work.

For service classes, if you remap an activity to a different subclass with a REMAP ACTIVITY action before it completes, then this activity counts only toward the total of the subclass it completes in.

Table 445. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 446. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	-
Statistics	event_scstats	-

Usage

This element can be used to determine the throughput of activities in the system or to aid in calculating average activity lifetime across multiple members.

coord_act_est_cost_avg - Coordinator activity estimated cost average monitor element

Arithmetic mean of the estimated costs for coordinator DML activities at nesting level 0 associated with this service subclass or work class since the last reset.

If the internally tracked average has overflowed, the value -2 is returned. For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE or BASE. For work classes, this monitor elements returns -1 if no COLLECT AGGREGATE ACTIVITY DATA EXTENDED work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE or BASE. It is measured in units of timerons.

For service classes, the estimated cost of an activity is counted only toward the service subclass in which the activity enters the system. When you remap activities between service subclasses with a REMAP ACTIVITY action, the coord_act_est_cost_avg mean of the service subclass you remap an activity to is unaffected.

Table 447. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	Always collected
Statistics	event_wcstats	Always collected
Statistics	event_wlstats	Always collected

Usage

Use this statistic to determine the arithmetic mean of the estimated costs of coordinator DML activities at nesting level 0 that are associated this service subclass, workload, or work class that completed or aborted since the last statistics reset.

This average can also be used to determine whether or not the histogram template used for the activity estimated cost histogram is appropriate. Compute the average activity estimated cost from the activity estimated cost histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template for the activity estimated cost histogram, using a set of bin values that are more appropriate for your data.

coord_act_exec_time_avg - Coordinator activities execution time average monitor element

Arithmetic mean of execution times for coordinator activities at nesting level 0 associated with this service subclass or work class since the last reset.

If the internally tracked average has overflowed, the value -2 is returned. For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE. For work classes, this monitor elements returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE. Units are milliseconds.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action, the coord_act_exec_time_avg mean of service subclasses an activity is mapped to but does not complete in is unaffected.

Table 448. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE ACTIVITY DATA
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	COLLECT AGGREGATE ACTIVITY DATA

Table 449. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this statistic to determine the arithmetic mean of execution time for coordinator activities associated with a service subclass, workload, or work class that completed or aborted.

This average can also be used to determine whether or not the histogram template used for the activity execution time histogram is appropriate. Compute the average activity execution time from the activity execution time histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template for the activity execution time histogram, using a set of bin values that are more appropriate for your data.

coord_act_interarrival_time_avg - Coordinator activity arrival time average monitor element

Arithmetic mean of the time between arrivals of coordinator activities at nesting level 0 associated with this service subclass or work class since the last reset.

If the internally tracked average has overflowed, the value -2 is returned. For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE or BASE. For work classes, this monitor elements returns -1 if no COLLECT AGGREGATE ACTIVITY DATA EXTENDED work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE or BASE. It is measured in milliseconds.

For service classes, the inter-arrival time mean is calculated for service subclasses through which activities enter the system. When you remap activities between service subclasses with a REMAP ACTIVITY action, the coord_act_interarrival_time_avg of the service subclass you remap an activity to is unaffected.

Table 450. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this statistic to determine the arithmetic mean between arrivals of coordinator activities at nesting level 0 associated with this service subclass, workload, or work class.

The inter-arrival time can be used to determine arrival rate, which is the inverse of inter-arrival time. This average can also be used to determine whether or not the histogram template used for the activity inter-arrival time histogram is appropriate. Compute the average activity inter-arrival time from the activity inter-arrival time histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template for the activity inter-arrival time histogram, using a set of bin values that are more appropriate for your data.

coord_act_lifetime_avg - Coordinator activity lifetime average monitor element

Arithmetic mean of lifetime for coordinator activities at nesting level 0 associated with this service subclass, workload, or work class since the last reset.

If the internally tracked average has overflowed, the value -2 is returned. For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE. For work classes, this monitor elements returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE. It is measured in milliseconds.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action, only the the coord_act_lifetime_avg mean of the final service class where the activity completes is affected.

Table 451. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE ACTIVITY DATA
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	COLLECT AGGREGATE ACTIVITY DATA

Table 452. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this statistic to determine the arithmetic mean of the lifetime for coordinator activities associated with a service subclass, workload, or work class that completed or aborted.

This statistic can also be used to determine whether or not the histogram template used for the activity lifetime histogram is appropriate. Compute the average activity lifetime from the activity lifetime histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template

for the activity lifetime histogram, using a set of bin values that are more appropriate for your data.

coord_act_lifetime_top - Coordinator activity lifetime top monitor element

The coord_act_lifetime_top element is a high watermark for coordinator activity lifetime, counted at all nesting levels. The stored information is represented in milliseconds.

For service classes, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class is set to NONE. For work classes, this monitor element returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE.

To effectively use this statistic with service classes when you also remap activities between service subclasses with a REMAP ACTIVITY action, you must aggregate the coord_act_lifetime_top high watermark of any given service subclass with that of other subclasses affected by the same remapping threshold or thresholds. This is because an activity will complete after it has been remapped to a different service subclass by a remapping threshold, and the time the activity spends in other service subclasses before being remapped is counted only toward the service class in which it completes.

Table 453. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE ACTIVITY DATA
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	COLLECT AGGREGATE ACTIVITY DATA

Table 454. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wcstats	-
Statistics	event_scstats	-
Statistics	event_wlstats	-

Usage

This element can be used to help determine whether or not thresholds on activity lifetime are being effective and can also help to determine how to configure such thresholds.

coord_agent_tid - Coordinator agent engine dispatchable unit ID monitor element

The engine dispatchable unit (EDU) identifier of the coordinator agent for the application.

Table 455. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

coord_act_queue_time_avg - Coordinator activity queue time average monitor element

Arithmetic mean of queue time for coordinator activities at nesting level 0 associated with this service subclass or work class since the last reset.

If the internally tracked average has overflowed, the value -2 is returned. For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE. For work classes, this monitor element returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE. It is measured in milliseconds.

For service classes, the queue time counts only toward the service subclass in which the activity completes or is aborted. When you remap activities between service subclasses with a REMAP ACTIVITY action, the coord_act_queue_time_avg mean of service subclasses an activity is mapped to but does not complete in is unaffected.

Table 456. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE ACTIVITY DATA
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	COLLECT AGGREGATE ACTIVITY DATA

Table 457. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	Always collected
Statistics	event_wcstats	Always collected
Statistics	event_wlstats	Always collected

Usage

Use this statistic to determine the arithmetic mean of the queue time for coordinator activities associated with a service subclass, workload, or work class that completed or aborted.

This statistic can also be used to determine whether or not the histogram template used for the activity queue time histogram is appropriate. Compute the average activity queue time from the activity queue time histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template for the activity queue time histogram, using a set of bin values that are more appropriate for your data.

coord_act_rejected_total - Coordinator activities rejected total monitor element

The coord_act_rejected_total stores the total number of coordinator activities at any nesting level that were rejected instead of being allowed to execute since the last reset.

This counter is updated when an activity is prevented from executing by either a predictive threshold or a prevent execution work action. For service classes, the value is updated when the activity completes. For workloads, the value is updated by each workload occurrence at the end of its unit of work.

Table 458. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE ACTIVITY DATA
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 459. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wlstats	-

Usage

This element can be used to help determine whether or not predictive thresholds and work actions that prevent execution are being effective and whether or not they are too restrictive.

coord_agent_pid - Coordinator agent identifier monitor element

The engine dispatchable unit (EDU) identifier of the coordinator agent for the application. Except on the Linux operating system, the EDU ID is mapped to the thread ID. On the Linux operating system, the EDU ID is a DB2 generated unique identifier.

Table 460. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic

Table 461. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-

Usage

You can use this element to link database system monitor information to other sources of diagnostic information, such as system traces.

coord_agents_top - Maximum Number of Coordinating Agents

The maximum number of coordinating agents working at one time.

Table 462. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
Database	dbase	Basic

Usage

If the peak number of coordinating agents represents too high a workload for this node, you can reduce this upper boundary by changing the **max_coordagents** configuration parameter.

coord_member - Coordinator member monitor element

Coordinating member for an application.

Table 463. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 464. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected
Change history	changesummary	Always collected

coord_node - Coordinating Node

In a multi-node system, the node number of the node where the application connected or attached to the instance.

Table 465. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Table 466. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage Each connected application is served by one coordinator node.

coord_partition_num - Coordinator partition number monitor element

The coordinator partition of the unit of work or activity. In a multi-partition system, the coordinator partition is the partition where the application connected to the database.

Table 467. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 468. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected
Activities	event_activity	Always collected
Threshold violations	event_thresholdviolations	Always collected

Usage

This element allows the coordinator partition to be identified for activities or units of work that have records on partitions other than the coordinator.

coord_stmt_exec_time - Execution time for statement by coordinator agent monitor element

The total time spent executing this statement by coordinator agents on this member. The value is given in milliseconds.

Table 469. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 470. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

corr_token - DRDA Correlation Token

The DRDA AS correlation token.

Table 471. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic

Table 472. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connections	event_connheader	Always collected

Usage The DRDA correlation token is used for correlating the processing between the application server and the application requester. It is an identifier dumped into logs when errors arise, that you can use to identify the conversation that is in error. In some cases, it will be the LUWID of the conversation.

If communications are not using DRDA, this element returns the *appl_id* (see *appl_id*).

If you are using the database system monitor APIs, note that the API constant `SQLM_APPLID_SZ` is used to define the length of this element.

cost_estimate_top - Cost estimate top monitor element

The cost_estimate_top monitor element is a high watermark for the estimated cost of DML activities at all nesting levels in a service subclass or work class.

For service subclasses, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service subclass is set to NONE. For work classes, this monitor element returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class.

For service classes, the estimated cost of DML activities is counted only toward the service subclass in which the activity enters the system. When you remap activities between service subclasses with a REMAP ACTIVITY action, the cost_estimate_top of the service subclass you remap an activity to is unaffected.

Table 473. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this element to determine the highest DML activity estimated cost reached on a member for a service class, workload, or work class in the time interval collected.

count - Number of Event Monitor Overflows

The number of consecutive overflows that have occurred.

Element identifier

count

Element type

counter

Table 474. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 475. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Overflow Record	event_overflow	Always collected

Usage You may use this element to get an indication of how much monitor data has been lost.

The event monitor sends one overflow record for a set of consecutive overflows.

cpu_configured - Number of configured CPUs monitor element

The number of processors on this host that the operating system is aware of.

Table 476. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_cores_per_socket - Number of CPU cores per socket monitor element

The number of processors on this host. On single core systems, this value is 1.

Table 477. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_hmt_degree - Number of logical CPUs monitor element

On systems that support hardware multithreading, the number of logical processors that appear to be present as a result of multithreading. On systems that do not support multithreading, this value is 1.

Table 478. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_idle - Processor idle time monitor element

Processor idle time, expressed in processor ticks. Reported for Windows, AIX and Linux systems only. This measurement represents the aggregate for all processors on the system.

Table 479. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

Usage

- This measurement represents the aggregate for all processors on the system.
- On AIX, this metric is reported for the workload partition (WPAR) and the logical partition (LPAR) on which the DB2 server is running.

- You can use this monitor element along with the related processor timer elements to calculate processor utilization for a specific time interval on the host system. To calculate processor utilization as a percentage, perform the following steps:
 1. Use the ENV_GET_SYSTEM_RESOURCES function at the beginning to the time interval to retrieve the values for the following metrics:
 - `cpu_usert1` = **cpu_user**
 - `cpu_systemt1` = **cpu_system**
 - `cpu_idlet1` = **cpu_idle**
 - `cpu_waitt1` = **cpu_wait**
 2. Repeat the preceding step to determine the timestamps for the same metrics at the end of the time interval for which you want to calculate processor utilization:
 - `cpu_usert2` = **cpu_user**
 - `cpu_systemt2` = **cpu_system**
 - `cpu_idlet2` = **cpu_idle**
 - `cpu_iowaitt2` = **cpu_iowait**
 3. Calculate processor utilization using the following formula:

$$100 \times \frac{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1})}{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1}) + (\text{cpu_idle}_{t2} - \text{cpu_idle}_{t1}) + (\text{cpu_iowait}_{t2} - \text{cpu_iowait}_{t1})}$$

cpu_iowait - IO Wait time monitor element

Time spent waiting for IO (Linux, UNIX); time spent receiving and servicing hardware interrupts (Windows), expressed in processor ticks. Reported for Windows, AIX and Linux systems only. This measurement represents the aggregate for all processors on the system.

Table 480. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

Usage

- This measurement represents the aggregate for all processors on the system.
- On AIX, this metric is reported for the workload partition (WPAR) and the logical partition (LPAR) on which the DB2 server is running.
- You can use this monitor element along with the related processor timer elements to calculate processor utilization for a specific time interval on the host system. To calculate processor utilization as a percentage, perform the following steps:
 1. Use the ENV_GET_SYSTEM_RESOURCES function at the beginning to the time interval to retrieve the values for the following metrics:
 - `cpu_usert1` = **cpu_user**
 - `cpu_systemt1` = **cpu_system**
 - `cpu_idlet1` = **cpu_idle**
 - `cpu_waitt1` = **cpu_wait**

2. Repeat the preceding step to determine the timestamps for the same metrics at the end of the time interval for which you want to calculate processor utilization:
 - $\text{cpu_user}_{t_2} = \text{cpu_user}$
 - $\text{cpu_system}_{t_2} = \text{cpu_system}$
 - $\text{cpu_idle}_{t_2} = \text{cpu_idle}$
 - $\text{cpu_iowait}_{t_2} = \text{cpu_iowait}$
3. Calculate processor utilization using the following formula:

$$100 \times \frac{(\text{cpu_system}_{t_2} - \text{cpu_system}_{t_1}) + (\text{cpu_user}_{t_2} - \text{cpu_user}_{t_1})}{(\text{cpu_system}_{t_2} - \text{cpu_system}_{t_1}) + (\text{cpu_user}_{t_2} - \text{cpu_user}_{t_1}) + (\text{cpu_idle}_{t_2} - \text{cpu_idle}_{t_1}) + (\text{cpu_iowait}_{t_2} - \text{cpu_iowait}_{t_1})}$$

cpu_limit - WLM dispatcher CPU limit monitor element

The WLM dispatcher CPU limit configured for the service class.

Table 481. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE

cpu_load_long - Processor load (long timeframe) monitor element

Processor load over the longer term, as defined by the system. For example, the average processor load over the past 10 or 15 minutes. Reported for all platforms except Windows.

Table 482. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_load_medium - Processor load (medium timeframe) monitor element

Processor load over the medium term, as defined by the system. For example, the average processor load over the past 5 or 10 minutes. Reported for all platforms except Windows.

Table 483. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_load_short - Processor load (short timeframe) monitor element

Processor load over the short term, as defined by the system. For example, the average processor load over the past 1 or 5 minutes. Reported for all platforms except Windows.

Table 484. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_online - Number of CPUs online monitor element

The number of processors on this host that are currently online.

Table 485. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_share_type - WLM dispatcher CPU share type monitor element

The type of WLM dispatcher CPU shares configured for the service class. Possible values are soft and hard.

Table 486. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE

cpu_shares - WLM dispatcher CPU shares monitor element

The number of WLM dispatcher CPU shares configured for the service class.

Table 487. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE

cpu_speed - CPU clock speed monitor element

The clock speed of the processors on this host, in MHz.

Table 488. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_system - Kernel time monitor element

Time spent running kernel code, expressed in processor ticks. Reported for Windows, AIX and Linux systems only. This measurement represents the aggregate for all processors on the system.

Table 489. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE

Usage

- This measurement represents the aggregate for all processors on the system.
- On AIX, this metric is reported for the workload partition (WPAR) and the logical partition (LPAR) on which the DB2 server is running.
- You can use this monitor element along with the related processor timer elements to calculate processor utilization for a specific time interval on the host system. To calculate processor utilization as a percentage, perform the following steps:

1. Use the ENV_GET_SYSTEM_RESOURCES function at the beginning to the time interval to retrieve the values for the following metrics:
 - `cpu_usert1` = `cpu_user`
 - `cpu_systemt1` = `cpu_system`
 - `cpu_idlet1` = `cpu_idle`
 - `cpu_waitt1` = `cpu_wait`
2. Repeat the preceding step to determine the timestamps for the same metrics at the end of the time interval for which you want to calculate processor utilization:
 - `cpu_usert2` = `cpu_user`
 - `cpu_systemt2` = `cpu_system`
 - `cpu_idlet2` = `cpu_idle`
 - `cpu_iowaitt2` = `cpu_iowait`
3. Calculate processor utilization using the following formula:

$$100 \times \frac{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1})}{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1}) + (\text{cpu_idle}_{t2} - \text{cpu_idle}_{t1}) + (\text{cpu_iowait}_{t2} - \text{cpu_iowait}_{t1})}$$

cpu_timebase - Frequency of timebase register increment monitor element

The frequency, in Hz, at which the timebase register is incremented. For Linux and PowerPC® systems only

Table 490. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_total - Number of CPUs monitor element

The number of processors on this host.

Table 491. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

Usage

The number reported for this monitor element means different things in different operating environments. For example, when returned from a Windows, system, **cpu_total** refers to the total number of processors installed; on AIX, it represents the number of configured processors.

cpu_usage_total - Processor usage monitor element

The overall processor usage on this host including kernel processing time, expressed as a percentage. Reported for AIX, Linux and Windows systems only.

Table 492. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

cpu_user - Non-kernel processing time monitor element

Time spent running user (non-kernel) code, expressed in processor ticks. Reported for Windows, AIX, and Linux systems only. This measurement represents the aggregate for all processors on the system.

Table 493. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE

Usage

- This measurement represents the aggregate for all processors on the system.
- On AIX, this metric is reported for the workload partition (WPAR) and the logical partition (LPAR) on which the DB2 server is running.
- You can use this monitor element along with the related processor timer elements to calculate processor utilization for a specific time interval on the host system. To calculate processor utilization as a percentage, perform the following steps:
 1. Use the ENV_GET_SYSTEM_RESOURCES function at the beginning to the time interval to retrieve the values for the following metrics:
 - $cpu_user_{t1} = \mathbf{cpu_user}$
 - $cpu_system_{t1} = \mathbf{cpu_system}$

- `cpu_idlet1` = `cpu_idle`
 - `cpu_waitt1` = `cpu_wait`
2. Repeat the preceding step to determine the timestamps for the same metrics at the end of the time interval for which you want to calculate processor utilization:
 - `cpu_usert2` = `cpu_user`
 - `cpu_systemt2` = `cpu_system`
 - `cpu_idlet2` = `cpu_idle`
 - `cpu_iowaitt2` = `cpu_iowait`
 3. Calculate processor utilization using the following formula:

$$100 \times \frac{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1})}{(\text{cpu_system}_{t2} - \text{cpu_system}_{t1}) + (\text{cpu_user}_{t2} - \text{cpu_user}_{t1}) + (\text{cpu_idle}_{t2} - \text{cpu_idle}_{t1}) + (\text{cpu_iowait}_{t2} - \text{cpu_iowait}_{t1})}$$

cpu_utilization - CPU utilization monitor element

The total CPU time consumed by the service class or workload on a particular logical partition divided by the amount of CPU time available on the host or the LPAR in a given period of time.

Table 494. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 495. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document	REQUEST METRICS BASE

Usage

When returned by the `WLM_GET_WORKLOAD_STATS` or the `WLM_GET_SERVICE_SUBCLASS_STATS` function, this monitor element represents the CPU utilization since the last reset of the statistics.

When returned by the `MON_SAMPLE_SERVICE_CLASS_METRICS` or the `MON_SAMPLE_WORKLOAD_METRICS` function, this monitor element represents the CPU utilization since the function was executed.

cpu_velocity - CPU velocity monitor element

A measure of the amount of contention for the CPU resources, measured on a scale from 0 to 1, with lower numbers meaning greater contention.

CPU velocity is computed by measuring the amount of time that work in a service class has access to the CPU divided by the total time spent accessing the CPU or waiting to access the CPU. It gives a measure of how efficiently the work is being executed relative to how efficiently it could be executed if such work never had to wait for the CPU. The formula is as follows:

$$\text{cpu_velocity} = \text{total_cpu_time} / (\text{total_cpu_time} + \text{total_disp_run_queue_time})$$

The `wlm_dispatcher` database manager configuration parameter must be set to `ON` for `cpu_velocity` to be collected.

Table 496. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
<code>MON_SAMPLE_SERVICE_CLASS_METRICS</code> - Sample service class metrics	REQUEST METRICS BASE
<code>MON_SAMPLE_WORKLOAD_METRICS</code> - Sample workload metrics	REQUEST METRICS BASE

Usage

The dispatcher is effective at prioritizing a service class or workload when that service class or workload demands more CPU resources at a given instant than can be supplied. In such instances, the work executing in the service class or workload spends time queuing to access the CPU resources. It is when this occurs that the dispatcher can give more of the CPU resources to such a service class or workload by reducing how much of the CPU resources it gives to another. A high CPU velocity indicates that the dispatcher can have little effect on improving response times or throughput for this service class at its current level of CPU demand because this demand is already being met. A low CPU velocity indicates that the dispatcher can potentially have a significant effect on improving response times or throughput for this service class or workload at its current level of CPU demand.

Use this element to determine whether the work executing in a service class or workload is spending a relatively large proportion of its time queuing to use the CPU resources. If the CPU velocity for a service class is low and you want to increase it, you can adjust the WLM dispatcher control of the CPU resources by increasing the number of CPU shares or increasing the CPU limit assigned to the service class that is exhibiting a low CPU velocity.

cputime_threshold_id - CPU time threshold ID monitor element

The ID of the CPU TIME threshold that was applied to the activity.

Table 497. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CPU TIME threshold, if any, was applied to the activity.

cputime_threshold_value - CPU time threshold value monitor element

The upper bound of the CPU TIME threshold that was applied to the activity.

Table 498. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CPU TIME threshold applied to the activity, if any.

cputime_threshold_violated - CPU time threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CPU TIME threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 499. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CPU TIME threshold that was applied to the activity.

cputimeinsc_threshold_id - CPU time in service class threshold ID monitor element

The ID of the CPUTIMEINSC threshold that was applied to the activity.

Table 500. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which CPUTIMEINSC threshold, if any, was applied to the activity.

cputimeinsc_threshold_value - CPU time in service class threshold value monitor element

The upper bound of the CPUTIMEINSC threshold that was applied to the activity.

Table 501. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the CPUTIMEINSC threshold applied to the activity, if any.

cputimeinsc_threshold_violated - CPU time in service class threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the CPUTIMEINSC threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 502. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the CPUTIMEINSC threshold that was applied to the activity.

create_nickname - Create Nicknames

This element contains a count of the total number of times the federated server has created a nickname over an object residing on this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters.

The monitor stores the most recent of the values.

Table 503. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine the amount of CREATE NICKNAME activity against this data source by this federated server instance or an application. CREATE NICKNAME processing results in multiple queries running against the data source catalogs; therefore, if the value of this element is high, you should determine the cause and perhaps restrict this activity.

create_nickname_time - Create Nickname Response Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to process CREATE NICKNAME statements from all applications or a single application running on this federated server instance.

The response time is measured since the start of the federated server instance, or the last reset of the database monitor counter, whichever is the latest. The response time is measured as the difference between the time the federated server started retrieving information from the data source to process the CREATE NICKNAME statement, and the time it took to retrieve all the required data from the data source.

Table 504. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine how much actual time was used to create nicknames for this data source.

creator - Application Creator

The authorization ID of the user that pre-compiled the application.

Table 505. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement

Table 506. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_dlconn	-
Statements	event_stmt	-
Activities	event_activitystmt	-

Usage Use this element to help identify the SQL statement that is processing, in conjunction with the CREATOR column of the package section information in the catalogs.

If the CURRENT PACKAGE PATH special register is set, the *creator* value may reflect different values over the lifetime of the SQL statement. If a snapshot or event monitor record is taken before PACKAGE PATH resolution, the *creator* value will reflect the value flowed in from the client request. If a snapshot or event monitor record is taken after PACKAGE PATH resolution, the *creator* value will reflect the creator of the resolved package. The resolved package will be the package whose *creator* value appears earliest in the CURRENT PACKAGE PATH SPECIAL REGISTER and whose package name and unique ID matches that of the client request.

current_cf_gbp_size - Current cluster caching facility group buffer pool size monitor element

Group buffer pool memory currently in use at the cluster caching facility, in pages with a page size of 4 KB.

Table 507. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_lock_size - Current cluster caching facility lock size monitor element

Global lock memory currently in use, in pages with a page size of 4 KB.

Table 508. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_sca_size - Current cluster caching facility shared communications area size monitor element

Shared communications area memory currently in use, in pages with a page size of 4 KB.

Table 509. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_mem_size - Current cluster caching facility memory size monitor element

Total memory currently in use, in pages with a page size of 4 KB.

Table 510. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_active_log - Current Active Log File Number

The file number of the active log file the DB2 database system is currently writing.

Table 511. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 512. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	detail_log	Basic

Table 513. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *first_active_log* and *last_active_log* elements to determine the range of active log files. Knowing the range of active log files helps you determine the disk space required for log files.

You can also use this element to determine which log files have data to help you identify log files needed for split mirror support.

current_archive_log - Current Archive Log File Number

The file number of the log file the DB2 database system is currently archiving. If the DB2 database system is not archiving a log file, the value for this element is SQLM_LOGFILE_NUM_UNKNOWN.

Table 514. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 515. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	detail_log	Basic

Table 516. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element to determine if there is a problem archiving log files. Such problems include:

- Slow archive media
- Archive media that is not available

current_extent - Extent currently being moved monitor element

The numeric identifier of the extent currently being moved by the table space rebalancing process.

Table 517. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

current_request - Current operation request monitor element

The operation currently being processed or most recently processed by the agent.

Table 518. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

cursor_name - Cursor Name

The name of the cursor corresponding to this SQL statement.

Element identifier
cursor_name

Element type
information

Table 519. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Table 520. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details	event_detailed_dlconn	Always collected
Statements	event_stmt	Always collected

Usage You may use this element to identify the SQL statement that is processing. This name will be used on an OPEN, FETCH, CLOSE, and PREPARE of an SQL SELECT statement. If a cursor is not used, this field will be blank.

data_object_pages - Data Object Pages

The number of disk pages consumed by a table. This size represents the base table size only. Space consumed by index objects are reported by *index_object_pages*, LOB data is reported by *lob_object_pages*, and long data is reported by *long_object_pages*.

Table 521. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 522. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage This element provides a mechanism for viewing the actual amount of space consumed by a particular table. This element can be used in conjunction with a table event monitor to track the rate of table growth over time.

data_object_l_pages - Table data logical pages monitor element

The number of logical pages used on disk by data contained in this table.

Table 523. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

- This value might be less than the amount of space allocated for the object. This can happen when you use the RECLAIM EXTENTS ONLY option with the REORG TABLE command. In this case, reclaimed extents are included in the logical number of pages returned by MON_GET_TABLE.

- This value might be less than the amount of space physically allocated for the object. This can happen when you use the REUSE STORAGE option of the TRUNCATE statement. This option causes storage allocated for the table to continue to be allocated, although the storage will be considered empty. In addition, the value for this monitor element might be less than the amount of space logically allocated for the object, because the total space logically allocated includes a small amount of additional meta data.

To retrieve an accurate measure of the logical or physical size of an object, use the ADMIN_GET_TAB_INFO_V97 function. This function provides more accurate information about the size of objects than you can obtain by multiplying the number of pages reported for this monitor element by the page size.

data_partition_id - Data partition identifier monitor element

The identifier of the data partition for which information is returned.

Table 524. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status on a usage list	ACTIVITY METRICS BASE

Table 525. Snapshot monitoring information

Snapshot level	Logical data grouping	Monitor switch
Table	table	Basic
Lock	lock	Lock
Lock	lock_wait	Lock

Table 526. Event monitoring information

Event type	Logical data grouping	Monitor switch
Table	event_table	-

Table 526. Event monitoring information (continued)

Event type	Logical data grouping	Monitor switch
Deadlocks	event_dlconn	-
Deadlocks with Details	event_detailed_dlconn	-
Deadlocks	lock	-

Usage

This element is only applicable to partitioned tables and partitioned indexes. Otherwise, the value of this monitor element is NULL.

When returning lock level information, a value of -1 represents a lock which controls access to the whole table.

datasource_name - Data Source Name

This element contains the name of the data source whose remote access information is being displayed by the federated server. This element corresponds to the 'SERVER' column in SYSCAT.SERVERS.

Element identifier

datasource_name

Element type

information

Table 527. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

Usage Use this element to identify the data source whose access information has been collected and is being returned.

datataginsc_threshold_id - Data tag in service class threshold (IN condition) ID

The ID of the DATATAGINSC IN threshold that was applied to the activity.

Table 528. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to understand which DATATAGINSC IN threshold was applied to the activity, if any.

datataginsc_threshold_value - Data tag in service class threshold (IN condition) value

Comma separated list of data tags in the DATATAGINSC IN threshold that was applied to the activity.

Table 529. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to understand the value of the DATATAGINSC IN threshold applied to the activity, if any.

datataginsc_threshold_violated - Data tag in service class threshold (IN condition) violated

Indicates if the activity has violated the DATATAGINSC IN threshold. Returns 1 if the activity violated the DATATAGINSC IN threshold. Returns 0 if the activity has not violated the threshold.

Table 530. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to determine if the activity violated the DATATAGINSC IN threshold that was applied to the activity.

datatagnotinsc_threshold_id - Data tag in service class threshold (NOT IN condition) ID

The ID of the DATATAGINSC NOT IN threshold that was applied to the activity.

Table 531. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to understand which DATATAGINSC NOT IN threshold was applied to the activity, if any.

datatagnotinsc_threshold_value - Data tag in service class threshold (NOT IN condition) value

Comma separated list of data tags in the DATATAGINSC NOT IN threshold that was applied to the activity.

Table 532. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to understand the value of the DATATAGINSC NOT IN threshold applied to the activity, if any.

datatagnotinsc_threshold_violated - Data tag in service class threshold (NOT IN condition) violated

Indicates if the activity has violated the DATATAGINSC NOT IN threshold. Returns 1 if the activity violated the DATATAGINSC NOT IN threshold. Returns 0 if the activity did not violate the threshold.

Table 533. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Usage notes

- Use this element to determine if the activity violated the DATATAGINSC NOT IN threshold that was applied to the activity.

db2_process_id - DB2 process ID monitor element

Numeric identifier of the DB2 process running on the reported member.

Table 534. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE

db2_process_name - DB2 process name monitor element

Name of the DB2 process running on the reported member.

Table 535. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE

db2_status - Status of DB2 instance monitor element

The current status of the instance of the database manager.

Table 536. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

You can use this element to determine the state of your database manager instance.

Values for this element are:

API Constant	Value	Description
SQLM_DB2_ACTIVE	0	The database manager instance is active.
SQLM_DB2_QUIESCE_PEND	1	The instance and the databases in the instance are in quiesce-pending state. New connections to any instance database are not permitted and new units of work cannot be started. Depending on the quiesce request, active units of work will be allowed to complete or will be rolled back immediately.
SQLM_DB2_QUIESCED	2	The instance and the databases in the instance has been quiesced. New connections to any instance database are not permitted and new units of work cannot be started.

db2start_time - Start Database Manager Timestamp

The date and time that the database manager was started using the db2start command.

Element identifier

db2start_time

Element type

timestamp

Table 537. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Table 538. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	evmonstart	Always collected

Usage

This element can be used with the *time_stamp* monitor element to calculate the elapsed time since the database manager was started up until the snapshot was taken.

For the change history event monitor, this element can be used to track when deferred database manager configuration parameter updates took effect.

db_conn_time - Database activation timestamp monitor element

The date and time of the connection to the database (at the database level, this is the first connection to the database), or when the activate database was issued.

Table 539. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Timestamp
Table Space	tablespace_list	Buffer Pool, Timestamp
Table	table_list	Timestamp

Table 540. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	-
Change history	evmonstart	Always collected

Usage

Use this element with the **disconn_time** monitor element to calculate the total connection time.

For the change history event monitor, this element can be used to track when deferred database configuration parameter updates took effect.

db_heap_top - Maximum Database Heap Allocated

This element is being maintained for DB2 version compatibility. It now measures memory usage, but not exclusively usage by the database heap.

Note: The **db_heap_top** monitor element is deprecated starting with DB2 Version 9.5. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 541. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 542. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

db_location - Database Location

The location of the database in relation to the application.

Table 543. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage Determine the relative location of the database server with respect to the application taking the snapshot. Values are:

- SQLM_LOCAL
- SQLM_REMOTE

db_name - Database name monitor element

The real name of the database for which information is collected or to which the application is connected. This is the name the database was given when created.

Table 544. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	ACTIVITY METRICS BASE

Table 545. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl_id_info	Basic
Application	appl_remote	Basic
Table Space	tablespace_list	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Table	table_list	Table
Lock	db_lock_list	Basic
Dynamic SQL	dynsql_list	Basic
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl_info	Basic

Table 546. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbheader	Always collected

Usage

You may use this element to identify the specific database to which the data applies.

For applications that are not using DB2 Connect to connect to a host or System i[®] database server, you can use this element in conjunction with the **db_path** monitor element to uniquely identify the database and help relate the different levels of information provided by the monitor.

db_path - Database Path

The full path of the location where the database is stored on the monitored system.

Table 547. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl_id_info	Basic
Table Space	tablespace_list	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Table	table_list	Table
Lock	db_lock_list	Basic
Dynamic SQL	dynsql_list	Basic

Table 548. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbheader	Always collected

Usage This element can be used with the *db_name* monitor element to identify the specific database to which the data applies.

db_status - Status of database monitor element

The current status of the database.

Table 549. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage

You can use this element to determine the state of your database.

Values for this field are:

API Constant	Value	Description
SQLM_DB_ACTIVE	0	The database is active.
SQLM_DB_QUIESCE_PEND	1	The database is in quiesce-pending state. New connections to the database are not permitted and new units of work cannot be started. Depending on the quiesce request, active units of work will be allowed to complete or will be rolled back immediately.
SQLM_DB_QUIESCED	2	The database has been quiesced. New connections to the database are not permitted and new units of work cannot be started.
SQLM_DB_ROLLFWD	3	A rollforward is in progress on the database.
SQLM_DB_ACTIVE_STANDBY	4	The database is a read-enabled HADR standby database.
SQLM_DB_STANDBY	5	The database is an HADR standby database.

db_storage_path - Automatic storage path monitor element

This element shows the full path of a location that is used by the database for placing automatic storage table spaces. There can be 0 or more storage paths associated with a database.

Table 550. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE

Table 551. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Basic

Usage

Use this element with the **num_db_storage_paths** monitor element to identify the storage paths that are associated with this database.

db_storage_path_id - Storage path identifier

Unique identifier for each occurrence of a storage path in a storage group.

Table 552. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE

Table 552. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

db_storage_path_state - Storage path state monitor element

The automatic storage path state indicates whether the storage path is in use by the database.

Table 553. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE

Table 554. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Basic

Usage

Use this monitor element to determine whether the storage path is in use by the database. The following values are possible:

NOT_IN_USE

There are no table spaces using this storage path on the specified database partition.

IN_USE

There are table spaces using this storage path on the specified database partition.

DROP_PENDING

This storage path has been dropped, but some table spaces are still using it. Before storage paths are physically dropped from the database, all table spaces must stop using them. To stop using a dropped storage path, either drop the table space or rebalance the table space using the REBALANCE clause of the ALTER TABLESPACE statement.

db_storage_path_with_dpe - Storage path including database partition expression monitor element

Automatic storage path that includes the unevaluated database partition expression.

Table 555. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE

Table 556. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Basic

Usage

Use this monitor element to determine the storage path that was specified for the database as part of the CREATE DATABASE command or the ALTER DATABASE statement, if the storage path contains a database partition expression.

If the storage path does not contain a database partition expression, then this monitor element returns a null value.

db_work_action_set_id - Database work action set ID monitor element

If this activity has been categorized into a work class of database scope, this monitor element shows the ID of the work action set associated with the work class set to which the work class belongs. Otherwise, this monitor element shows the value of 0.

Table 557. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
WLM_GET_ACTIVITY_DETAILS_COMPLETE (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Table 558. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

This element can be used with the **db_work_class_id** element to uniquely identify the database work class of the activity, if one exists.

db_work_class_id - Database work class ID monitor element

If this activity has been categorized into a work class of database scope, this monitor element displays the ID of the work class. Otherwise, this monitor element displays the value of 0.

Table 559. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_ACTIVITY_DETAILS_COMPLETE table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 560. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

This element can be used with the **db_work_action_set_id** element to uniquely identify the database work class of the activity, if one exists.

dbpartitionnum - Database partition number monitor element

In a partitioned database environment, this is the numeric identifier for the database member. For DB2 Enterprise Server Edition and in a DB2 pureScale environment, this value is 0.

Table 561. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_MSGS table function - Retrieve messages generated by a data movement utility that is executed through the ADMIN_CMD procedure	ACTIVITY METRICS BASE
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
AUDIT_ARCHIVE procedure and table function - Archive audit log file	ACTIVITY METRICS BASE
DBCFCG administrative view and DB_GET_CFG table function - Retrieve database configuration parameter information	ACTIVITY METRICS BASE
DBPATHS administrative view and ADMIN_LIST_DB_PATHS table function - Retrieve database paths	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 561. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE
PDLOGMSG_LAST24HOURS administrative view and PD_GET_LOG_MSGS table function - Retrieve problem determination messages	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Usage

In a DB2 pureScale environment, multiple members operate on a single partition. When running in such a configuration, physical attributes of storage, such as the number of free pages in a table space, are duplicated across all members in the system. Each member reports the total accurate size for the system. In a multiple partition configuration, the values from each partition must be correlated by the user in order to understand the overall value for the system.

The **dbpartitionnum** monitor element is different to the **data_partition_id** monitor element, which is used to identify a data partition that was created by subdividing data in a table based on a value.

dc_s_appl_status - DCS application status monitor element

The status of a DCS application at the DB2 Connect gateway.

Table 562. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dc_s_appl_info	Basic

Usage

Use this element for problem determination on DCS applications. Values are:

- **SQLM_DCS_CONNECTPEND_OUTBOUND**
The application has initiated a database connection from the DB2 Connect gateway to the host database, but the request has not completed yet.
- **SQLM_DCS_UOWWAIT_OUTBOUND**
The DB2 Connect gateway is waiting for the host database to reply to the application's request.
- **SQLM_DCS_UOWWAIT_INBOUND**
The connection from the DB2 Connect gateway to the host database has been established and the gateway is waiting for SQL requests from the application. Or the DB2 Connect gateway is waiting on behalf of the unit of work in the application. This usually means that the application's code is being executed.

dc_s_db_name - DCS Database Name

The name of the DCS database as cataloged in the DCS directory.

Table 563. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Basic
DCS Application	dc_s_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

ddl_classification - DDL classification

Classification describing type of DDL executed.

Table 564. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DDLSTMTEXEC	Always collected

Usage

DDL can be classified as one of:

DDLSTORAGE

The execution of alter database, buffer pool, partition group, storage group, and table space DDL.

DDLWLM

The execution of histogram, service class, threshold, work action set, work class set, and workload DDL.

DDLMONITOR

The execution of event monitor, and usage list DDL.

DDLSECURITY

The execution of audit policy, grant, mask, permission role, revoke, security label, security label component, security policy, and trusted context DDL.

DDLSQL

The execution of alias, function, method, module, package, procedure, schema, synonym, transform, trigger, type, variable, and view DDL.

DDLDATA

The execution of index, sequence, table, and temporary table DDL.

DDLXML

The execution of XSROBJECT DDL.

DDLFEDERATED

The execution of nickname/server, type/user mapping, and wrapper DDL.

ddl_sql_stmts - Data Definition Language (DDL) SQL Statements

This element indicates the number of SQL Data Definition Language (DDL) statements that were executed.

Table 565. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 566. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to determine the level of database activity at the application or database level. DDL statements are expensive to run due to their impact on the system catalog tables. As a result, if the value of this element is high, you should determine the cause, and possibly restrict this activity from being performed.

You can also use this element to determine the percentage of DDL activity using the following formula:

$$\text{ddl_sql_stmts} / \text{total number of statements}$$

This information can be useful for analyzing application activity and throughput. DDL statements can also impact:

- the catalog cache, by invalidating table descriptor information and authorization information that are stored there and causing additional system usage to retrieve the information from the system catalogs

- the package cache, by invalidating sections that are stored there and causing additional processing time due to section recompilation.

Examples of DDL statements are CREATE TABLE, CREATE VIEW, ALTER TABLE, and DROP INDEX.

deadlock_id - Deadlock Event Identifier

The deadlock identifier for a deadlock.

Element identifier
deadlock_id

Element type
information

Table 567. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_deadlock	Always collected
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected
Deadlocks with Details History	event_detailed_dlconn	Always collected
Deadlocks with Details History	event_stmt_history	Always collected
Deadlocks with Details History Values	event_data_value	Always collected
Deadlocks with Details History Values	event_detailed_dlconn	Always collected
Deadlocks with Details History Values	event_stmt_history	Always collected

Usage Use this element in your monitoring application to correlate deadlock connection and statement history event records with deadlock event records.

deadlock_member - Deadlock member monitor element

The member were the participant is requesting the lock.

Table 568. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

deadlock_node - Partition Number Where Deadlock Occurred

Partition number where the deadlock occurred.

Element identifier
deadlock_node

Element type
information

Table 569. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_deadlock	Always collected
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage This element is relevant only for partitioned databases. Use this in your monitoring application to correlate deadlock connection event records with deadlock event records.

deadlock_type - Deadlock type monitor element

The type of deadlock that has occurred. The value can be either LOCAL or GLOBAL. In a local deadlock, all participants run on the same member. In a global deadlock, at least one deadlock participant is running on a remote member.

Table 570. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock	

deadlocks - Deadlocks detected monitor element

The total number of deadlocks that have occurred.

Table 571. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 571. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 572. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Lock

For snapshot monitoring, this counter can be reset.

Table 573. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This element can indicate that applications are experiencing contention problems. These problems could be caused by the following situations:

- Lock escalations are occurring for the database
- An application may be locking tables explicitly when system-generated row locks may be sufficient
- An application may be using an inappropriate isolation level when binding
- Catalog tables are locked for repeatable read
- Applications are getting the same locks in different orders, resulting in deadlock.

You may be able to resolve the problem by determining in which applications (or application processes) the deadlocks are occurring. You may then be able to modify the application to better enable it to run concurrently. Some applications, however, may not be capable of running concurrently.

You can use the connection timestamp monitor elements (**last_reset**, **db_conn_time**, and **appl_con_time**) to determine the severity of the deadlocks. For example, 10 deadlocks in 5 minutes is much more severe than 10 deadlocks in 5 hours.

The descriptions for the previously listed related elements may also provide additional tuning suggestions.

deferred - Deferred

Indicates if a change to a configuration parameter value is deferred.

Table 574. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DBDBMCFG	Always collected

Usage

The change history event monitor collected this value as:

- Y Change deferred until next database activation
N Change takes effect immediately

degree_parallelism - Degree of Parallelism

The degree of parallelism requested when the query was bound.

Element identifier
degree_parallelism

Element type
information

Table 575. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Usage Use with `agents_top`, to determine if the query achieved maximum level of parallelism.

del_keys_cleaned - Pseudo deleted keys cleaned monitor element

Number of pseudo deleted keys that have been cleaned.

Table 576. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

delete_sql_stmts - Deletes

This element contains a count of the total number of times the federated server has issued a DELETE statement to this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

Table 577. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine the level of database activity directed against this data source by the federated server or an application.

You can also use this element to determine the percentage of write activity against this data source by the federated server or an application, with the following formula:

$$\text{write_activity} = \frac{(\text{INSERT statements} + \text{UPDATE statements} + \text{DELETE statements})}{(\text{SELECT statements} + \text{INSERT statements} + \text{UPDATE statements} + \text{DELETE statements})}$$

delete_time - Delete Response Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to DELETES from all applications or a single application running on this federated server instance since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

The response time is measured as the difference in time between the time the federated server submits a DELETE statement to the data source, and the time the data source responds to the federated server, indicating the DELETE has been processed.

Table 578. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine how much actual time transpires while waiting for DELETES to this data source to be processed. This information can be useful for capacity planning and tuning.

destination_service_class_id - Destination service class ID monitor element

The ID of the service subclass to which an activity was remapped when the threshold violation record to which this element belongs was generated. This element has a value of zero for any threshold action other than REMAP ACTIVITY.

Table 579. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element to trace the path of an activity through the service classes to which it was remapped. This element can also be used to compute aggregates of how many activities were mapped into a given service subclass.

details_xml - Details XML monitor element

An XML document containing some of the system monitor elements collected by the statistics event monitor.

Table 580. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Statistics	EVENTS_SCSTATS	Always collected
Statistics	EVENT_WLSTATS	Always collected

Usage

The schema for the XML documents returned is available in the file `sql11lib/misc/DB2MonCommon.xsd`. The top level element is **system_metrics**.

The XML documents associated with this monitor element and the **metrics** monitor element contain the same system metrics, but there is an important difference. The metrics in this monitor element generally start at 0 and continue to accumulate until the next database activation, while the metrics in **metrics** are calculated to show the change in value for the metric since the last time statistics were collected.

Important: Starting with Version 10.1 Fix Pack 1, this monitor element is deprecated for the statistics event monitor and might be removed in a future release. If you use the XML metrics data returned in this element, start using the **metrics** document instead.

device_type - Device type

This element is an identifier for the device type associated with a UTILSTART event.

Table 581. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILLOCATION	Always collected

Usage

For the change history event monitor, this field determines the interpretation for the LOCATION field:

A	TSM
C	Client
D	Disk
F	Snapshot backup
L	Local
N	Internally generated by DB2
O	Other vendor device support
P	Pipe
Q	Cursor
R	Remove fetch data
S	Server
T	Tape
U	User exit
X	X/Open XBSA interface

diaglog_write_wait_time - Diagnostic log file write wait time monitor element

The time spent waiting on a write to the db2diag log file. The value is given in milliseconds.

Table 582. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 582. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_WAIT_TIMES _BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 583. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 583. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to understand the amount of time spent writing to the db2diag log file. In a partitioned database environment, a high value for this time may indicate contention for the db2diag log file if shared storage is being used for the diagnostic directory path (diagpath). A high value may also indicate excessive logging, for example if **diaglevel** has been set to log all informational messages.

diaglog_writes_total - Total diagnostic log file writes monitor element

The number of times agents have written to the db2diag log file.

Table 584. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 584. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 585. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element with the **diaglog_write_wait_time** monitor element to understand the average amount of time spent writing to the db2diag log file.

direct_read_reqs - Direct read requests monitor element

The number of requests to perform a direct read of one or more sectors of data.

Table 586. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 586. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 587. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 588. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average number of sectors that are read by a direct read:

$$\text{direct_reads} / \text{direct_read_reqs}$$

direct_read_time - Direct read time monitor element

The elapsed time required to perform the direct reads. This value is given in milliseconds.

Table 589. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 589. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 590. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 591. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average direct read time per sector:

$$\text{direct_read_time} / \text{direct_reads}$$

A high average time may indicate an I/O conflict.

direct_reads - Direct reads from database monitor element

The number of read operations that do not use the buffer pool.

Table 592. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 592. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	REQUEST METRICS BASE

Table 593. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 594. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average number of sectors that are read by a direct read:

direct_reads / direct_read_reqs

When using system monitors to track I/O, this element helps you distinguish database I/O from non-database I/O on the device.

Direct reads are performed in units, the smallest being a 512-byte sector. They are used when:

- Reading LONG VARCHAR columns
- Reading LOB (large object) columns
- Performing a backup

direct_write_reqs - Direct write requests monitor element

The number of requests to perform a direct write of one or more sectors of data.

Table 595. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED

Table 595. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 596. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 597. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average number of sectors that are written by a direct write:

$$\text{direct_writes} / \text{direct_write_reqs}$$

direct_write_time - Direct write time monitor element

The elapsed time required to perform the direct writes. This value is reported in milliseconds.

Table 598. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 598. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 599. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 600. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average direct write time per sector:

$$\text{direct_write_time} / \text{direct_writes}$$

A high average time may indicate an I/O conflict.

direct_writes - Direct writes to database monitor element

The number of write operations that do not use the buffer pool.

Table 601. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED

Table 601. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	REQUEST METRICS BASE

Table 602. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 603. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Tablespaces	event_tablespace	Always collected

Table 603. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the following formula to calculate the average number of sectors that are written by a direct write.

$$\text{direct_writes} / \text{direct_write_reqs}$$

When using system monitors to track I/O, this element helps you distinguish database I/O from non-database I/O on the device.

Direct writes are performed in units, the smallest being a 512-byte sector. They are used when:

- Writing LONG VARCHAR columns
- Writing LOB (large object) columns
- Performing a restore
- Performing a load
- Allocating new extents for SMS table space if MPFA is enabled (which is the default)

disabled_peds - Disabled partial early distincts monitor element

The number of times that partial early distinct operations were disabled because insufficient sort heap was available.

Table 604. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 605. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 605. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 606. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-

Table 606. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with the **total_peds** monitor element to determine if partial early distinct operations are getting sufficient sort heap memory most of the time. If the ratio of the **disabled_peds** monitor element to the **total_peds** monitor element is high, your database performance may be sub-optimal. You should consider increasing the sort heap size or the sort heap threshold, or both.

disconn_time - Database Deactivation Timestamp

The date and time that the application disconnected from the database (at the database level, this is the time the last application disconnected).

Element identifier

disconn_time

Element type

timestamp

Table 607. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Use this element to calculate the elapsed time since:

- The database was active (for information at the database level)
- The connection was active (for information at the connection level).

disconnects - Disconnects

This element contains a count of the total number of times the federated server has disconnected from this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

Table 608. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine the total number of times the federated server has disconnected from this data source on behalf of any application. Together with the CONNECT count, this element provides a mechanism by which you can determine the number of applications this instance of the federated server believes is currently connected to a data source.

dl_conns - Connections involved in deadlock monitor element

The number of connections that are involved in the deadlock.

Table 609. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	event_deadlock	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Use this element in your monitoring application to identify how many deadlock connection event records will follow in the event monitor data stream.

dyn_compound_exec_id - Dynamic compound statement executable identifier monitor element

Executable ID identifying the dynamically prepared compound SQL statement or anonymous block in PL/SQL.

Table 610. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected

Usage

Use this value to retrieve the statement text of the routine using the MON_GET_PKG_CACHE_STMT table function.

dynamic_sql_stmts - Dynamic SQL Statements Attempted

The number of dynamic SQL statements that were attempted.

Table 611. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 612. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

An occurrence of each of the following operations increments the value of the `dynamic_sql_stmts` monitor element by one.

- FETCH
- OPEN
- PREPARE
- CLOSE
- DESCRIBE

Usage You can use this element to calculate the total number of successful SQL statements at the database or application level:

```

dynamic_sql_stmts
+ static_sql_stmts
- failed_sql_stmts
= throughput during monitoring period
    
```

edu_ID - Engine dispatchable unit ID monitor element

ID of engine dispatchable unit with which this memory pool is associated.

Table 613. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE

Usage

When returned by the table function `MON_GET_MEMORY_POOL`, this monitor element is NULL except when the memory pool being described is PRIVATE.

eff_stmt_text - Effective statement text monitor element

The effective text of the SQL statement, if the statement was modified as a result of the statement concentrator.

Table 614. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_ACTIVITY_DETAILS_COMPLETE table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 615. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activitystmt	Always collected

Usage

If the statement concentrator is enabled and if the statement text has been modified as a result of the statement concentrator, then this monitor element contains the effective statement text. Otherwise, this monitor element contains a text string which is 0 bytes long.

effective_isolation - Effective isolation monitor element

The effective isolation level for this statement.

Table 616. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 617. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Package cache	-	COLLECT BASE DATA

Usage

Use this element to understand the isolation level that was used during the execution of the statement.

effective_lock_timeout - Effective lock timeout monitor element

The effective lock timeout value for this activity. This value is reported in seconds.

Table 618. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

effective_query_degree - Effective query degree monitor element

The effective query degree of parallelism for this activity.

Table 619. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 620. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-

elapsed_exec_time - Statement Execution Elapsed Time

At the DCS statement level, this is the elapsed time spent processing an SQL request on a host database server. This value is reported by this server. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

In contrast to the host_response_time element, this element does not include the network elapsed time between DB2 Connect and the host database server. At other levels, this value represents the sum of the host execution times for all the statements that were executed for a particular database or application, or for those statements that used a given number of data transmissions.

Table 621. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement, Timestamp
Application	appl	Statement, Timestamp
DCS Database	dcс_dbase	Statement, Timestamp
DCS Application	dcс_appl	Statement, Timestamp
DCS Statement	dcс_stmt	Statement, Timestamp
Data Transmission	stmt_transmissions	Statement, Timestamp

For snapshot monitoring at the statement level, this counter cannot be reset. This counter can be reset at other levels.

Usage Use this element, along with other elapsed time monitor elements, to evaluate the database server's processing of SQL requests and to help isolate performance issues.

Subtract this element from the host_response_time element to calculate the network elapsed time between DB2 Connect and the host database server.

Note: For the dcs_dbase, dcs_appl, dcs_stmt and stmt_transmissions levels, the elapsed_exec_time element applies only to z/OS® databases. If the DB2 Connect gateway is connecting to a Windows, Linux, AIX, or other UNIX database, the elapsed_exec_time is reported as zero.

empty_pages_deleted - Empty pages deleted monitor element

The number of pseudo empty pages that have been deleted. Pseudo empty pages are pages where all the keys have been pseudo deleted.

Table 622. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

empty_pages_reused - Empty pages reused monitor element

The number of pseudo empty pages that have been reused. Pseudo empty pages are pages where all the keys have been pseudo deleted.

Table 623. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

entry_time - Entry time monitor element

The time at which this activity entered the system.

Table 624. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Usage

estimated_cpu_entitlement - Estimated CPU entitlement monitor element

The percentage of total CPU on a host or an LPAR that a service subclass is configured to consume based on its CPU shares assuming that it consumes no more and no less than what it is configured to consume.

The determination of which service classes participate in its calculation is based on the actual CPU utilization measured over the sampling period versus the WLM_DISP_MIN_UTIL database manager configuration setting. The impact of a CPU limit on a service class itself, on the service classes with which it competes, or on a parent service class (if it has one) are not taken into account in the calculation.

Table 625. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE

estimatedsqlcost_threshold_id - Estimated SQL cost threshold ID monitor element

The ID of the ESTIMATEDSQLCOST threshold that was applied to the activity.

Table 626. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which ESTIMATEDSQLCOST threshold, if any, was applied to the activity.

estimatedsqlcost_threshold_value - Estimated SQL cost threshold value monitor element

The upper bound of the ESTIMATEDSQLCOST threshold that was applied to the activity.

Table 627. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the ESTIMATEDSQLCOST threshold applied to the activity, if any.

estimatedsqlcost_threshold_violated - Estimated SQL cost threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the ESTIMATEDSQLCOST threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 628. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the ESTIMATEDSQLCOST threshold that was applied to the activity.

event_id - Event ID monitor element

An identifier associated with an event that is used in conjunction with other monitor elements to uniquely identify the event. This monitor element forms a part of the **xmlid** monitor element in the interfaces that return that element.

Table 629. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary dbdbmcfg ddlstmtexec evmonstart regvar txncompletion utillocation utilphase utilstart utilstop	Always collected
Locking	<ul style="list-style-type: none">event_lockevent_lock_participantsevent_lock_participants_activitiesevent_lock_activity_values	Always collected
Package Cache	<ul style="list-style-type: none">event_pkgcacheevent_pkgcache_metricsevent_pkgcache_stmt_args	Always collected
Unit of Work	event_uow	Always collected

Usage

The value for this identifier is different depending on the type of event record in which it appears:

Locking event monitor records

An numeric identifier for the event. The ID is recycled at database activation time. Uniqueness is guaranteed by the combination of **event_timestamp**, **event_id**, **member**, and **event-type**.

Unit of work event monitor records

An alias of the UOW ID that is unique per connection. Uniqueness is guaranteed by the combination of **event_timestamp**, **event_id**, **event-type**, **member**, and **appl_id**.

Package cache event monitor record

An numeric identifier for the event. The ID is recycled at database activation time. Uniqueness is guaranteed by the combination of **event_timestamp**, **event_id**, **member**, and **event-type**.

Change history event monitor record

An numeric identifier for the event. The ID is recycled at database activation time. The uniqueness of events is guaranteed by the combination of **event_timestamp**, **event_id**, **member**, and **event-type**.

event_monitor_name - Event Monitor Name

The name of the event monitor that created the event data stream.

Element identifier

event_monitor_name

Element type

information

Table 630. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	Always collected

Usage This element allows you to correlate the data that you are analyzing to a specific event monitor in the system catalog tables. This is the same name that can be found in the NAME column of the SYSCAT.EVENTMONITORS catalog table, which is the name specified on the CREATE EVENT MONITOR and SET EVENT MONITOR statements.

event_time - Event Time

The date and time an event occurred.

Table 631. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tablespaces	event_tablespace	-
Tables	event_table	-

Usage You can use this element to help relate events chronologically.

event_timestamp - Event timestamp monitor element

The time that this event record was generated by the database manager.

Table 632. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary dbdbmcfg ddlstmtexec evmonstart regvar txncompletion utillocation utilphase utilstart utilstop	Always collected

Table 632. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Element Collection Level
Locking	<ul style="list-style-type: none"> • event_lock • event_lock_participants • event_lock_participants_activities • event_lock_activity_values 	Always collected
Package Cache	<ul style="list-style-type: none"> • event_pkgcache • event_pkgcache_metrics • event_pkgcache_stmt_args 	Always collected
Unit of Work	<ul style="list-style-type: none"> • event_uow 	Always collected

event_type - Event Type monitor element

The event type of the event that is being reported. Reported by the change history, locking, and package cache event monitors only.

Many even monitors capture only one type of event. For example, a unit of work event monitor records a unit of work completion event that captures data related to the unit of work when it is completed. Other event monitors, such as the database, table, buffer pool or table space event monitors each capture one type of event after database deactivation.

Some event monitors, however, generate different types of events. These event monitors report the type of event in the **event_type** monitor element. Table 633 shows the event monitors that return this monitor element. Table 634 on page 882 shows the possible values that this monitor element can have.

Table 633. Event Monitoring Information

Event Monitor	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary dbdbmcfg ddlstmtexec evmonstart regvar txncompletion utillocation utilphase utilstart utilstop	Always collected
Locking	<ul style="list-style-type: none"> • event_lock • event_lock_participants • event_lock_participants_activities • event_lock_activity_values 	Always collected
Unit of work	Not applicable. For more information, see the usage notes for this event monitor in Table 634 on page 882.	Always collected

Table 633. Event Monitoring Information (continued)

Event Monitor	Logical Data Grouping	Monitor Element Collection Level
Package cache	<ul style="list-style-type: none"> pkgcache 	Always collected

Table 634. Possible values for event_type

Event monitor	Possible values for event_type element	Usage notes
Change history	<ul style="list-style-type: none"> DBCFCG DBCFCGVALUES DBMCFG DBMCFGVALUES REGVAR REGVARVALUES DDLSTMTEXEC TXNCOMPLETION EVMONSTART UTILSTART UTILSTOP UTILSTARTPROC UTILSTOPPROC UTILPHASESTART UTILPHASESTOP 	The event_type monitor element is included as a column in the output of this event monitor.
Locking	<ul style="list-style-type: none"> LOCKTIMEOUT LOCKWAIT DEADLOCK 	The event_type monitor element is included as a column in the output of this event monitor when it writes to either regular or unformatted event (UE) tables. It is also included in the output created by the routines <code>EVMON_FORMAT_UE_TO_TABLES</code> or <code>EVMON_FORMAT_UE_TO_XML</code> .
Package cache	<ul style="list-style-type: none"> PKGCACHEBASE PKGCACHEDETAILED 	The event_type monitor element is included as a column in the output of this event monitor when it writes to unformatted event (UE) tables, but not regular tables. It is also included in the output created by the routines <code>EVMON_FORMAT_UE_TO_TABLES</code> or <code>EVMON_FORMAT_UE_TO_XML</code> .
Unit of work	<ul style="list-style-type: none"> UOW 	The event_type monitor element is included as a column in the output of this event monitor only when it writes to an unformatted event (UE) table. Moreover, it is included only in the UE table created by this event monitor; it is not included in the output created by the routines <code>EVMON_FORMAT_UE_TO_TABLES</code> or <code>EVMON_FORMAT_UE_TO_XML</code> .

evmon_activates - Number of event monitor activations

The number of times an event monitor has been activated.

Element identifier

evmon_activates

Element type
counter

This monitor element is not reported by all event monitors. See Table 635 for more details.

Table 635. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tables	event_table	Always collected
Tablespaces	event_tablespace	Always collected
Bufferpools	event_bufferpool	Always collected
Deadlocks	event_deadlock	Always collected
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected
Statements	event_stmt_history	Always collected
Connections*	-	
Transactions*	-	
Statistics*	-	
Threshold violations*	-	

* This event monitor updates the `evmon_activates` column only in the catalog table `SYSCAT.EVENTMONITORS`. The monitor element is not included in any of the logical data groups that are written to event monitor output tables.

Usage Use this element to correlate information returned by the event monitors listed in Table 635. This element is applicable only to write-to-table event monitors; it is not maintained for event monitors that write to a file or pipe.

All of the event monitors in Table 635 update the `evmon_activates` column of the `SYSCAT.EVENTMONITORS` catalog table when the event monitor is activated. This change is logged, so the `DATABASE CONFIGURATION` displays:

```
All committed transactions have been written to disk = NO
```

If an event monitor is created with the `AUTOSTART` option, and the first user `CONNECTS` to the database and immediately `DISCONNECTS` so that the database is deactivated, a log file is produced.

Unless otherwise noted, these event monitors also include the value for `evmon_activates` as a column in the tables to which event data is written.

Event monitors not included in this table do not report the `evmon_activates` monitor element.

evmon_wait_time - Event monitor wait time monitor element

The amount of time that an agent waited for an event monitor record to become available.

A wait occurs when the agent tries to write an event monitor record and the agent is blocked until a fast writer record becomes available. Fast writers are used for high volume, parallel writing of event monitor data to tables, files, or pipes.

The unit of measurement is milliseconds.

Table 636. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - Get detailed metrics for package cache entries (reported in the DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in the DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 637. Event Monitoring Information

Event Type	Event monitor output type	Logical Data Grouping	Monitor Switch
Unit of work	TABLE, FILE, PIPE	uow_metrics	REQUEST METRICS BASE

Table 637. Event Monitoring Information (continued)

Event Type	Event monitor output type	Logical Data Grouping	Monitor Switch
Unit of work	UE TABLE, processed by the EVMON_FORMAT_UE_TO_XML function	Reported in the system_metrics document Always collected	REQUEST METRICS BASE
Unit of work	UE TABLE, processed by the EVMON_FORMAT_UE_TO_TABLES function	Reported in the metrics document of the UOW_EVENT table and in the UOW_METRICS table Always collected	REQUEST METRICS BASE
Package cache	TABLE, FILE, PIPE	pkgcache_metrics	ACTIVITY METRICS BASE
Package cache	UE TABLE, processed by the EVMON_FORMAT_UE_TO_XML function	Reported in the activity_metrics document Always collected	ACTIVITY METRICS BASE
Package cache	UE TABLE, processed by the EVMON_FORMAT_UE_TO_TABLES function	Reported in the metrics document of the PKGCACHE_EVENT table and in the PKGCACHE_METRICS table Always collected	ACTIVITY METRICS BASE
Activities	TABLE, FILE, PIPE	event_activitymetrics	ACTIVITY METRICS BASE
Activities	TABLE, FILE, PIPE	event_activity (reported in the DETAILS XML document)	ACTIVITY METRICS BASE
Statistics	TABLE, FILE, PIPE	event_scstats (reported in the DETAILS XML document)	REQUEST METRICS BASE
Statistics	TABLE, FILE, PIPE	event_wlstats (reported in the DETAILS XML document)	REQUEST METRICS BASE

evmon_waits_total - Event monitor total waits monitor element

The number of times that an agent waited for an event monitor record to become available.

A wait occurs when the agent tries to write an event monitor record and the agent is blocked until a fast writer record becomes available. Fast writers are used for high volume, parallel writing of event monitor data to tables, files, or pipes.

Table 638. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE

Table 638. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - Get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in the DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 639. Event Monitoring Information

Event Type	Event monitor output type	Logical Data Grouping	Monitor Switch
Unit of work	TABLE	uow_metrics	REQUEST METRICS BASE
Unit of work	UE TABLE, processed by the EVMON_FORMAT_UE_TO_XML function	Reported in the system_metrics document Always collected	REQUEST METRICS BASE
Unit of work	UE TABLE, processed by the EVMON_FORMAT_UE_TO_TABLES function	Reported in the metrics document of the UOW_EVENT table and in the UOW_METRICS table Always collected	REQUEST METRICS BASE
Package cache	TABLE	pkgcache_metrics	ACTIVITY METRICS BASE

Table 639. Event Monitoring Information (continued)

Event Type	Event monitor output type	Logical Data Grouping	Monitor Switch
Package cache	UE TABLE, processed by the EVMON_FORMAT_UE_TO_XML function	Reported in the activity_metrics document Always collected	ACTIVITY METRICS BASE
Package cache	UE TABLE, processed by the EVMON_FORMAT_UE_TO_TABLES function	Reported in the metrics document of the PKGCACHE_EVENT table and in the PKGCACHE_METRICS table Always collected	ACTIVITY METRICS BASE
Activities	TABLE	event_activymetrics	ACTIVITY METRICS BASE
Activities	TABLE	event_activity (reported in the DETAILS_XML document)	ACTIVITY METRICS BASE
Statistics	TABLE	event_scstats (reported in the DETAILS_XML document)	REQUEST METRICS BASE
Statistics	TABLE	event_wlstats (reported in the DETAILS_XML document)	REQUEST METRICS BASE

exec_list_cleanup_time - Execution list cleanup time monitor element

Time when the execution list was last pruned.

This element returns NULL if execution list was never pruned.

Table 640. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected

exec_list_mem_exceeded - Execution list memory exceeded monitor element

Identifies if there was insufficient memory in the monitor heap to capture all statement information for the routine.

Possible values for this element are as follows:

- Y Insufficient memory to capture all statement information
- N For all other cases

The value is set to 'N' when the execution list for the routine is pruned.

Table 641. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected

executable_id - Executable ID monitor element

An opaque binary token generated on the data server that uniquely identifies the SQL statement section that was executed. For non-SQL activities, a 0-length string value is returned.

Table 642. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 643. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activitystmt	-
Package cache	-	COLLECT BASE DATA

Usage

Use this monitor element as input to different monitoring interfaces to obtain data about the section. The MON_GET_PKG_CACHE_STMT table function, which is used to get SQL statement activity metrics in the package cache, takes the executable ID as input.

executable_list_size - Size of executable list monitor element

The number of entries that are present within the executable ID listing for a particular unit of work.

Table 644. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of Work	uow	

executable_list_truncated - Executable list truncated monitor element

Indicates whether the executable list is truncated. Possible values are YES or NO. The list can be truncated if there is insufficient memory available to store the entire executable list during processing.

Table 645. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of Work	uow	

evmon_flushes - Number of Event Monitor Flushes

The number of times the FLUSH EVENT MONITOR SQL statement has been issued.

Element identifier

evmon_flushes

Element type

information

Table 646. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tables	event_table	Always collected
Tablespaces	event_tablespace	Always collected
Bufferpools	event_bufferpool	Always collected

Usage This identifier increments with each successive FLUSH EVENT MONITOR SQL request processed by the database manager after an application has connected to the database. This element helps to uniquely identify database, table, table space and buffer pool data.

executable_id - Executable ID monitor element

An opaque binary token generated on the data server that uniquely identifies the SQL statement section that was executed. For non-SQL activities, a 0-length string value is returned.

Table 647. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 648. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activystmt	-
Package cache	-	COLLECT BASE DATA

Usage

Use this monitor element as input to different monitoring interfaces to obtain data about the section. The MON_GET_PKG_CACHE_STMT table function, which is used to get SQL statement activity metrics in the package cache, takes the executable ID as input.

execution_id - User Login ID

The ID that the user specified when logging in to the operating system. This ID is distinct from auth_id, which the user specifies when connecting to the database.

Table 649. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic

Table 649. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcx_appl_info	Basic

Table 650. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connections	event_connheader	-

Usage You can use this element to determine the operating system userid of the individual running the application that you are monitoring.

failed_sql_stmts - Failed Statement Operations

The number of SQL statements that were attempted, but failed.

Table 651. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic
DCS Database	dcx_dbase	Basic
DCS Application	dcx_appl	Basic

For snapshot monitoring, this counter can be reset.

Table 652. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to calculate the total number of successful SQL statements at the database or application level:

```

dynamic_sql_stmts
+ static_sql_stmts
- failed_sql_stmts
= throughput during monitoring period

```

This count includes all SQL statements that received a negative SQLCODE.

This element may also help you in determining reasons for poor performance, since failed statements mean time wasted by the database manager and as a result, lower throughput for the database.

fcm_congested_sends - FCM congested sends monitor element

The number of send operations to a remote member that were delayed due to congestion.

A state of congestion occurs when data sent on a network connection are blocked because previously sent data not being received at the remote member. Congestion can be the result latency in processing by the receiver, or network issues that cause packet loss and retransmission of data.

Table 653. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

fcm_congestion_time - FCM congestion time monitor element

The duration of time that the FCM network connection to a remote member was in a state of congestion. Unit of measure is milliseconds.

A state of congestion occurs when data sent on a network connection are blocked because previously sent data not being received at the remote member. Congestion can be the result latency in processing by the receiver, or network issues that cause packet loss and retransmission of data.

Table 654. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

fcm_num_congestion_timeouts - FCM congestion timeouts monitor element

The number of times that a state of congestion on an FCM network connection did not resolve itself within the allowable time period. A timeout occurs when the sender drops the connection because the remote member was temporarily unreachable.

A state of congestion occurs when data sent on a network connection are blocked because previously sent data not being received at the remote member. Congestion can be the result latency in processing by the receiver, or network issues that cause packet loss and retransmission of data.

Table 655. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

fcm_num_conn_lost - FCM lost connections monitor element

The number of times that an FCM network connection to a remote member was unexpectedly disconnected.

Table 656. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

fcf_num_conn_timeouts - FCF connection timeouts monitor element

The number of times out out when attempting to establish an FCF network connection with a remote member.

Table 657. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCF_CONNECTION_LIST - Get details for all FCF connections	ACTIVITY METRICS BASE

fcf_message_rcv_volume - FCF message received volume monitor element

The amount of data received for internal requests (such as RPCs) distributed by the FCF communications layer. This value is reported in bytes.

Table 658. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_FCF_CONNECTION_LIST - Get details for all FCF connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 658. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 659. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine how much of the data volume being sent through the FCM subsystem is for request or reply message traffic as opposed to actual table data.

fc_message_rcv_wait_time - FCM message received wait time monitor element

The fc_message_rcv_wait_time monitor element stores the time spent by an agent waiting for an FCM reply message containing the results of a previously sent FCM request message.

This value reflects both the time required to send the response between partitions using FCM and the time required for the subagent to process the request message. The value is given in milliseconds.

Table 660. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 661. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This element can be used to determine how much time was spent on a given partition waiting for requests to be processed on other partitions in a multi-partition instance.

fcm_message_recvs_total - Total FCM message receives monitor element

The total number of buffers received as part of an FCM reply message containing the results of a previously sent FCM request message.

Table 662. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 662. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 663. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

This element can be used to determine both the average volume per FCM message received, as well as the average time spent waiting for a single FCM message to be received.

fcm_message_send_volume - FCM message send volume monitor element

Amount of data volume sent via internal FCM requests. This value is reported in bytes.

Table 664. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 665. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this element to determine how much of the data volume being sent through the FCM subsystem is used for sending request and reply message traffic, as opposed to sending actual table data.

fcm_message_send_wait_time - FCM message send wait time monitor element

The time spent blocking on an FCM message send. The value is given in milliseconds. This monitor element reflects the time spent blocking for FCM buffers to be flushed from an FCM channel when distributing internal requests on the database system.

Table 666. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 666. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 667. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this element to determine how much time agents are spending waiting to send an FCM request message through the FCM subsystem. Depending on how busy the FCM daemons are, an agent may need to wait when attempting to send messages.

fcm_message_sends_total - Total FCM message sends monitor element

The total number of buffers distributed as part of internal requests using the FCM communications mechanism.

Table 668. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 668. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 669. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine both the average amount of data sent per FCM request message, as well as the average amount of time waited per FCM message.

fcm_rcv_volume - FCM received volume monitor element

The total amount of data received via the FCM communications layer. This value is reported in bytes.

Table 670. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 670. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 671. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Indicates the total volume of data received on this partition using FCM, including both message traffic and table queue data.

fcm_rcv_wait_time - FCM received wait time monitor element

The total time spent waiting to receive data through FCM. The value is given in milliseconds.

Table 672. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 672. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 673. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine the total time spent waiting to receive data through FCM on this database partition. This includes both data from replies to request messages as well as table queue data.

fcm_recvs_total - FCM receives total monitor element

Total number of buffers received for internal requests using the FCM communications mechanism. The fcm_recvs_total monitor element value is the sum of the values for the fcm_message_recvs_total and fcm_tq_recvs_total monitor elements.

Table 674. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 674. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 675. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 675. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element together with the **fcm_recv_wait_time** monitor element to determine the average wait time per FCM receive operation as well as the average volume returned from an FCM receive operation.

fcm_send_volume - FCM send volume monitor element

The total amount of data distributed by the FCM communications layer. This value is reported in bytes.

Table 676. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 676. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 677. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the total volume of data sent using FCM, including both message traffic and table queue data.

fcmsendwaittime - FCM send wait time monitor element

The time spent blocking on an FCM send operation. This includes time spent waiting for buffers for internal requests to be flushed and time spent waiting for window count acknowledgements when sending data over table queues. The value is given in milliseconds.

Table 678. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 678. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 679. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine the total time spent waiting to send data through FCM. This includes both request messages and table queue data.

fcm_sends_total - FCM sends total monitor element

The total number of buffers sent using the internal FCM communications layer.

Table 680. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 681. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine the average wait time per FCM receive operation as well as the average volume returned from an FCM receive operation.

fcm_tq_recv_volume - FCM table queue received volume monitor element

The amount of data received on table queues by the FCM communications layer. This value is reported in bytes.

Table 682. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 682. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 683. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the total volume of data received through table queues.

fcm_tq_recv_wait_time - FCM table queue received wait time monitor element

The time spent waiting to receive the next buffer from a table queue. The value is given in milliseconds.

Table 684. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 684. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 685. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine how much time agents are spending waiting to receive data on table queues.

fcm_tq_recvs_total - FCM table queue receives total monitor element

The total number of buffers received from table queues using the internal FCM communications mechanism.

Table 686. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 686. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 687. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with `fcmtqrcvvolume` and `fcmtqrcvwaittime` to determine the average wait time and volume per table queue buffer received.

fcmtqsendvolume - FCM table queue send volume monitor element

The amount of data sent over table queues by the FCM communications layer. This value is reported in bytes.

Table 688. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 688. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 689. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine the total volume of data sent over FCM through table queue buffer sends.

fcmtq_send_wait_time - FCM table queue send wait time monitor element

The time spent waiting to send the next buffer through a table queue. This reflects the time spent waiting for window count acknowledgements from the receiver end of the table queue. The value is given in milliseconds.

Table 690. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 690. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 691. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 691. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this monitor element to determine how much time is being spent waiting to send a data buffer over FCM through a table queue.

fcm_tq_sends_total - FCM table queue send total monitor element

The total number of buffers containing table queue data sent using the internal FCM communications mechanism.

Table 692. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 692. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 693. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with **fcm_tq_send_volume** and **fcm_tq_send_wait_time** monitor elements to determine the average data volume and time waited for buffer sent using a table queue.

fetch_count - Number of Successful Fetches

The number of successful physical fetches or the number of attempted physical fetches, depending on the snapshot monitoring level.

- For the stmt and dynsql snapshot monitoring levels and the statement event type: the number of successful fetches performed on a specific cursor.
- For the dcs_stmt snapshot monitoring level: The number of attempted physical fetches during a statement's execution (regardless of how many rows were fetched by the application). In this situation, **fetch_count** represents the number of times the server needed to send a reply data back to the gateway while processing a statement.

Table 694. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Table 694. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Statement	dc_stmt	Statement
Dynamic SQL	dynsql	Statement

For Dynamic SQL snapshot monitoring, this counter can be reset.

Table 695. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_stmt	Always collected

Usage

You can use this element to gain insight into the current level of activity within the database manager.

For performance reasons, a statement event monitor does not generate a statement event record for every FETCH statement. A record event is only generated when a FETCH returns a non-zero SQLCODE.

files_closed - Database files closed monitor element

The total number of database files closed.

Table 696. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 697. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 698. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

The database manager opens files for reading and writing into and out of the buffer pool. The maximum number of database files open by an application at any time is controlled by the **maxfilop** configuration parameter. If the maximum is reached, one file will be closed before the new file is opened. Note that the actual number of files opened may not equal the number of files closed.

You can use this element to help you determine the best value for the **maxfilop** configuration parameter.

first_active_log - First Active Log File Number

The file number of the first active log file.

Element identifier

first_active_log

Element type

information

Table 699. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 700. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	detail_log	Basic

Table 701. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *last_active_log* and *current_active_log* elements to determine the range of active log files. Knowing the range of active log files helps you determine the disk space required for log files.

You can also use this element to determine which log files have data to help you identify log files needed for split mirror support.

first_overflow_time - Time of First Event Overflow

The date and time of the first overflow recorded by this overflow record.

Table 702. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Overflow Record	event_overflow	-

Usage Use this element with *last_overflow_time* to calculate the elapsed time for which the overflow record was generated.

fs_caching - File system caching monitor element

Indicates whether a particular table space uses file system caching. If **fs_caching** is 0, file system caching is enabled. If **fs_caching** is 1, file system caching is disabled.

Table 703. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 704. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table space	tablespace	Basic

Table 705. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tablespaces	event_tablespace	-

fs_id - Unique file system identification number monitor element

This element shows the unique identification number provided by the operating system for a file system pointed to by a storage path or container.

Table 706. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 707. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Buffer Pool

Usage

Use this element together with the following elements to gather data on space utilization for the database:

- **db_storage_path**
- **sto_path_free_size**
- **fs_used_size**
- **fs_total_size**

fs_total_size - Total size of a file system monitor element

This element shows the capacity (in bytes) of a file system pointed to by a storage path or container.

Table 708. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 709. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Buffer Pool

Usage

You can use this element together with the following elements to gather data on space utilization for the database:

- **db_storage_path**
- **sto_path_free_size**
- **fs_used_size**
- **fs_id**

fs_used_size - Amount of space used on a file system monitor element

This element shows the amount of space (in bytes) already used on a file system pointed to by a storage path or container.

Table 710. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE

Table 711. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Buffer Pool

Usage

You can use this element together with the following elements to gather data on space utilization for the database:

- **db_storage_path**
- **sto_path_free_size**

- `fs_total_size`
- `fs_id`

global_transaction_id - Global transaction identifier monitor element

The XA transaction ID in use at the time the event occurred.

Table 712. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	ddlstmtexec txncompletion	Always collected
Unit of Work	uow	Always collected

Usage

For the change history event monitor, this is the global transaction ID in use at the time the event occurred. This is the data field in the `SQLP_GXID` structure that is part of the transaction logs.

gw_comm_error_time - Communication Error Time

The date and time when the most recent communication error (SQL30081) occurred while a DCS application was attempting to connect to a host database, or while it was processing an SQL statement.

Table 713. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Timestamp

Usage

Use this element for problem determination, in conjunction with Communication Error and the communication error logged in administration notification log.

gw_comm_errors - Communication Errors

The number of times that a communication error (SQL30081) occurred while a DCS application was attempting to connect to a host database, or while it was processing an SQL statement.

Table 714. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Basic

For snapshot monitoring, this counter can be reset.

Usage By monitoring the number of communication errors over time, you can assess whether your DB2 Connect gateway has connectivity problems with a particular host database. You can establish what you consider to be a normal error threshold, so that any time the number of errors exceeds this threshold an investigation of the communication errors should be made.

Use this element for problem determination, in conjunction with the communication error logged in administration notification log.

gw_con_time - DB2 Connect Gateway First Connect Initiated

The date and time when the first connection to the host database was initiated from the DB2 Connect gateway.

Table 715. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Timestamp
DCS Application	dc_s_appl	Timestamp

Usage Use this element for problem determination on DCS applications.

gw_connections_top - Maximum Number of Concurrent Connections to Host Database

The maximum number of concurrent connections to a host database that have been handled by the DB2 Connect gateway since the first database connection.

Element identifier

gw_connections_top

Element type

watermark

Table 716. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Basic

Usage This element will help you understand the level of activity at the DB2 Connect gateway and the associated use of system resources.

gw_cons_wait_client - Number of Connections Waiting for the Client to Send Request

The current number of connections to host databases being handled by the DB2 Connect gateway that are waiting for the client to send a request.

Element identifier

gw_cons_wait_client

Element type

gauge

Table 717. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
DCS Database	dc_s_dbase	Basic

Usage This value can change frequently. It should be sampled at regular intervals over an extended period in order to obtain a realistic view of gateway usage.

gw_cons_wait_host - Number of Connections Waiting for the Host to Reply

The current number of connections to host databases being handled by the DB2 Connect gateway that are waiting for a reply from the host.

Element identifier

gw_cons_wait_host

Element type

gauge

Table 718. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
DCS Database	dcs_dbase	Basic

Usage This value can change frequently. It should be sampled at regular intervals over an extended period in order to obtain a realistic view of gateway usage.

gw_cur_cons - Current Number of Connections for DB2 Connect

The current number of connections to host databases being handled by the DB2 Connect gateway.

Table 719. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
DCS Database	dcs_dbase	Basic

Usage This element will help you understand the level of activity at the DB2 Connect gateway and the associated use of system resources.

gw_db_alias - Database Alias at the Gateway

The alias used at the DB2 Connect gateway to connect to the host database.

Element identifier

gw_db_alias

Element type

information

Table 720. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

gw_exec_time - Elapsed Time Spent on DB2 Connect Gateway Processing

The time in seconds and microseconds at the DB2 Connect gateway to process an application request (since the connection was established), or to process a single statement.

Table 721. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl	Statement, Timestamp
DCS Statement	dcs_stmt	Statement, Timestamp

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine what portion of the overall processing time is due to DB2 Connect gateway processing.

gw_total_cons - Total Number of Attempted Connections for DB2 Connect

The total number of connections attempted from the DB2 Connect gateway since the last db2start command or the last reset.

Table 722. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
DCS Database	dcs_dbase	Basic

For snapshot monitoring, this counter can be reset.

Usage This element will help you understand the level of activity at the DB2 Connect gateway and the associated use of system resources.

hadr_connect_status - HADR Connection Status monitor element

The current high availability disaster recovery (HADR) connection status of the database.

Table 723. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 724. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the HADR connection status of a database.

The data type of this element is integer.

If the database is in HADR primary or standby role, the value for this element is one of the following constants:

SQLM_HADR_CONN_CONNECTED

The database is connected to its partner node.

SQLM_HADR_CONN_DISCONNECTED

The database is not connected to its partner node.

SQLM_HADR_CONN_CONGESTED

The database is connected to its partner node, but the connection is congested. A connection is congested when the TCP/IP socket connection between the primary-standby pair is still alive, but one end cannot send to the other end. For example, the receiving end is not receiving from the socket connection, resulting in a full TCP/IP send space. The reasons for network connection being congested include the following:

- The network is being shared by too many resources or the network is not fast enough for the transaction volume of the primary HADR node.
- The server on which the standby HADR node resides is not powerful enough to retrieve information from the communication subsystem at the necessary rate.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_connect_time - HADR Connection Time monitor element

This monitor element can return one of the following values: high availability disaster recovery (HADR) connection time, HADR congestion time, or HADR disconnection time.

Table 725. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine when the current HADR connection status began.

If the database is in HADR primary or standby role, the meaning of this element depends on the value of the **hadr_connect_status** element:

- If the value of the **hadr_connect_status** element is **SQLM_HADR_CONN_CONNECTED**, then this element shows connection time.

- If the value of the **hadr_connect_status** element is `SQLM_HADR_CONN_CONGESTED`, then this element shows the time when congestion began.
- If the value of the **hadr_connect_status** element is `SQLM_HADR_CONN_DISCONNECTED`, then this element shows disconnection time.

If there has been no connection since the HADR engine dispatchable unit (EDU) was started, connection status is reported as Disconnected and HADR EDU startup time is used for the disconnection time. Since HADR connect and disconnect events are relatively infrequent, the time is collected and reported even if the `DFT_MON_TIMESTAMP` switch is off.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_heartbeat - HADR Heartbeat monitor element

Number of consecutively missed heartbeats on the high availability disaster recovery (HADR) connection.

This number is reset to zero when the database receives a heartbeat again. If the database is in the HADR primary or standby role, this element indicates the health of the HADR connection.

Table 726. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

For snapshot monitoring, this counter cannot be reset.

Usage note:

Use this element to determine the health of the HADR connection.

A heartbeat is a message sent from the other HADR database at regular intervals. If the value for this element is zero, no heartbeats have been missed and the connection is healthy. The higher the value, the worse the condition of the connection.

In disconnected mode, heartbeat missed is always shown as 0, because it is not applicable.

The heartbeat interval is derived from configuration parameters such as **hadr_timeout** and **hadr_peer_window**, with a maximal setting of 30 seconds.

The data type of this element is integer.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

Ignore this element if the HADR role of the database is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_local_host - HADR Local Host monitor element

The local high availability disaster recovery (HADR) host name. The value is displayed as a host name string or an IP address string such as "1.2.3.4".

Table 727. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR local host name. HADR database configuration parameters are static. Changes to a parameter are not effective until the database is stopped and restarted. This monitor element reports the value that the HADR system is actually using rather than the value in the database configuration file.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Note: Any name used must resolve to one IP address. A name that resolves to more than one address will cause an error when trying to start HADR.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see "Some monitoring interfaces for HADR have been deprecated" in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_local_service - HADR Local Service monitor element

The local HADR TCP service. This value is displayed as a service name string or a port number string.

Table 728. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR local service name.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see "Some monitoring interfaces for HADR have been deprecated" in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_log_gap - HADR Log Gap

This element shows the running average of the gap between the primary Log sequence number (LSN) and the standby log LSN. The gap is measured in number of bytes.

Table 729. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 730. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the gap between the primary and standby HADR database logs.

When a log file is truncated, the LSN in the next log file starts as if the last file were not truncated. This LSN hole does not contain any log data. Such holes can cause the log gap not to reflect the actual log difference between the primary and the standby HADR database logs.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_peer_window - HADR peer window monitor element

The value of the HADR_PEER_WINDOW database configuration parameter.

Table 731. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the value of the HADR_PEER_WINDOW database configuration parameter.

hadr_peer_window_end - HADR peer window end monitor element

The point in time until which a high availability disaster recovery (HADR) primary database promises to stay in peer or disconnected peer state, as long as the primary database is active.

Table 732. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the point in time until which the primary promises to stay in peer or disconnected peer state.

The value reported by the primary database might be different from the value reported by the standby database. This occurs because the primary database updates the value when it sends a heartbeat message, but the new value is shown on the standby database only after the message is received and processed on the standby database.

If a database moves out of peer or disconnected peer state, the value of this monitor element is not reset. The last known value is kept and returned. If a database never reached peer state, a value of zero will be returned.

The peer window end time is set by the primary database and then sent to the standby database. For this reason, the value of the peer window end is based on the clock of the primary database. When you compare the peer window end time with the primary database down time, you might need to add an offset to convert the timestamp to the primary database clock, if the two clocks are not well synchronized.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

hadr_primary_log_file - HADR Primary Log File monitor element

The name of the current log file on the primary HADR database.

Table 733. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log file on the primary HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_primary_log_lsn - HADR Primary Log LSN monitor element

The current log position of the primary HADR database. Log sequence number (LSN) is a byte offset in the database's log stream.

Table 734. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log position on the primary HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see "Some monitoring interfaces for HADR have been deprecated" in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_primary_log_page - HADR Primary Log Page monitor element

The page number in the current log file indicating the current log position on the primary HADR database. The page number is relative to the log file. For example, page zero is the beginning of the file.

Table 735. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log page on the primary HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see "Some monitoring interfaces for HADR have been deprecated" in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_remote_host - HADR Remote Host monitor element

The remote high availability disaster recovery (HADR) host name. The value is displayed as a host name string or an IP address string such as "1.2.3.4".

Table 736. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR remote host name.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Note: Any name used must resolve to one IP address. A name that resolves to more than one address will cause an error when trying to start HADR.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the `hadr_role` monitor element to determine the HADR role of the database.

hadr_remote_instance - HADR Remote Instance monitor element

The remote HADR instance name.

Table 737. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR remote instance name.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the `hadr_role` monitor element to determine the HADR role of the database.

hadr_remote_service - HADR Remote Service monitor element

The remote HADR TCP service. This value is displayed as a service name string or a port number string.

Table 738. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR remote service name.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_role - HADR Role

The current high availability disaster recovery (HADR) role of the database.

Table 739. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 740. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the HADR role of a database.

The data type of this element is integer.

The value for this element is one of the following constants:

SQLM_HADR_ROLE_STANDARD

The database is not an HADR database.

SQLM_HADR_ROLE_PRIMARY

The database is the primary HADR database.

SQLM_HADR_ROLE_STANDBY

The database is the standby HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

hadr_standby_log_file - HADR Standby Log File monitor element

The name of the current log file on the standby HADR database.

Table 741. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log file on the standby HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_standby_log_lsn - HADR Standby Log LSN monitor element

The current log position of the standby HADR database. Log sequence number (LSN) is a byte offset in the database's log stream.

Table 742. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log position on the standby HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_standby_log_page - HADR Standby Log Page monitor element

The page number in the current log file indicating the current log position on the standby HADR database. The page number is relative to the log file. For example, page zero is the beginning of the file.

Table 743. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the current log page on the standby HADR database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_state - HADR State monitor element

The current high availability disaster recovery (HADR) state of the database.

Table 744. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 745. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the HADR state of a database.

The data type of this element is integer. If the database is in HADR primary or standby role, the value for this element is one of the following constants:

SQLM_HADR_STATE_DISCONNECTED

The database is not connected to its partner database.

SQLM_HADR_STATE_LOC_CATCHUP

The database is doing local catchup.

SQLM_HADR_STATE_REM_CATCH_PEND

The database is waiting to connect to its partner to do remote catchup.

SQLM_HADR_STATE_REM_CATCHUP

The database is doing remote catchup.

SQLM_HADR_STATE_PEER

The primary and standby databases are connected and are in peer state.

SQLM_HADR_STATE_DISCONN_PEER

The primary and standby databases are in disconnected peer state.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see "Some monitoring interfaces for HADR have been deprecated" in *What's New for DB2 Version 10.1*.

hadr_syncmode - HADR Synchronization Mode monitor element

The current high availability disaster recovery (HADR) synchronization mode of the database.

Table 746. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 747. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the HADR synchronization mode of a database.

The data type of this element is integer.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

If the database is in HADR primary or standby role, the value for this element is one of the following constants:

SQLM_HADR_SYNCMODE_SYNC
SYNC mode.

SQLM_HADR_SYNCMODE_NEARSYNC
NEARSYNC mode.

SQLM_HADR_SYNCMODE_ASYNC
ASYNC mode.

SQLM_HADR_SYNCMODE_SUPERASYNC
SUPERASYNC mode.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What’s New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hadr_timeout - HADR Timeout monitor element

The number of seconds without any communication from its partner after which an HADR database server will consider that the connection between them has failed.

Table 748. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_HADR table function - Returns high availability disaster recovery (HADR) monitoring information	ACTIVITY METRICS BASE

Table 749. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	hadr	Basic

Usage

Use this element to determine the effective HADR timeout value.

Changes to this element take effect on database activation or, if the database is already online, after HADR has been stopped and restarted on the primary.

Important: This monitor element has been deprecated in Version 10.1 and might be removed in a future release. For more information, see “Some monitoring interfaces for HADR have been deprecated” in *What's New for DB2 Version 10.1*.

This element should be ignored if the database's HADR role is standard. Use the **hadr_role** monitor element to determine the HADR role of the database.

hash_join_overflows - Hash Join Overflows

The number of times that hash join data exceeded the available sort heap space.

Element identifier

hash_join_overflows

Element type

counter

Table 750. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 751. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage At the database level, if the value of hash_join_small_overflows is greater than 10% of this hash_join_overflows, then you should consider increasing the sort heap size. Values at the application level can be used to evaluate hash join performance for individual applications.

hash_join_small_overflows - Hash Join Small Overflows

The number of times that hash join data exceeded the available sort heap space by less than 10%.

Element identifier

hash_join_small_overflows

Element type

counter

Table 752. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 753. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage If this value and `hash_join_overflows` are high, then you should consider increasing the sort heap threshold. If this value is greater than 10% of `hash_join_overflows`, then you should consider increasing the sort heap size.

histogram_type - Histogram type monitor element

The type of the histogram, in string format.

There are seven histogram types.

CoordActQueueTime

A histogram of the time (in milliseconds) non-nested activities spend queued (for example, in a threshold queue), measured on the coordinator member.

CoordActExecTime

A histogram of the time (in milliseconds) non-nested activities spend executing at the coordinator member. Execution time does not include time spent initializing or queued. For cursors, execution time includes only the time spent on open, fetch and close requests. When an activity is remapped between service subclasses, the execution time histogram is updated only for the service subclass in which the activity completes execution.

CoordActLifetime

A histogram of the elapsed time (in milliseconds) from when a non-nested activity is identified by the database manager until the activity completes execution, as measured on the coordinator member. When you remap activities between service subclasses, the lifetime histogram is updated only for the service subclass in which the activity completes execution.

CoordActInterArrivalTime

A histogram of the time interval (in milliseconds) between the arrival of non-nested coordinator activities. The inter-arrival time mean is calculated for service subclasses through which activities enter the system. When you remap activities between service subclasses, the inter-arrival time histogram of the service subclass you remap an activity to is unaffected.

CoordActEstCost

A histogram of the estimated cost (in timerons) of non-nested DML activities. The estimated cost of an activity is counted only toward the service subclass in which the activity enters the system.

ReqExecTime

A histogram of request execution times (in milliseconds), which includes requests on the coordinator member, and any subrequests on both coordinator and non-coordinator members (like RPC requests or SMP subagent requests). Requests included may or may not be associated with an activity: Both PREPARE and OPEN requests are included in this histogram, for example, but while OPEN requests are always associated with a cursor activity, PREPARE requests are not part of any activity. The

execution time histogram of a service subclass involved in remapping counts the portion of the execution time spent by the partial request in the service subclass.

UowLifetime

A histogram of the elapsed time (in milliseconds) from the time that a unit of work is identified by the database manager until the time that the unit of work completes execution (committed or rolled back).

Table 754. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	Always collected

Usage

Use this element to identify the type of histogram. Several histograms can belong to the same statistics record, but only one of each type.

hld_application_handle - Identifier for the application holding the lock monitor element

System-wide unique ID for the application that is holding the lock. If the application holding this lock is unknown or cannot be found, then a value of NULL is returned.

Table 755. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

hld_member - Database member for application holding lock

Database member where the lock is being held by the holding application.

Table 756. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Usage

If the lock is being held on a remote member, the value of **hld_member** is -2. To determine which member the lock is being held at, use the MON_GET_LOCKS table function and specify the **lock_name** as a search argument.

host_ccsid - Host Coded Character Set ID

This is the coded character set identifier (CCSID) of the host database.

Element identifier

host_ccsid

Element type
information

Table 757. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

host_db_name - Host Database Name

The real name of the host database for which information is being collected or to which the application is connected. This is the name that was given to the database when it was created.

Table 758. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

hostname - Host name monitor element

The host name of the machine on which the database member resides.

Table 759. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB2_CLUSTER_HOST_STATE administrative view and DB2_GET_CLUSTER_HOST_STATE table function - get information about hosts	ACTIVITY METRICS BASE
MON_GET_CF_CMD table function - Get cluster caching facility command processing time	ACTIVITY METRICS BASE
MON_GET_CF_WAIT_TIME table function - Get cluster caching facility command wait time	ACTIVITY METRICS BASE
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE
MON_GET_SERVERLIST table function - get member priority details	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD - Get workload metrics	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	ACTIVITY METRICS BASE

host_name - Host name monitor element

Name of the host on which the cluster caching facility process resides.

Table 760. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB_MEMBERS table function	ACTIVITY METRICS BASE
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

host_prdid - Host Product/Version ID

The product and version that is running on the server.

Table 761. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage Used to identify the product and code version of the DRDA host database product. It is in the form PPPVVRRM, where:

- PPP identifies the host DRDA product
 - ARI for DB2 Server for VSE & VM
 - DSN for DB2 for z/OS
 - QSQ for DB2 for i
 - SQL for other DB2 products.
- VV identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version)
- RR identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release)
- M identifies a 1-character modification level (0-9 or A-Z)

host_response_time - Host Response Time

At the DCS statement level, this is the elapsed time between the time that the statement was sent from the DB2 Connect gateway to the host for processing and the time when the result was received from the host.

At DCS database and DCS application levels, it is the sum of the elapsed times for all the statements that were executed for a particular application or database. At the data transmission level, this is the sum of host response times for all the statements that used this many data transmissions.

Table 762. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement, Timestamp
DCS Statement	dcс_stmt	Statement, Timestamp
Data Transmission	stmt_transmissions	Statement, Timestamp

For snapshot monitoring at the statement level, this counter cannot be reset. This counter can be reset at other levels.

Usage

Use this element with Outbound Number of Bytes Sent and Outbound Number of Bytes Received to calculate the outbound response time (transfer rate):

$$(\text{outbound bytes sent} + \text{outbound bytes received}) / \text{host response time}$$

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

id - cluster caching facility identification monitor element

cluster caching facility identifier, as defined in the db2nodes.cfg file.

Table 763. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB2_MEMBER and DB2_CF administrative views and DB2_GET_INSTANCE_INFO table function	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE
MON_GET_CF_CMD table function - Get cluster caching facility command processing time	ACTIVITY METRICS BASE
MON_GET_CF_WAIT_TIME table function - Get cluster caching facility command wait time	ACTIVITY METRICS BASE

ida_recv_volume - Total data volume received monitor element

The total volume of data (in bytes) that the database server received from an in-database analytics process.

Table 764. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 764. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 765. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

ida_recv_wait_time - Time spent waiting to receive data monitor element

The total amount of time spent waiting to receive data from an in-database analytics process.

Table 766. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 766. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 767. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

ida_recvs_total - Number of times data received monitor element

The total number of times data was received from an in-database analytics process.

Table 768. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 768. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 769. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

ida_send_volume - Total data volume sent monitor element

The total volume of data (in bytes) sent from the database server to an in-database analytics process.

Table 770. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 770. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 771. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

ida_send_wait_time - Time spent waiting to send data monitor element

The total amount of time spent waiting to send data to an in-database analytics process.

Table 772. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 772. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 773. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

ida_sends_total - Number of times data sent monitor element

The total number of times data was sent to an in-database analytics process.

Table 774. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	REQUEST METRICS BASE
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	REQUEST METRICS BASE
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	REQUEST METRICS BASE
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	REQUEST METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 774. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 775. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activity	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activity	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Package cache	event_pkgcache_metrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Unit of work	event_uow_metrics	REQUEST METRICS BASE

idle_agents - Number of Idle Agents

The number of agents in the agent pool that are currently unassigned to an application and are, therefore, “idle”.

Table 776. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage You can use this element to help set the *num_poolagents* configuration parameter. Having idle agents available to service requests for agents can improve performance.

iid - Index identifier monitor element

Identifier for the index.

Table 777. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

inbound_bytes_received - Inbound Number of Bytes Received

The number of bytes received by the DB2 Connect gateway from the client, excluding communication protocol usage (for example, TCP/IP).

Table 778. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl	Basic
DCS Statement	dcs_stmt	Statement

For snapshot monitoring at the application level, this counter can be reset. This counter cannot be reset at other levels.

Usage Use this element to measure the throughput from the client to the DB2 Connect gateway.

inbound_bytes_sent - Inbound Number of Bytes Sent

The number of bytes sent by the DB2 Connect gateway to the client, excluding communication protocol usage (for example, TCP/IP).

Table 779. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl	Basic
DCS Statement	dcs_stmt	Statement

For snapshot monitoring at the application level, this counter can be reset. This counter cannot be reset at other levels.

Usage Use this element to measure the throughput from the DB2 Connect gateway to the client.

inbound_comm_address - Inbound Communication Address

This is the communication address of the client. For example, it could be an IP address and port number for TCP/IP.

Table 780. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

include_col_updates - Include column updates monitor element

Number of include column updates.

Table 781. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

incremental_bind - Incremental bind monitor element

Indicates whether the package was incrementally bound at execution time. Possible values are YES or NO.

Table 782. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participant_activities	

index_jump_scans - Index jump scans monitor element

Number of jump scans. A jump scan is an index scan where there is a gap in the index start and stop keys and sections of the index that will not yield results are skipped.

Table 783. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

Usage

You can use this monitor element to validate that jump scans are happening at an expected rate. If the value for this monitor element is not increasing as expected, check the following conditions:

- For queries being issued where you expect a jump scan, verify that the target table has an appropriate composite index and that the query predicates introduce an index gap. The DB2 optimizer will not create plans with jump scans if there are no index gaps.
- Jump scans do not scan the following types of indexes:
 - range-clustered table indexes
 - extended indexes (for example, spatial indexes)
 - XML indexes
 - text indexes (for Text Search)

Note: When creating an access plan, the DB2 optimizer performs costing analysis to determine if jump scans should be executed. There might be cases where the optimizer finds that not using a jump scan is more efficient.

index_name - Index name monitor element

The name of an index.

Table 784. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE

index_schema - Index schema monitor element

The name of an index schema.

Table 785. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE

index_object_pages - Index Object Pages

The number of disk pages consumed by all indexes defined on a table.

Table 786. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 787. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage This element provides a mechanism for viewing the actual amount of space consumed by indexes defined on a particular table. This element can be used in conjunction with a table event monitor to track the rate of index growth over time. This element is not returned for partitioned tables.

index_object_l_pages - Index data logical pages monitor element

The number of logical pages used on disk by all indexes associated with this table. For partitioned tables, the value returned is NULL.

Table 788. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

- This value might be less than the amount of space physically allocated for the object. This can happen when you use the REUSE STORAGE option of the TRUNCATE statement. This option causes storage allocated for the table to continue to be allocated, although the storage will be considered empty. In addition, the value for this monitor element might be less than the amount of space logically allocated for the object, because the total space logically allocated includes a small amount of additional meta data.

To retrieve an accurate measure of the logical or physical size of an object, use the ADMIN_GET_TAB_INFO_V97 function. This function provides more accurate information about the size of objects than you can obtain by multiplying the number of pages reported for this monitor element by the page size.

index_only_scans - Index-only scans monitor element

Number of index-only scans. Index-only scans occur when the results of scan was satisfied by access to the index only.

Table 789. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

index_scans - Index scans monitor element

Number of index scans.

Table 790. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

index_tbsp_id - Index table space ID monitor element

An identifier of the table space that holds indexes created on this table.

Table 791. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

The value of this element matches a value from column TBSPACEID of view SYSCAT.TABLESPACES.

input_db_alias - Input Database Alias

The alias of the database provided when calling the snapshot function.

Table 792. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl_id_info	Basic
Table Space	tablespace_list	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Table	table_list	Table

Table 792. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	db_lock_list	Basic

Usage This element can be used to identify the specific database to which the monitor data applies. It contains blanks unless you requested monitor information related to a specific database.

The value of this field may be different than the value of the *client_db_alias* monitor element since a database can have many different aliases. Different applications and users can use different aliases to connect to the same database.

insert_sql_stmts - Inserts

This element contains a count of the total number of times the federated server has issued an INSERT statement to this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

Table 793. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine the level of database activity directed against this data source by the federated server or an application.

You can also use this element to determine the percentage of write activity against this data source by the federated server or an application, with the following formula:

```
write_activity =  
  (INSERT statements + UPDATE statements + DELETE statements) /  
  (SELECT statements + INSERT statements + UPDATE statements +  
  DELETE statements)
```

insert_time - Insert Response Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to INSERTs from all applications or a single application running on this federated server instance since the start of the federated server instance or the last reset of the database monitor counters.

The monitor stores the most recent value.

The response time is measured as the difference in time between the time the federated server submits an INSERT statement to the data source, and the time the data source responds to the federated server, indicating that the INSERT has been processed.

Table 794. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine the actual amount of time that transpires waiting for INSERTs to this data source to be processed. This information can be useful for capacity planning and tuning.

insert_timestamp - Insert timestamp monitor element

The insert_timestamp monitor element stores the time when the statement or section was inserted into the cache.

For dynamic sql snapshots this represents the time when the statement entered the cache. For MON_GET_PKG_CACHE_STMT, MON_GET_PKG_CACHE_STMT_DETAILS and the package cache event monitor, the value is more granular and represents the time when an individual section for this statement was inserted into the cache.

Table 795. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 796. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

Table 797. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

Usage

This element specifies the time when the statement was inserted into the cache. It can be used to estimate the lifetime of a statement in the cache.

int_auto_rebinds - Internal Automatic Rebinds

The number of automatic rebinds (or recompiles) that have been attempted.

Table 798. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 799. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Automatic rebinds are the internal binds the system performs when a package has been invalidated. The rebind is performed the first time that the database manager needs to execute an SQL statement from the package. For example, packages are invalidated when you:

- Drop an object, such as a table, view, or index, on which the plan is dependent
- Add or drop a foreign key
- Revoke object privileges on which the plan is dependent.

You can use this element to determine the level of database activity at the application or database level. Since `int_auto_rebinds` can have a significant impact on performance, they should be minimized where possible.

You can also use this element to determine the percentage of rebind activity using the following formula:

$$\text{int_auto_rebinds} / \text{total number of statements}$$

This information can be useful for analyzing application activity and throughput.

int_commits - Internal commits monitor element

The total number of commits initiated internally by the database manager.

Table 800. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 800. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 801. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 802. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

An internal commit may occur during any of the following events:

- A reorganization
- An import
- A bind or pre-compile
- An application ends without executing an explicit SQL COMMIT statement (on UNIX).

This value, which does not include explicit SQL COMMIT statements, represents the number of these internal commits since the later of:

- The connection to the database (for database-level information, this is the time of the first connection)
- The last reset of the database monitor counters.

You can use this element to calculate the total number of units of work by calculating the sum using the following expression:

```
commit_sql_stmts
+ int_commits
+ rollback_sql_stmts
+ int_rollbacks
```

Note: The units of work calculated will only include those since the later of:

- The connection to the database (for database-level information, this is the time of the first connection)
- The last reset of the database monitor counters.

This calculation can be done at the application or the database level.

int_deadlock_rollbacks - Internal Rollbacks Due To Deadlock

The total number of forced rollbacks initiated by the database manager due to a deadlock. A rollback is performed on the current unit of work in an application selected by the database manager to resolve the deadlock.

Element identifier

int_deadlock_rollbacks

Element type

counter

Table 803. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 804. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage This element shows the number of deadlocks that have been broken and can be used as an indicator of concurrency problems. It is important, since `int_deadlock_rollbacks` lower the throughput of the database.

This value is included in the value given by `int_rollbacks`.

int_node_splits - Intermediate node splits monitor element

Number of times an intermediate index node was split during an insert operation.

Table 805. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

int_rollbacks - Internal rollbacks monitor element

The total number of rollbacks initiated internally by the database manager.

Table 806. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 806. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 807. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 808. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

An internal rollback occurs when any of the following cannot complete successfully:

- A reorganization
- An import
- A bind or pre-compile
- An application ends as a result of a deadlock situation or lock timeout situation
- An application ends without executing an explicit commit or rollback statement (on Windows).

This value represents the number of these internal rollbacks since the later of:

- The connection to the database (for database-level information, this is the time of the first connection)
- The last reset of the database monitor counters.

While this value does not include explicit SQL ROLLBACK statements, the count from the **int_deadlock_rollbacks** monitor element is included.

You can use this element to calculate the total number of units of work by calculating the sum of the following:

```

    commit_sql_stmts
+ int_commits
+ rollback_sql_stmts
+ int_rollbacks

```

Note: The units of work calculated will include those since the later of:

- The connection to the database (for database-level information, this is the time of the first connection)
- The last reset of the database monitor counters.

This calculation can be done at the application or the database level.

int_rows_deleted - Internal Rows Deleted

This is the number of rows deleted from the database as a result of internal activity.

Table 809. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic
Application	stmt	Basic
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Table 810. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected

Usage This element can help you gain insight into internal activity within the database manager of which you might not be aware. If this activity is high, you may want to evaluate your table design to determine if the referential constraints or triggers that you have defined on your database are necessary.

Internal delete activity can be a result of:

- A cascading delete enforcing an ON CASCADE DELETE referential constraint
- A trigger being fired.

int_rows_inserted - Internal Rows Inserted

The number of rows inserted into the database as a result of internal activity caused by triggers.

Table 811. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 811. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic
Application	stmt	Basic
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Table 812. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected

Usage This element can help you gain insight into the internal activity within the database manager. If this activity is high, you may want to evaluate your design to determine if you can alter it to reduce this activity.

int_rows_updated - Internal Rows Updated

This is the number of rows updated from the database as a result of internal activity.

Table 813. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic
Application	stmt	Basic
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Table 814. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected

Usage This element can help you gain insight into internal activity within the database manager of which you might not be aware. If this activity is high, you may want to evaluate your table design to determine if the referential constraints that you have defined on your database are necessary.

Internal update activity can be a result of:

- A *set null* row update enforcing a referential constraint defined with the ON DELETE SET NULL rule
- A trigger being fired.

intra_parallel_state - Current state of intrapartition parallelism monitor element

The current state of intrapartition parallelism reported at statement, activity, transaction, or workload level. Possible values are "YES" to indicate that intrapartition parallelism is enabled so a statement can run with subagents; and "NO" to indicate that intrapartition parallelism is disabled.

Table 815. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE

Table 816. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	-	Always collected
Locking		
Unit of work		

invocation_id - Invocation ID monitor element

An identifier that distinguishes one invocation of a routine from others at the same nesting level within a unit of work. It is unique within a unit of work for a specific nesting level.

The **invocation_id** monitor element is an alias of the **stmt_invocation_id** monitor element.

Table 817. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 818. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitystmt	-
Locking	-	-

Table 818. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Unit of work	Reported in the package list.	-

- 1 This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element to uniquely identify the invocation in which a particular SQL statement has been executed. You can also use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

ipc_rcv_volume - Interprocess communication received volume monitor element

The amount of data received by data server from clients over IPC. This value is reported in bytes.

Table 819. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 819. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 820. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

ipc_recv_wait_time - Interprocess communication received wait time monitor element

The time spent by an agent receiving an incoming client request using the IPC communications protocol. The value is reported in milliseconds.

Table 821. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 821. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 822. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

ipc_recvs_total - Interprocess communication receives total monitor element

The number of times data was received by the database server from the client application using IPC.

Table 823. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 824. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

ipc_send_volume - Interprocess communication send volume monitor element

The amount of data sent by data server to clients over the IPC protocol. This value is reported in bytes.

Table 825. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 826. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE

Table 826. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	-

ipc_send_wait_time - Interprocess communication send wait time monitor element

The time spent blocking on an IPC send to the client. The value is given in milliseconds.

Table 827. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 828. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE

Table 828. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

ipc_sends_total - Interprocess communication send total monitor element

The number of times data was sent by the database server to client applications using IPC.

Table 829. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 830. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

is_system_appl - Is System Application monitor element

Indicates whether the application is a system application.

Table 831. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic

Usage

The **is_system_appl** monitor element indicates whether an application is an internal system application. The possible values are

- 0 user application
- 1 system application

key_updates - Key updates monitor element

Number of key updates.

Table 832. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

last_active_log - Last Active Log File Number

The file number of the last active log file.

Element identifier

last_active_log

Element type

information

Table 833. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 834. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	detail_log	Basic

Table 835. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *first_active_log* and *current_active_log* elements to determine the range of active log files. Knowing the range of active log files helps you determine the disk space required for log files.

You can also use this element to determine which log files have data to help you identify log files needed for split mirror support.

last_backup - Last Backup Timestamp

The date and time that the latest database backup was completed.

Element identifier

last_backup

Element type

timestamp

Table 836. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Timestamp

Usage You may use this element to help you identify a database that has not been backed up recently, or to identify which database backup file is the most recent. If the database has never been backed up, this timestamp is initialized to zero.

last_executable_id - Last executable identifier monitor element

The executable id for the statement most recently completed by the application.

Table 837. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

last_extent - Last extent moved monitor element

The numeric identifier of the last extent moved by the table space rebalancer process.

Table 838. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

last_metrics_update - Metrics last update timestamp monitor element

Timestamp reflecting the last time metrics were updated for this cache entry.

Table 839. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 840. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

last_overflow_time - Time of Last Event Overflow

The date and time of the last overflow recorded this overflow record.

Table 841. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Overflow Record	event_overflow	-

Usage Use this element with *first_overflow_time* to calculate the elapsed time for which the overflow record was generated.

last_reference_time - Last reference time monitor element

The last time the activity was accessed by a request.

Table 842. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

last_request_type - Last request type monitor element

The type of the last request completed by the application.

Table 843. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 843. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

This monitor element is only reported on the coordinator member for the application.

The following values are possible.

- CLOSE
- COMMIT
- COMPILE
- DESCRIBE
- EXCSQLSET
- EXECIMMD
- EXECUTE
- FETCH
- INTERNAL *number*, where *number* is the value of the internal constant
- OPEN
- PREPARE
- REBIND
- REDISTRIBUTE
- REORG
- ROLLBACK
- RUNSTATS

last_reset - Last Reset Timestamp

Indicates the date and time that the monitor counters were reset for the application issuing the GET SNAPSHOT.

Element identifier

last_reset

Element type

timestamp

Table 844. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE

Table 844. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 845. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Timestamp
Database	dbase	Timestamp
Application	appl	Timestamp
Table Space	tablespace_list	Buffer Pool, Timestamp
Table	table_list	Timestamp
DCS Database	dcs_dbase	Timestamp
DCS Application	dcs_appl	Timestamp

Usage You can use this element to help you determine the scope of information returned by the database system monitor.

If the counters have never been reset, this element will be zero.

The database manager counters will only be reset if you reset all active databases.

last_updated - Last update time stamp monitor element

The time stamp indicating the last time this entry was updated.

Table 846. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

last_wlm_reset - Time of last reset monitor element

This element, in the form of a local timestamp, shows the time at which the last statistics event record of this type was created.

Table 847. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Table 847. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	-
Statistics	event_wcstats	-
Statistics	event_qstats	-

Usage

Use the **wlm_last_reset** and **statistics_timestamp** monitor elements to determine a period of time over which the statistics in an event monitor statistics record were collected. The collection interval begins at the **wlm_last_reset** time and ends at **statistics_timestamp**.

lib_id - Library identifier monitor element

Internal unique identifier for triggers and trigger subroutines.

This element returns NULL when it is not applicable for the monitored object.

Table 848. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

Usage

Use this element to relate a trigger to its subroutine.

lob_object_pages - LOB Object Pages

The number of disk pages consumed by LOB data.

Table 849. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 850. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage This element provides a mechanism for viewing the actual amount of

space consumed by LOB data in a particular table. This element can be used in conjunction with a table event monitor to track the rate of LOB data growth over time.

lob_object_l_pages - LOB data logical pages monitor element

The number of logical pages used on disk by LOBs associated with this table.

Table 851. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

- This value might be less than the amount of space physically allocated for the object. This can happen when you use the REUSE STORAGE option of the TRUNCATE statement. This option causes storage allocated for the table to continue to be allocated, although the storage will be considered empty. In addition, the value for this monitor element might be less than the amount of space logically allocated for the object, because the total space logically allocated includes a small amount of additional meta data.

To retrieve an accurate measure of the logical or physical size of an object, use the ADMIN_GET_TAB_INFO_V97 function. This function provides more accurate information about the size of objects than you can obtain by multiplying the number of pages reported for this monitor element by the page size.

local_cons - Local Connections

The number of local applications that are currently connected to a database within the database manager instance being monitored.

Table 852. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

This number can help you determine the level of concurrent processing occurring in the database manager. This value will change frequently, so you may need to sample it at specific intervals over an extended period of time to get a realistic view of system usage.

This number only includes applications that were initiated from the same instance as the database manager. The applications are connected, but may or may not be executing a unit of work in the database.

When used in conjunction with the rem_cons_in monitor element, this element can help you adjust the setting of the **max_connections** configuration parameter.

local_cons_in_exec - Local Connections Executing in the Database Manager

The number of local applications that are currently connected to a database within the database manager instance being monitored and are currently processing a unit of work.

Table 853. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

This number can help you determine the level of concurrent processing occurring in the database manager. This value will change frequently, so you may need to sample it at specific intervals over an extended period of time to get a realistic view of system usage. This number only includes applications that were initiated from the same instance as the database manager.

When used in conjunction with the **rem_cons_in_exec** monitor element, this element can help you adjust the setting of the **max_coordagents** configuration parameter.

The following recommendations apply to non-concentrator configurations only. When concentrator is enabled, DB2 is multiplexing a larger number of client connections onto a smaller pool of coordinator agents. In this case, it is usually acceptable to have the sum of **rem_cons_in_exec** and **local_cons_in_exec** approach the **max_coordagents** value.

- If **max_coordagents** is set to AUTOMATIC, do not make any adjustments.
- If **max_coordagents** is not set to AUTOMATIC and if the sum of **rem_cons_in_exec** and **local_cons_in_exec** is close to **max_coordagents**, increase the value of **max_coordagents**.

local_start_time - Local start time monitor element

The time that this activity began doing work on the member. It is in local time. This field can be an empty string when an activity has entered the system but is in a queue and has not started executing.

Table 854. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Usage

local_transaction_id - Local transaction identifier monitor element

The local transaction ID in use at the time the event occurred.

Table 855. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	ddlstmtexec txncompletion	Always collected
Unit of Work	uow	

Usage

For the change history event monitor, this is the local transaction ID in use at the time the event occurred. This is the SQLU_TID structure that is part of the transaction logs.

location - Location

Identifies the location associated with the event.

Table 856. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILLOCATION	Always collected

Usage

For the change history event monitor, locations depend on the UTILITY_TYPE, for example, load input files or backup target path name.

location_type - Location type

A description of what the location is used for.

Table 857. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILLOCATION	Always collected

Usage

If the utility_type element is LOAD, one of:

- C** Copy target
- D** Input data
- L** LOB path
- X** XML path

If the utility_type element is BACKUP, one of:

- B** Backup target location

If the utility_type element is RESTORE, one of:

S Restore source location

If the `utility_type` element is `ROLLFORWARD`, one of:

O Alternate overflow log path captured as part of the `ROLLFORWARD DATABASE` command. Note that if the default overflow log path is used, no location record will be captured.

otherwise a blank character.

lock_attributes - Lock attributes monitor element

The lock attributes of the application that is currently holding the lock.

Table 858. Table Function Monitoring Information

Table Function	Monitor Element	Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS	BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS	BASE

Table 859. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic
Lock	lock_wait	Basic

Table 860. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected

¹ This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the `CREATE EVENT MONITOR FOR LOCKING` statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The following table lists all possible lock attribute settings. Each lock attribute setting is based upon a bit flag value defined in `sqlmon.h`.

Lock Attribute Value in Table Functions	API Constant	Description
0000000000000001	SQLM_LOCKATTR_WAIT_FOR_AVAIL	Wait for availability.
0000000000000002	SQLM_LOCKATTR_ESCALATED	Acquired by escalation.
0000000000000004	SQLM_LOCKATTR_RR_IN_BLOCK	RR lock in block.
0000000000000008	SQLM_LOCKATTR_INSERT	Insert lock.
0000000000000010	SQLM_LOCKATTR_RR	Lock by RR scan.

Lock Attribute Value in Table Functions	API Constant	Description
0000000000000020	SQLM_LOCKATTR_UPDATE_DELETE	Update/delete row lock.
0000000000000040	SQLM_LOCKATTR_ALLOW_NEW	Allow new lock requests.
0000000000000080	SQLM_LOCKATTR_NEW_REQUEST	A new lock requester.
0000000000000200	SQLM_LOCKATTR_INDOUBT	Lock held by Indoubt Transaction.
0000000000000400	SQLM_LOCKATTR_LOW_PRIORITY	Lock held by low priority application.

Bits returned that are not listed in the previously shown table are reserved for internal use.

lock_count - Lock count monitor element

The number of locks on the lock being held.

Table 861. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - Get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Table 862. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic

Table 863. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This value ranges from 1 to 255. It is incremented as new locks are acquired, and decremented as locks are released.

When the **lock_count** monitor element has a value of 255, this indicates that a transaction duration lock is being held. At this point, the **lock_count** monitor element is no longer incremented or decremented when locks are acquired or released. The **lock_count** monitor element is set to a value of 255 in one of two possible ways:

1. The **lock_count** monitor element value is incremented 255 times due to new locks being acquired.

2. A transaction duration lock is explicitly acquired. For example, with a LOCK TABLE statement, or an INSERT.

lock_current_mode - Original lock mode before conversion monitor element

During a lock conversion operation, the lock mode held by the application waiting to acquire the lock, before the conversion is completed.

Table 864. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE

Table 865. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic
Lock	lock_wait	Basic

Table 866. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The following scenario describes an example of lock conversion. During an update or delete operation it is possible to wait for an X lock on the target row. If the transaction is holding an S or V lock on the row, this would require a conversion. At this point, the **lock_current_mode** element is assigned a value of S or V, while the lock waits to be converted to an X lock.

The possible lock modes are listed in the following table.

Mode	Type of Lock	API Constant
	No Lock	SQLM_LNON
IS	Intention Share Lock	SQLM_LOIS
IX	Intention Exclusive Lock	SQLM_LOIX
S	Share Lock	SQLM_LOOS
SIX	Share with Intention Exclusive Lock	SQLM_LSIX

Mode	Type of Lock	API Constant
X	Exclusive Lock	SQLM_LOOX
IN	Intent None	SQLM_LOIN
Z	Super Exclusive Lock	SQLM_LOOZ
U	Update Lock	SQLM_LOOU
NS	Scan Share Lock	SQLM_LONS
NW	Next Key Weak Exclusive Lock	SQLM_LONW

lock_escalation - Lock escalation monitor element

Indicates whether the application waiting to acquire this lock was a result of a lock escalation request. The possible values are Y (Yes) and N (No).

Table 867. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Table 868. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Lock
Lock	lock_wait	Lock

Table 869. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Use this element to better understand the cause of deadlocks. If you experience a deadlock that involves applications doing lock escalation, you may want to increase the amount of lock memory or change the percentage of locks that any one application can request.

lock_escals - Number of lock escalations monitor element

The number of times that locks have been escalated from several row locks to a table lock.

Table 870. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 870. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 871. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 872. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Transactions	event_xact	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

A lock is escalated when the total number of locks held by an application reaches the maximum amount of lock list space available to the application, or the lock list space consumed by all applications is approaching the total lock list space. The amount of lock list space available is determined by the **maxlocks** and **locklist** configuration parameters.

When an application reaches the maximum number of locks allowed and there are no more locks to escalate, it will then use space in the lock list allocated for other applications. When the entire lock list is full, an error occurs.

This data item includes a count of all lock escalations, including exclusive lock escalations and escalations in the DB2 pureScale environment. To determine just the lock escalations in the DB2 pureScale environment, use the **lock_escals_global** monitor element.

There are several possible causes for excessive lock escalations:

- The lock list size (**locklist**) may be too small for the number of concurrent applications
- The percent of the lock list usable by each application (**maxlocks**) may be too small
- One or more applications may be using an excessive number of locks.
- In the DB2 pureScale environment, the global lock list size (**cf_lock_sz**) may be too small.

To resolve these problems, you may be able to:

- Increase the **locklist** configuration parameter value.
- Increase the **maxlocks** configuration parameter value.
- Identify the applications with large numbers of locks, or those that are holding too much of the lock list, using one of the following formulae, and comparing the value to **maxlocks**.
 - On 64-bit systems, $((locks\ held * 64) / (locklist * 4096)) * 100$
 - On 32-bit systems, $((locks\ held * 48) / (locklist * 4096)) * 100$

These applications can also cause lock escalations in other applications by using too large a portion of the lock list. These applications may need to resort to using table locks instead of row locks, although table locks may cause an increase in **lock_waits** and **lock_wait_time** monitor element values.

lock_escals_global - Number of global lock escalations monitor element

Number of lock escalations on a global lock due to global lock memory usage reaching the limit specified in the **cf_lock_sz** database configuration parameter.

Table 873. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 873. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 874. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_maxlocks** and **lock_escals_locklist** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_escals_locklist - Number of locklist lock escalations monitor element

Number of lock escalations due to local lock memory usage reaching the limit specified in the **locklist** database configuration parameter.

Table 875. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 876. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE

Table 876. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_maxlocks** and **lock_escals_global** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_escals_maxlocks - Number of maxlocks lock escalations monitor element

Number of lock escalations due to local lock memory usage reaching the limit specified in the **maxlocks** database configuration parameter.

Table 877. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 877. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 878. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_locklist** and **lock_escals_global** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_hold_count - Lock hold count monitor element

The number of holds placed on the lock. Holds are placed on locks by cursors registered with the WITH HOLD clause and some DB2 utilities. Locks with holds are not released when transactions are committed.

Table 879. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic

Table 880. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

lock_list_in_use - Total lock list memory in use monitor element

The total amount of lock list memory (in bytes) that is in use.

Table 881. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage

This element may be used in conjunction with the **locklist** configuration parameter to calculate the lock list utilization. If the lock list utilization is high, you may want to consider increasing the size of that parameter.

Note: When calculating utilization, it is important to note that the **locklist** configuration parameter is allocated in pages of 4 KB each, while this monitor element provides results in bytes.

lock_mode - Lock mode monitor element

The type of lock being held. If the mode is unknown, the value of this monitor element is NULL.

Table 882. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE

Table 883. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock
Lock	lock	Lock
Lock	lock_wait	Lock

Table 884. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks ¹	lock	-
Deadlocks ¹	event_dlconn	-
Deadlocks with Details ¹	event_detailed_dlconn	-

1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This mode can help you determine the source of contention for resources.

This element indicates one of the following, depending on the type of monitor information being examined:

- The type of lock another application holds on the object that this application is waiting to lock (for application-monitoring and deadlock-monitoring levels).
- The type of lock held on the object by this application (for object-lock levels).

The possible values for this field are:

Mode	Type of Lock	API Constant
	No Lock	SQLM_LNON
IS	Intention Share Lock	SQLM_LOIS
IX	Intention Exclusive Lock	SQLM_LOIX
S	Share Lock	SQLM_LOOS
SIX	Share with Intention Exclusive Lock	SQLM_LSIX
X	Exclusive Lock	SQLM_LOOX
IN	Intent None	SQLM_LOIN
Z	Super Exclusive Lock	SQLM_LOOZ
U	Update Lock	SQLM_LOOU
NS	Scan Share Lock	SQLM_LONS
NW	Next Key Weak Exclusive Lock	SQLM_LONW

lock_mode_requested - Lock mode requested monitor element

The mode in which the lock was requested by the application waiting to acquire the lock.

Table 885. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Table 886. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock_wait	Lock

Table 887. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The mode in which the lock was requested by the application. This value can help you determine the source of contention for resources.

The possible lock modes are listed in the following table.

Mode	Type of Lock	API Constant
	No Lock	SQLM_LNON
IS	Intention Share Lock	SQLM_LOIS
IX	Intention Exclusive Lock	SQLM_LOIX
S	Share Lock	SQLM_LOOS
SIX	Share with Intention Exclusive Lock	SQLM_LSIX
X	Exclusive Lock	SQLM_LOOX
IN	Intent None	SQLM_LOIN
Z	Super Exclusive Lock	SQLM_LOOZ
U	Update Lock	SQLM_LOOU
NS	Scan Share Lock	SQLM_LONS
NW	Next Key Weak Exclusive Lock	SQLM_LONW

lock_name - Lock name monitor element

Internal binary lock name. This element serves as a unique identifier for locks.

Table 888. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE

Table 889. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic
Lock	lock_wait	lock_wait

Table 890. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks ¹	lock	-
Deadlocks ¹	event_dlconn	-

- 1** This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The internal name can be formatted using the routine MON_FORMAT_LOCK_NAME to obtain more details about the lock. For example, if this is a table lock, then you can obtain the table and tablespace that the lock references.

lock_node - Lock Node

The node involved in a lock.

Table 891. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement
Deadlocks	event_dlconn	Statement
Deadlocks with Details	event_detailed_dlconn	Statement

Usage This can be used for troubleshooting.

lock_object_name - Lock Object Name

This element is provided for informational purposes only. It is the name of the object for which the application holds a lock (for object-lock-level information), or the name of the object for which the application is waiting to obtain a lock (for application-level and deadlock-level information).

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 892. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Basic

Table 893. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	lock	Always collected
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage For table-level locks, it is the file ID (FID) for SMS and DMS table spaces. For row-level locks, the object name is the row ID (RID). For table space locks, the object name is blank. For buffer pool locks, the object name is the name of the buffer pool.

To determine the table holding the lock, use *table_name* and *table_schema* instead of the file ID, since the file ID may not be unique.

To determine the table space holding the lock, use *tablespace_name*.

lock_object_type - Lock object type waited on monitor element

The type of object against which the application holds a lock (for object-lock-level information), or the type of object for which the application is waiting to obtain a lock (for application-level and deadlock-level information).

Table 894. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_FORMAT_LOCK_NAME table function - format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE

Table 895. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Basic
Lock	lock_wait	Lock

Table 896. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks ¹	lock	-
Deadlocks ¹	event_dlconn	-
Deadlocks with Details ¹	event_detailed_dlconn	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This element can help you determine the source of contention for resources.

For snapshot monitoring and the deadlock¹ event monitor, the object type identifiers are defined in sqlmon.h. The objects may be one of the following types:

- Table space (SQLM_TABLESPACE_LOCK in sqlmon.h)
- Table
- Buffer pool
- Block
- Record (or row)
- Data partition (SQLM_TABLE_PART_LOCK in sqlmon.h)
- Internal (another type of lock held internally by the database manager)
- Automatic resize
- Automatic storage.

For the locking event monitor and the monitoring table functions in Table 1, the possible values for the **lock_object_type** monitor element are defined in Table 4.

Table 897. Possible values for lock_object_type monitor element

Possible values	Description
TABLE	Table lock
ROW	Row lock
TABLESPACE	Table space lock
EOT	End of table lock
KEYVALUE	Key value lock
SYSBOOT	Sysboot lock
PLAN	Plan lock

Table 897. Possible values for lock_object_type monitor element (continued)

Possible values	Description
VARIATION	Variation lock
SEQUENCE	Sequence lock
BUFFERPOOL	Buffer pool lock
LOB	LOB/Long region lock
CATALOG	Catalog cache lock
ONLINE_BACKUP	Online backup lock
OBJECT_TABLE	Object table lock
ALTER_TABLE	Table alter lock
DMS_SEQUENCE	DMS sequence lock
REORG	Inplace reorganization lock
MDC_BLOCK	MDC block lock
TABLE_PARTITION	Table partition lock
AUTORESIZE	Autoresize lock
AUTOSTORAGE	Autostorage lock
XMLPATH	XML path lock
EXTENT_MOVEMENT	Extent movement lock
WORKLOAD	Workload authorization lock
FED_SERVER	Federation server lock
FED_USER	Federation user mapping lock
CHUNK	Chunk lock
LOAD_PRE_PART	Load table pre-partitioning lock
LOAD_PART	Load table partitioning lock
LOAD_TS	Loading table space lock
LONG_FIELD_ESC	Long field escalation lock
LONG_FIELD_SPACE	Long field buddy space lock

lock_release_flags - Lock release flags monitor element

Lock release flags.

Table 898. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_LOCKS table function - List all locks in the currently connected database	ACTIVITY METRICS BASE

Table 899. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic
Lock	lock_wait	Basic

Table 900. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

The following table lists all possible release flag settings. Each release flag is based upon a bit flag value defined in sqlmon.h.

API Constant	Description
SQLM_LOCKRELFIELDS_SQLCOMPILER	Locks by SQL compiler.
SQLM_LOCKRELFIELDS_UNTRACKED	Non-unique, untracked locks.

Note: All non-assigned bits are used for application cursors.

lock_status - Lock status monitor element

Indicates the internal status of the lock.

Table 901. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE

Table 902. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Lock	lock	Basic

Table 903. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	lock	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This element can help explain what is happening when an application is waiting to obtain a lock on an object. While it may appear that the application already has a lock on the object it needs, it may have to wait to obtain a different type of lock on the same object.

The lock can be in one of the following statuses:

- G** Granted state: The application has the lock in the state specified by the **lock_mode** monitor element.
- C** Converting state: The application is trying to change the lock held to a different type; for example, changing from a share lock to an exclusive lock.
- W** Waiting state.

Note: API users should refer to the `sqlmon.h` header file containing definitions of database system monitor constants.

lock_timeout_val - Lock timeout value monitor element

Indicates the timeout value (in seconds) when an application has issued a SET CURRENT LOCK TIMEOUT statement. In cases where the statement has not been executed, the database level lock timeout will be shown.

Table 904. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic
Application	agent	Basic

Table 905. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-

Usage

The SET CURRENT LOCK TIMEOUT statement can be used to specify the maximum duration for which application agents will wait for a table or index lock.

If an application is waiting too long on a lock, you can check the **lock_timeout_val** monitor element value to see whether it is set too high inside the application. You can modify the application to lower the lock timeout value to let the application time out, if that is appropriate for the application logic. You can accomplish this modification with the SET CURRENT LOCK TIMEOUT statement.

If the application is timing out frequently, you can check whether the lock timeout value is set too low and increase it as appropriate.

lock_timeouts - Number of lock timeouts monitor element

The number of times that a request to lock an object timed out instead of being granted.

Table 906. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 907. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 908. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This element can help you adjust the setting for the **locktimeout** database configuration parameter. If the number of lock timeouts becomes excessive when compared to normal operating levels, you may have an application that is holding locks for long durations. In this case, this element may indicate that you should analyze some of the other lock and deadlock monitor elements to determine if you have an application problem.

You could also have too few lock timeouts if your **locktimeout** database configuration parameter is set too high. In this case, your applications may wait excessively to obtain a lock.

lock_timeouts_global - Lock timeouts global monitor element

Number of lock timeouts where the application holding the lock was on a remote member.

Table 909. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 909. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 910. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected

Table 910. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected

Usage

Use this element in conjunction with the **lock_timeouts** monitor element. The **lock_timeouts_global** monitor element represents the number of times a lock timeout has occurred while waiting to acquire a lock held on another member. To determine the number of times a lock timeout has occurred while waiting to acquire a lock held on the same member, use the following formula:

`lock_timeouts - lock_timeouts_global`

Outside of the DB2 pureScale environment, this value is always zero.

lock_wait_end_time - Lock wait end timestamp monitor element

The date and time the application stopped waiting to obtain a lock on the object that is currently lock.

Table 911. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

lock_wait_start_time - Lock wait start timestamp monitor element

The date and time that this application started waiting to obtain a lock on the object that is currently locked by another application.

Table 912. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Table 913. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock, Timestamp
Lock	lock_wait	Lock, Timestamp

Table 914. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	event_dlconn	Timestamp
Deadlocks with Details ¹	event_detailed_dlconn	Timestamp

¹ This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT

MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This element can help you determine the severity of resource contention.

lock_wait_time - Time waited on locks monitor element

The total elapsed time spent waiting for locks. The value is given in milliseconds.

Table 915. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED

Table 915. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 916. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Lock
Application	appl	Lock
Lock	appl_lock_list	appl_lock_list

For snapshot monitoring, this counter can be reset.

Table 917. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Transactions	event_xact	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At the database level, this is the total amount of elapsed time that all applications were waiting for a lock within this database. This measure of elapsed time can include time spent on locks taken during activities, as well as locks taken during other processing, such compilation.

At the application-connection and transaction levels, this is the total amount of elapsed time that this connection or transaction has waited for a lock to be granted to it.

The value for this element does not include lock wait times for agents that are currently still in a lock wait state. It only includes lock wait times for agents that have already completed their lock waits.

This element may be used in conjunction with the **lock_waits** monitor element to calculate the average wait time for a lock. This calculation can be performed at either the database or the application-connection level.

When using monitor elements providing elapsed times, you should consider:

- Elapsed times are affected by system load, so the more processes you have running, the higher this elapsed time value.
- To calculate this element at the database level, the database system monitor sums the application-level times. This can result in double counting elapsed times at a database level, since more than one application process can be running at the same time.

To provide meaningful data, you can calculate the average wait time for a lock, as previously shown.

lock_wait_time_global - Lock wait time global monitor element

Time spent on global lock waits. The unit of measurement for time is in milliseconds.

Table 918. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 918. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 919. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected

Table 919. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected

Usage

Use this monitor element in conjunction with the **lock_wait_time** monitor element, which represents all the time spent waiting for locks. The **lock_wait_time_global** monitor element represents the time spent waiting for locks held by conflicting applications on different members. To determine the total time spent waiting for locks held by conflicting applications on the same member, use the following formula:

`lock_wait_time - lock_wait_time_global`

Outside of the DB2 pureScale environment, this value is always zero.

lock_wait_time_global_top - Top global lock wait time monitor element

The longest lock wait that has occurred for a lock that is held on another member. This value is reported in milliseconds.

Table 920. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	Always collected

lock_wait_time_top - Lock wait time top monitor element

The high watermark for lock wait times of any request in a workload. Units are milliseconds. The **lock_wait_time_top** high watermark is always collected for workloads. A request contributes toward this high watermark only when request metrics are enabled.

Table 921. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	Always collected

Usage

Use this element to determine the highest lock wait time of any request on a partition for a workload during the time interval collected.

lock_wait_val - Lock wait value monitor element

The amount of time spent in lock wait (in milliseconds) before an event for **mon_lockwait** is generated.

Table 922. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

lock_waits - Lock waits monitor element

The total number of times that applications or connections waited for locks.

Table 923. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 924. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 925. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At the database level, this is the total number of times that applications have had to wait for locks within this database.

At the application-connection level, this is the total number of times that this connection requested a lock but had to wait because another connection was already holding a lock on the data.

This element may be used with **lock_wait_time** to calculate, at the database level, the average wait time for a lock. This calculation can be done at either the database or the application-connection level.

If the average lock wait time is high, you should look for applications that hold many locks, or have lock escalations, with a focus on tuning your applications to improve concurrency, if appropriate. If escalations are the reason for a high average lock wait time, then the values of one or both of the **locklist** and **maxlocks** configuration parameters may be too low.

lock_waits_global - Lock waits global monitor element

Number of lock waits due to the application holding the lock being on a remote member.

Table 926. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 927. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element in conjunction with the **lock_waits** monitor element, which reports the total number of lock waits due to locks held by conflicting applications on all members. The **lock_waits_global** monitor element indicates the number of times that a lock wait was held by conflicting applications on different members. To determine the number of lock waits held by a conflicting application on the same member as the waiting application, use the following formula:

`lock_waits - lock_waits_global`

Outside of the DB2 pureScale environment, this value is always zero.

locks_held - Locks held monitor element

The number of locks currently held.

Table 928. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 929. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic
Lock	db_lock_list	Basic
Lock	appl_lock_list	Basic

Table 930. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage

If the monitor information is at the database level, this is the total number of locks currently held by all applications in the database.

If the monitor information is at the application level, this is the total number of locks currently held by all agents for the application.

locks_held_top - Maximum number of locks held monitor element

The maximum number of locks held during this transaction.

Table 931. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected

Usage

You can use this element to determine if your application is approaching the maximum number of locks available to it, as defined by the **maxlocks** configuration parameter. This parameter indicates the percentage of the lock list that each application can use before lock escalations occur. Lock escalations can result in a decrease in concurrency between applications connected to a database.

Since the **maxlocks** parameter is specified as a percentage and this element is a counter, you can compare the count provided by this element against the total number of locks that can be held by an application, as calculated using one of the following formulae:

- On 64-bit systems, $(locklist * 4096 / 64) * (maxlocks / 100)$
- On 32-bit systems, $(locklist * 4096 / 48) * (maxlocks / 100)$

If you have a large number of locks, you may need to perform more commits within your application so that some of the locks can be released.

locks_in_list - Number of Locks Reported

The number of locks held by a particular application to be reported on by the event monitor.

Table 932. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details	event_detailed_dlconn	Always collected

locks_waiting - Current agents waiting on locks monitor element

Indicates the number of agents waiting on a lock.

Table 933. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic
Lock	db_lock_list	Basic

Usage

When used in conjunction with `appls_cur_cons`, this element indicates the percentage of applications waiting on locks. If this number is high, the applications may have concurrency problems, and you should identify applications that are holding locks or exclusive locks for long periods of time.

log_buffer_wait_time - Log buffer wait time monitor element

The amount of time an agent spends waiting for space in the log buffer. The value is given in milliseconds.

Table 934. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 934. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 935. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

log_disk_wait_time - Log disk wait time monitor element

The amount of time an agent spends waiting for log records to be flushed to disk. The value is given in milliseconds.

Table 936. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 936. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 937. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

log_disk_waits_total - Total log disk waits monitor element

The number of times agents have to wait for log data to write to disk.

Table 938. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 938. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 939. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

log_held_by_dirty_pages - Amount of Log Space Accounted for by Dirty Pages

The amount of log (in bytes) corresponding to the difference between the oldest dirty page in the database and the top of the active log.

Element identifier

log_held_by_dirty_pages

Element type

watermark

Table 940. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 941. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 942. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage When the snapshot is taken, this value is calculated based on conditions at the time of that snapshot.

Use this element to evaluate the effectiveness of page cleaning for older pages in the buffer pool.

The cleaning of old pages in the buffer pool is governed by the *softmax* database configuration parameter. If the page cleaning is effective then *log_held_by_dirty_pages* should be less than or approximately equal to:

$$(\text{softmax} / 100) * \text{logfilsiz} * 4096$$

If this statement is not true, increase the number of page cleaners (*num_iocleaners*) configuration parameter.

If the condition is true and it is required that less log be held by dirty pages, then decrease the *softmax* configuration parameter.

log_read_time - Log Read Time

The total elapsed time spent by the logger reading log data from the disk. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

Table 943. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 944. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 945. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *log_reads*, *num_log_read_io*, and *num_log_data_found_in_buffer* elements to determine if:

- The current disk is adequate for logging.
- The log buffer size is adequate.

log_reads - Number of Log Pages Read

The number of log pages read from disk by the logger.

Element identifier

log_reads

Element type

counter

Table 946. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 947. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 948. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You can use this element with an operating system monitor to quantify the amount of I/O on a device that is attributable to database activity.

log_to_redo_for_recovery - Amount of Log to be Redone for Recovery

The amount of log (in bytes) that will have to be redone for crash recovery.

Element identifier

log_to_redo_for_recovery

Element type

watermark

Table 949. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 950. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 951. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage When the snapshot is taken, this value is calculated based on conditions at the time of that snapshot. Larger values indicate longer recovery times after a system crash. If the value seems excessive, check the *log_held_by_dirty_pages* monitor element to see if page cleaning needs to be tuned. Also check if there are any long running transactions that need to be terminated.

log_write_time - Log Write Time

The total elapsed time spent by the logger writing log data to the disk. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

Table 952. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 953. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 954. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *log_writes* and *num_log_write_io* elements to determine if the current disk is adequate for logging.

log_writes - Number of Log Pages Written

The number of log pages written to disk by the logger.

Element identifier

log_writes

Element type

counter

Table 955. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 956. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 957. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You may use this element with an operating system monitor to quantify the amount of I/O on a device that is attributable to database activity.

Note: When log pages are written to disk, the last page might not be full. In such cases, the partial log page remains in the log buffer, and additional log records are written to the page. Therefore log pages might be written to disk by the logger more than once. You should not use this element to measure the number of pages produced by DB2.

long_object_pages - Long Object Pages

The number of disk pages consumed by long data in a table.

Table 958. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 959. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage This element provides a mechanism for viewing the actual amount of space consumed by long data in a particular table. This element can be used in conjunction with a table event monitor to track the rate of long data growth over time.

long_object_l_pages - Long object data logical pages monitor element

The number of logical pages used on disk by long data contained in this table.

Table 960. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

- This value might be less than the amount of space physically allocated for the object. This can happen when you use the REUSE STORAGE option of the TRUNCATE statement. This option causes storage allocated for the table to continue to be allocated, although the storage will be considered empty. In

addition, the value for this monitor element might be less than the amount of space logically allocated for the object, because the total space logically allocated includes a small amount of additional meta data.

To retrieve an accurate measure of the logical or physical size of an object, use the ADMIN_GET_TAB_INFO_V97 function. This function provides more accurate information about the size of objects than you can obtain by multiplying the number of pages reported for this monitor element by the page size.

long_tbsp_id - Long table space ID monitor element

An identifier of the table space that holds long data (LONG or LOB type columns) for this table.

Table 961. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

The value of this element matches a value from column TBSPACEID of view SYSCAT.TABLESPACES.

machine_identification - Host hardware identification monitor element

A string that describes the processor architecture. For example, "x86 64 bit". The value returned for this identifier is determined by the operating system running on the host.

Table 962. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

max_agent_overflows - Maximum Agent Overflows

The number of times a request to create a new agent was received when the Maximum Number of Agents (**maxagents**) configuration parameter had already been reached.

Note: The **max_agent_overflows** monitor element is deprecated starting with DB2 Version 9.5. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 963. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

If agent creation requests are still being received when the **maxagents** configuration parameter has been reached, this might indicate too high a workload for this node.

max_coord_stmt_exec_time - Maximum coordinator statement execution time monitor element

The maximum coordinator execution time of a single run of the statement, in milliseconds. This value will be zero at non-coordinator nodes or if the statement has not been executed.

Table 964. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 965. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	pkgcache	ACTIVITY METRICS BASE

max_coord_stmt_exec_time_args - Maximum coordinator statement execution time arguments monitor element

An XML document that represents the input arguments provided to the statement that was running when the maximum execution time of a single run of the statement (**max_coord_stmt_exec_time**) took place on the coordinator member.

This column is NULL if the statement has not yet run or if the statement has no input arguments. This document contains a parent element named **max_coord_stmt_exec_time_args**, which consists of one or more elements with the name **max_coord_stmt_exec_time_arg**. See Figure 19 on page 1031 for an example of the structure of the XML document.

Table 966. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 967. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	pkgcache_stmt_args	ACTIVITY METRICS BASE

Usage

You can view the content of this document with the XMLPARSE scalar function. For example:

```
SELECT XMLPARSE(DOCUMENT MAX_COORD_STMT_EXEC_STMT_ARGS)
FROM TABLE(MON_GET_PKG_CACHE_STMT(NULL, NULL, NULL, -2));
```

Figure 19 on page 1031 shows an example of the contents of XML document returned by the preceding statement.

```

<?xml version="1.0" encoding="ISO-8859-1" ?>
<max_coord_stmt_exec_time_args
  xmlns="http://www.ibm.com/xmlns/prod/db2/mon" release="10010000">
  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>1</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>INTEGER</stmt_value_type>
    <stmt_value_data>5</stmt_value_data>
  </max_coord_stmt_exec_time_arg>
  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>2</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>VARCHAR</stmt_value_type>
    <stmt_value_data>78</stmt_value_data>
  </max_coord_stmt_exec_time_arg>
  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>3</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>VARCHAR</stmt_value_type>
    <stmt_value_data>john</stmt_value_data>
  </max_coord_stmt_exec_time_arg>
  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>4</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>VARCHAR</stmt_value_type>
    <stmt_value_data>x</stmt_value_data>
  </max_coord_stmt_exec_time_arg>
  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>5</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>DATE</stmt_value_type>
    <stmt_value_data>2001-02-12</stmt_value_data>

  :

  <max_coord_stmt_exec_time_arg>
    <stmt_value_index>15</stmt_value_index>
    <stmt_value_isreopt id="0">no</stmt_value_isreopt>
    <stmt_value_isnull id="0">no</stmt_value_isnull>
    <stmt_value_type>DECIMAL</stmt_value_type>
    <stmt_value_data>+0002000.55</stmt_value_data>
  </max_coord_stmt_exec_time_arg>
</max_coord_stmt_exec_time_args>

```

Figure 19. Sample content of max_coord_stmt_exec_time_args. In this example, the document shows that 15 arguments were passed to the statement.

Entries for the following data types are recorded in this XML document, however, the actual values for arguments of these types are not captured in the STMT_VALUE_DATA element:

- BLOB
- CLOB
- REF
- BOOLEAN
- Structured data types
- DATALINK
- LONG VARGRAPHIC

- LONG VARCHAR
- XML tyoes
- DBCLOB
- ARRAY types
- ROW types
- ROWID
- CURSOR variables

Input arguments are recorded beginning with the one that appears first in the statement, and continuing with each one in succession. The number of input parameters that can be recorded is constrained only by the upper limit on the size of the BLOB containing the XML document. In practical terms, it is unlikely the number input arguments captured would ever cause this limit to be reached.

The schema for the XML document that contains this element can be found in the path `sqllib/misc/DB2EvmonPkgCache.xsd`.

max_coord_stmt_exec_timestamp - Maximum coordinator statement execution timestamp monitor element

The time the statement that produced the `max_coord_stmt_exec_time` value began execution.

Table 968. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 969. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	pkgcache	ACTIVITY METRICS BASE

max_data_received_1024 - Number of Statements with Outbound Bytes Received Between 513 and 1024 Bytes

This element represents the number of statements or chains with outbound bytes received between 513 and 1024 inclusive.

Element identifier

`max_data_received_1024`

Element type

counter

Table 970. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement

Table 970. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_128 - Number of Statements with Outbound Bytes Received Between 1 and 128 Bytes

This element represents the number of statements or chains with outbound bytes received between 1 and 128 inclusive.

Element identifier

max_data_received_128

Element type

counter

Table 971. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_16384 - Number of Statements with Outbound Bytes Received Between 8193 and 16384 Bytes

This element represents the number of statements or chains with outbound bytes received between 8193 and 16384 inclusive.

Element identifier

max_data_received_16384

Element type

counter

Table 972. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_2048 - Number of Statements with Outbound Bytes Received Between 1025 and 2048 Bytes

This element represents the number of statements or chains with outbound bytes received between 1025 and 2048 inclusive.

Element identifier

max_data_received_2048

Element type

counter

Table 973. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_256 - Number of Statements with Outbound Bytes Received Between 129 and 256 Bytes

This element represents the number of statements or chains with outbound bytes received between 129 and 256 inclusive.

Element identifier

max_data_received_256

Element type

counter

Table 974. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_31999 - Number of Statements with Outbound Bytes Received Between 16385 and 31999 Bytes monitor element

This element represents the number of statements or chains with outbound bytes received between 16385 and 31999 inclusive.

Table 975. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_4096 - Number of Statements with Outbound Bytes Received Between 2049 and 4096 Bytes

This element represents the number of statements or chains with outbound bytes received between 2049 and 4096 inclusive.

Element identifier

max_data_received_4096

Element type

counter

Table 976. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_512 - Number of Statements with Outbound Bytes Received Between 257 and 512 Bytes

This element represents the number of statements or chains with outbound bytes received between 257 and 512 inclusive.

Element identifier

max_data_received_512

Element type

counter

Table 977. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_64000 - Number of Statements with Outbound Bytes Received Between 32000 and 64000 Bytes monitor element

This element represents the number of statements or chains with outbound bytes received between 32000 and 64000 inclusive.

Table 978. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_8192 - Number of Statements with Outbound Bytes Received Between 4097 and 8192 Bytes

This element represents the number of statements or chains with outbound bytes received between 4097 and 8192 inclusive.

Element identifier

max_data_received_8192

Element type

counter

Table 979. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_received_gt64000 - Number of Statements with Outbound Bytes Received Greater than 64000 Bytes

This element represents the number of statements or chains with outbound bytes received greater than 64000.

Element identifier

max_data_received_gt64000

Element type

counter

Table 980. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_1024 - Number of Statements with Outbound Bytes Sent Between 513 and 1024 Bytes

This element represents the number of statements or chains with outbound bytes sent between 513 and 1024 inclusive.

Element identifier

max_data_sent_1024

Element type

counter

Table 981. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_128 - Number of Statements with Outbound Bytes Sent Between 1 and 128 Bytes

This element represents the number of statements or chains with outbound bytes sent between 1 and 128 inclusive.

Element identifier

max_data_sent_128

Element type
counter

Table 982. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_16384 - Number of Statements with Outbound Bytes Sent Between 8193 and 16384 Bytes

This element represents the number of statements or chains with outbound bytes sent between 8193 and 16384 inclusive.

Element identifier
max_data_sent_16384

Element type
counter

Table 983. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_2048 - Number of Statements with Outbound Bytes Sent Between 1025 and 2048 Bytes

This element represents the number of statements or chains with outbound bytes sent between 1025 and 2048 inclusive.

Element identifier
max_data_sent_2048

Element type
counter

Table 984. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement

Table 984. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_256 - Number of Statements with Outbound Bytes Sent Between 129 and 256 Bytes

This element represents the number of statements or chains with outbound bytes sent between 129 and 256 inclusive.

Element identifier

max_data_sent_256

Element type

counter

Table 985. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_31999 - Number of Statements with Outbound Bytes Sent Between 16385 and 31999 Bytes

This element represents the number of statements or chains with outbound bytes sent between 16385 and 31999 inclusive.

Element identifier

max_data_sent_31999

Element type

counter

Table 986. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_4096 - Number of Statements with Outbound Bytes Sent Between 2049 and 4096 Bytes

This element represents the number of statements or chains with outbound bytes sent between 2049 and 4096 inclusive.

Element identifier

max_data_sent_4096

Element type

counter

Table 987. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_512 - Number of Statements with Outbound Bytes Sent Between 257 and 512 Bytes

This element represents the number of statements or chains with outbound bytes sent between 257 and 512 inclusive.

Element identifier

max_data_sent_512

Element type

counter

Table 988. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_64000 - Number of Statements with Outbound Bytes Sent Between 32000 and 64000 Bytes

This element represents the number of statements or chains with outbound bytes sent between 32000 and 64000 inclusive.

Element identifier
max_data_sent_64000

Element type
counter

Table 989. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_8192 - Number of Statements with Outbound Bytes Sent Between 4097 and 8192 Bytes

This element represents the number of statements or chains with outbound bytes sent between 4097 and 8192 inclusive.

Element identifier
max_data_sent_8192

Element type
counter

Table 990. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement
DCS Application	dcс_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_data_sent_gt64000 - Number of Statements with Outbound Bytes Sent Greater than 64000 Bytes

This element represents the number of statements or chains with outbound bytes sent greater than 64000.

Element identifier
max_data_sent_gt64000

Element type
counter

Table 991. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Statement
DCS Application	dc_s_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_100_ms - Number of Statements with Network Time between 16 and 100 ms

This element represents the number of statements or chains whose network time was greater than 16 milliseconds but less or equal to 100 milliseconds. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Table 992. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Statement
DCS Application	dc_s_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_16_ms - Number of Statements with Network Time between 4 and 16 ms

This element represents the number of statements or chains whose network time was greater than 4 milliseconds but less or equal to 16 milliseconds. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Element identifier

max_network_time_16_ms

Element type

counter

Table 993. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Statement
DCS Application	dc_s_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_1_ms - Number of Statements with Network Time of up to 1 ms

This element represents the number of statements or chains whose network time was less or equal to 1 millisecond. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Table 994. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_4_ms - Number of Statements with Network Time between 1 and 4 ms

This element represents the number of statements or chains whose network time was greater than 1 millisecond but less or equal to 4 milliseconds. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Element identifier

max_network_time_4_ms

Element type

counter

Table 995. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_500_ms - Number of Statements with Network Time between 100 and 500 ms

This element represents the number of statements or chains whose network time was greater than 100 milliseconds but less or equal to 500 milliseconds. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Table 996. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

max_network_time_gt500_ms - Number of Statements with Network Time greater than 500 ms

This element represents the number of statements or chains whose network time was greater than 500 milliseconds. (Network time is the difference between host response time and elapsed execution time for a statement or chain.)

Table 997. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Statement
DCS Application	dcs_appl	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring, this counter can be reset.

Usage Use this element to get a better idea of the database activity and network traffic at the database or application levels.

member - Database member monitor element

The numeric identifier for the database member from which the data was retrieved for this result record.

Table 998. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
ADMIN_GET_MEM_USAGE table function - Get total memory consumption for instance	ACTIVITY METRICS BASE
AUDIT_ARCHIVE procedure and table function - Archive audit log file	ACTIVITY METRICS BASE
DBCFG administrative view and DB_GET_CFG table function - Retrieve database configuration parameter information	ACTIVITY METRICS BASE
ENV_GET_REG_VARIABLES table function - Retrieve DB2 registry settings in use	ACTIVITY METRICS BASE
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE

Table 998. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	ACTIVITY METRICS BASE
MON_GET_CF_WAIT_TIME table function - Get cluster caching facility command wait time	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_EXTENDED_LATCH_WAIT table function - Return information for latches	ACTIVITY METRICS BASE
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_GROUP_BUFFERPOOL table function - Get group buffer pool metrics	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

Table 998. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS BASE
MON_GET_SERVERLIST table function - get member priority details	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status on a usage list	ACTIVITY METRICS BASE

Table 998. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE
PDLOGMSG_LAST24HOURS administrative view and PD_GET_LOG_MSGS table function - Retrieve problem determination messages	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 999. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 999. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	-	COLLECT BASE DATA
Locking	-	Always collected
Change history	changesummary dbdbmcfg regvar ddlstmtexec txncompletion evmonstart utilstart utillocation utilstop	Always collected

Usage

A DB2 member is a database manager instance that runs DB2 server software on a single host. A DB2 member accepts and processes database requests from applications connected to it.

memory_free - Amount of free physical memory monitor element

The total amount of physical memory on this host that is not allocated to a running process, in MB.

Table 1000. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

memory_pool_used_hwm - Memory pool high water mark monitor element

The highest amount of memory assigned to this pool since it was created, in KB.

Table 1001. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory set information	ACTIVITY METRICS BASE

memory_pool_id - Memory pool identifier monitor element

Memory pool identifier

Table 1002. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	Always collected

memory_pool_type - Memory pool name monitor element

The name of the memory pool.

Table 1003. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE

Usage

Use the memory_pool_type element to identify the type of memory pool. The possible values returned by this monitor element are listed in Table 1004.

Table 1004. Possible values returned for memory_pool_type.

Memory pool name*	Description	Additional information
APM	Agent pool management (APM) heap	Internal memory pool
APPL_SHARED	Application shared heap	Internal memory pool
APPLICATION	Application heap	See applheapsz - Application heap size configuration parameter.
APS	APS heap	Internal memory pool
BSU_CF	Base service utility (BSU) CF heap	Internal memory pool
BSU	Base service utility (BSU) heap	Internal memory pool
BP	Buffer pool heap	See CREATE BUFFERPOOL statement.
CAT_CACHE	Catalog cache heap	See catalogcache_sz - Catalog cache size configuration parameter.
DATABASE_CF	Database CF heap	Internal memory pool
DATABASE	Database heap	See dbheap - Database heap configuration parameter.
DEBUG	Debug heap	Internal memory pool
DROP_INDEX	Drop index heap	Internal memory pool
EDU	Engine dispatchable unit (EDU) heap	Internal memory pool
FCMBP	Fast communications manager (FCM) buffer heap	See fcm_num_buffers - Number of FCM buffers configuration parameter.
FCM_CHANNEL	FCM channel heap	See fcm_num_channels - Number of FCM channels configuration parameter
FCM_CONTROL	FCM control heap	Internal memory pool
FCM_LOCAL	FCM local heap	Internal memory pool
FCM_SESSION	FCM session heap	Internal memory pool
FEDERATED	Federated heap	Internal memory pool

Table 1004. Possible values returned for *memory_pool_type* (continued).

Memory pool name*	Description	Additional information
KERNEL_CONTROL	Kernel control block heap	Internal memory pool
KERNEL	Kernel heap	Internal memory pool
LOCK_MGR	Lock manager heap	See locklist - Maximum storage for lock list configuration parameter.
MISC	Miscellaneous heap	See DB2_FMP_COMM_HEAPSZ registry variable.
MONITOR	Monitor heap	See mon_heap_sz - Database system monitor heap size configuration parameter.
OPTPROF_PARSER	OptProf XML parser heap	Internal memory pool
OSS_TRACKER	OSS resource tracking heap	Internal memory pool
PERSISTENT_PRIVATE	Persistent private heap	Internal memory pool
PACKAGE_CACHE	Package cache heap	See pckcachesz - Package cache size configuration parameter.
PRIVATE	Private	Internal memory pool
RESYNC	Resync heap	Internal memory pool
SORT	Private sort heap	See sortheap - Sort heap size configuration parameter.
SHARED_SORT	Shared sort heap	See sheapthres_shr - Sort heap threshold for shared sorts configuration parameter.
SQL_COMPILER	SQL compiler heap	Internal memory pool
STATEMENT	Statement heap	See stmtheap - Statement heap size configuration parameter.
STATISTICS	Statistics heap	See stat_heap_sz - Statistics heap size configuration parameter.
USER_DATA	User data heap	Internal memory pool
UTILITY	Utility heap	See util_heap_sz - Utility heap size configuration parameter.
XMLCACHE	XML cache heap	Internal memory pool
XMLPARSER	XML parser heap	Internal memory pool

* Names returned by **db2pd** for these pools might be abbreviated. The names of the pools and any abbreviations used by **db2pd** are defined in `sqlpoolinfo.h`.

memory_pool_used - Amount of memory pool in use monitor element

Amount of committed memory in use by this memory pool, in KB.

Table 1005. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE

memory_set_committed - Memory currently committed monitor element

The amount of memory currently committed to this memory set, in KB.

Table 1006. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

Usage

Committed memory is memory that is backed by RAM, or paging space, or both on the system.

memory_set_id - Memory set identifier monitor element

A numeric identifier that maps to a specific memory set type.

Table 1007. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

memory_set_size - Memory set size monitor element

Maximum memory commitment limit, in KB.

This value represents either a configured setting for a memory set or an internally calculated value for those memory sets that are managed automatically.

Table 1008. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

memory_set_type - Memory set type monitor element

The type of memory set.

Table 1009. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

Usage

The possible values returned for this monitor element are described in Table 1010 on page 1052:

Table 1010. Possible values for `memory_set_type`

Memory set type	Description	Scope
DBMS	Database manager memory set	Instance
FMP	Fenced mode process memory set	Instance
PRIVATE	Private memory set	Instance
DATABASE	Database memory set	Database
APPLICATION	Application memory set	Database
FCM	Fast communication manager (FCM) memory set	Instance, Host

memory_set_used - Memory in use by this set monitor element

Amount of memory from this set that has been assigned to memory pools, in KB.

Table 1011. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

Usage

All of memory represented by this monitor element is committed memory; the value returned for this monitor element is included in `MEMORY_SET_COMMITTED`. Any additional memory that is committed but not in use is cached to improve performance.

memory_set_used_hwm - Memory set high water mark monitor element

The highest amount of memory assigned to memory pools from this set since the memory set was created, in KB.

Table 1012. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

memory_swap_free - Total free swap space monitor element

The total amount of unused swap space on this host, in MB.

Table 1013. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

memory_swap_total - Total swap space monitor element

The total amount of swap space on this host, in MB.

Table 1014. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

memory_total - Total physical memory monitor element

The total amount of physical memory on this host, in MB.

Table 1015. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

message - Control Table Message

The nature of the timestamp in the MESSAGE_TIME column. This element is only used in the CONTROL table by write-to-table event monitors.

Table 1016. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
-	-	Always collected

Usage

The following possible values are:

DROPPED RECORDS: *n*

Number of activity records that were dropped because MONHEAP could not be allocated for them.

FIRST_CONNECT

The time of the first connect to the database after activation.

EVMON_START

The time the event monitor listed in the EVMONNAME column was started.

OVERFLOWS: *n*

Denotes that *n* records were discarded due to buffer overflow.

LAST DROPPED RECORD

The last time that an activity record was dropped.

message_time - Timestamp Control Table Message

The timestamp corresponding to the event described in the MESSAGE column. This element is only used in the CONTROL table by write-to-table event monitors.

Table 1017. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
-	-	Always collected

metrics - Metrics monitor element

An XML document containing some of the system monitor elements collected by the statistics event monitor.

Table 1018. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Statistics	EVENTS_SCSTATS	Always collected
Statistics	EVENT_WLSTATS	Always collected

Usage

The schema for the XML documents returned is available in the file `sql1lib/misc/DB2MonCommon.xsd`. The top level element is **system_metrics**.

The XML documents associated with this monitor element and the **details_xml** monitor element contain the same system metrics, but there is an important difference. The metrics in this monitor element are calculated to show the change in value for the metric since the last time statistics were collected. While the metrics in **details_xml** generally start at 0 and continue to accumulate until the next database activation.

Using the logical data groups `EVENT_SCMETRICS` and `EVENT_WLMETRICS`, you can directly view the monitor elements contained in **metrics** as individual elements. For example, if your statistics event monitor writes to tables, you can access the metrics by using an SQL query to retrieve data from the new logical data groups, rather than of having to post-process or parse the **metrics** monitor element XML document.

Important: Starting with Version 10.1 Fix Pack 1, the **details_xml** monitor element is deprecated for the statistics event monitor and might be removed in a future release. If you use the XML metrics data returned in **details_xml**, start using this monitor element instead.

mon_interval_id - Monitor interval identifier monitor element

The value of the MON_INTERVAL_ID database global variable when a particular transaction is completed.

Table 1019. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

Table 1020. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	Always collected
Statistics	event_scstats	Always collected
Statistics	event_histogrambin	Always collected
Statistics	event_wcstats	Always collected
Statistics	event_wlstats	Always collected
Activities	event_activity	Always collected
Unit of Work	uow	Always collected

nesting_level - Nesting level monitor element

This element shows the level of nesting or recursion in effect when the statement was being run; each level of nesting corresponds to nested or recursive invocation of a stored procedure or user-defined function (UDF).

The **nesting_level** monitor element is an alias of the **stmt_nest_level** monitor element.

Table 1021. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1022. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Activities	event_activitystmt	-
Unit of work	Reported in the package list.	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element, along with `stmt_invocation_id` monitor element, to uniquely identify the invocation in which a particular SQL statement has been executed. You can also use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

network_time_bottom - Minimum Network Time for Statement

This element represents the shortest network time for a statement executed against this DCS database or in this DCS application, or having used this many data transmissions. (Network time is the difference between host response time and elapsed execution time for a statement.)

Element identifier

network_time_bottom

Element type

watermark

Table 1023. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcс_dbase	Statement, Timestamp
DCS Application	dcс_appl	Statement, Timestamp
Data Transmission	stmt_transmissions	Statement, Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to get a better idea of the database activity and network traffic at the database or application levels.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

network_time_top - Maximum Network Time for Statement

This element represents the longest network time for a statement executed against this DCS database or in this DCS application, or having used this many data transmissions. (Network time is the difference between host response time and elapsed execution time for a statement.)

Element identifier

network_time_top

Element type
watermark

Table 1024. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Statement, Timestamp
DCS Application	dc_s_appl	Statement, Timestamp
Data Transmission	stmt_transmissions	Statement, Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to get a better idea of the database activity and network traffic at the database or application levels. Note that this element is not collected when the timestamp switch is off.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

nleaf - Number of leaf pages monitor element

The approximate number of leaf pages.

Table 1025. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

nlevels - Number of index levels monitor element

Number of index levels. This is an approximation.

Table 1026. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

no_change_updates - Number of no change row updates monitor element

The number of row updates that resulted in no changes to any of the column values of a row.

If a LOB, XML, or LONG column is included in the SET clause of an UPDATE statement, every row affected by that statement is assumed to change, and will not participate in this counter.

Table 1027. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - get table metrics	ACTIVITY METRICS BASE

node_number - Node Number

The number assigned to the node in the *db2nodes.cfg* file.

Table 1028. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic
Database Manager	memory_pool	Basic
Database Manager	fcm	Basic
Database Manager	fcm_node	Basic
Database Manager	utility_info	Basic
Database	detail_log	Basic
Buffer Pool	bufferpool_nodeinfo	Buffer Pool
Table Space	rollforward	Basic
Lock	lock	Basic
Lock	lock_wait	Basic
Database	db_sto_path_info	Buffer Pool

Table 1029. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connections	event_connheader	Always collected
Deadlocks	lock	Always collected
Overflow Record	event_overflow	Always collected
Database	event_dbmemuse	Always collected
Connection	event_connmemuse	Always collected

Usage This value identifies the current node number, which can be used when monitoring multiple nodes.

nonboundary_leaf_node_splits - Non-boundary leaf node splits monitor element

Number of times a non-boundary leaf node was split during an insert operation.

Table 1030. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

num_agents - Number of Agents Working on a Statement

Number of concurrent agents currently executing a statement or subsection.

Element identifier

num_agents

Element type

gauge

Table 1031. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
Application	subsection	Statement

Usage An indicator how well the query is parallelized. This is useful for tracking the progress of query execution, by taking successive snapshots.

num_assoc_agents - Number of Associated Agents

At the application level, this is the number of subagents associated with an application. At the database level, it is the number of subagents for all applications.

Element identifier

num_assoc_agents

Element type

gauge

Table 1032. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl_info	Basic

Usage You can use this element to help evaluate your settings for your agent configuration parameters.

num_compilations - Statement Compilations

The number of different compilations for a specific SQL statement.

Table 1033. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

Usage Some SQL statements issued on different schemas, such as **SELECT t1 FROM test** will appear to be the same statement in the DB2 cache even though they refer to different access plans. Use this value in conjunction with num_executions to determine whether a bad compilation environment may be skewing the results of dynamic SQL snapshot statistics.

num_coord_exec - Number of executions by coordinator agent monitor element

The number of times this section was executed by a coordinator agent.

Table 1034. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1035. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

num_coord_exec_with_metrics - Number of executions by coordinator agent with metrics monitor element

The number of times this section was executed by a coordinator agent and monitoring metrics were being captured

Table 1036. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1037. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

num_db_storage_paths - Number of automatic storage paths

The number of automatic storage paths associated with a database.

Table 1038. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage note

You can use this element with the db_storage_path monitor element to identify the storage paths that are associated with this database.

If you use storage groups, this element shows the number of automatic storage paths in the default database storage group only.

num_executions - Statement executions monitor element

The number of times that an SQL statement has been executed.

Table 1039. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1040. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

For snapshot monitoring, this counter can be reset.

Table 1041. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

Usage

You can use this element to identify the most frequently executed SQL statements in your system.

At the package cache level, use this element to compute averages for the activity metrics reported per statement. For example, the average CPU usage for an execution of a statement reported at the package cache level can be calculated by the following formula:

`total_cpu_time / num_exec_with_metrics`

Use the **num_exec_with_metrics** monitor element instead of the **num_executions** monitor element when computing averages, since the **num_executions** monitor element counts all executions of a statement, regardless of whether or not the execution of the statement contributed to the activity metrics that are reported.

num_exec_with_metrics - Number of executions with metrics collected monitor element

The number of times that this SQL statement section has been executed with the metrics collected. This element can be used to calculate the per execution value for monitor elements for statements in the package cache.

Table 1042. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1043. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

num_extents_left - Number of extents left to process monitor element

The number of extents left to move during this table rebalancing process.

Table 1044. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

num_extents_moved - Number of extents moved monitor element

The number of extents moved so far during this extent movement operation.

Table 1045. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

num_gw_conn_switches - Connection Switches

The number of times that an agent from the agents pool was primed with a connection and was reassigned for use with a different DRDA database.

Table 1046. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

For most users, the default setting of the **num_poolagents** configuration parameter ensures optimal performance. The default setting for this configuration parameter automatically manages agent pooling and avoids reassigning agents.

To reduce the value of this monitor element, adjust the value of the **num_poolagents** configuration parameter.

num_indoubt_trans - Number of Indoubt Transactions

The number of outstanding indoubt transactions in the database.

Table 1047. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1048. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage Indoubt transactions hold log space for uncommitted transactions, which can cause the logs to become full. When the logs are full, further transactions cannot be completed. The resolution of this problem involves a manual process of heuristically resolving the indoubt transactions. This monitor element provides a count of the number of currently outstanding indoubt transactions that must be heuristically resolved.

num_log_buffer_full - Number of times full log buffer caused agents to wait monitor element

The **num_log_buffer_full** element stores the number of times agents have to wait for log data to write to disk while copying log records into the log buffer. This value is incremented per agent per incident.

For example, if two agents attempt to copy log data while the buffer is full, then this value is incremented by two.

Table 1049. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1049. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1050. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1051. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 1051. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element to determine if the **logbufsz** database configuration parameter needs to be increased.

num_log_data_found_in_buffer - Number of Log Data Found In Buffer

The number of times an agent reads log data from the buffer. Reading log data from the buffer is preferable to reading from the disk because the latter is slower.

Table 1052. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1053. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1054. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *num_log_read_io* element to determine if the LOGBUFSZ database configuration parameter needs to be increased.

num_log_part_page_io - Number of Partial Log Page Writes

The number of I/O requests issued by the logger for writing partial log data to the disk.

Table 1055. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1056. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1057. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *log_writes*, *log_write_time*, and *num_log_write_io* elements to determine if the current disk is adequate for logging.

num_log_read_io - Number of Log Reads

The number of I/O requests issued by the logger for reading log data from the disk.

Table 1058. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1059. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1060. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *log_reads* and *log_read_time* elements to determine if the current disk is adequate for logging.

num_log_write_io - Number of Log Writes

The number of I/O requests issued by the logger for writing log data to the disk.

Table 1061. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1062. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1063. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage Use this element in conjunction with the *log_writes* and *log_write_time* elements to determine if the current disk is adequate for logging.

num_lw_thresh_exceeded - Number of lock wait thresholds exceeded monitor element

This monitor element reports the number of times the lock wait threshold (set using **mon_lw_thresh** configuration parameter) was exceeded and a lock wait event was captured by the locking event monitor. If no lock wait event is generated, the monitor element is not incremented.

Table 1064. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1064. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1065. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

num_nodes_in_db2_instance - Number of Nodes in Partition

The number of nodes on the instance where the snapshot was taken.

Table 1066. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Table 1067. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	Always collected

Usage Use this element to determine the number of nodes for an instance. For non-partitioned system databases, this value will be 1.

num_page_dict_built - Number of page-level compression dictionaries created or recreated

The number of page-level compression dictionaries created or recreated for a table since the database was last activated.

Table 1068. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - get table metrics	ACTIVITY METRICS BASE

num_ref_with_metrics - Number of references with metrics monitor element

The total number of times that a section referenced the database object. The usage list for the data object must be created and active; in addition the collection of object metrics must be enabled for the section.

Table 1069. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

num_references - Number of references monitor element

The number of times that this section has referenced this object since it was added to the list.

Table 1070. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

num_remaps - Number of remaps monitor element

Count of the number of times this activity has been remapped. If num_remaps is greater than zero, the service_class_id of this activity record is the ID of the last service class to which the activity was remapped.

Table 1071. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this information to verify whether the activity was remapped the expected number of times.

num_routines - Number of routines monitor element

Number of procedures, external functions, compiled functions, and compiled triggers that might be invoked during section execution.

Table 1072. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	Always collected
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	Always collected
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected

Table 1073. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Activities	event_activitystmt	Always collected
Package Cache	event_pkgcache	Always collected

Usage

Use MON_GET_SECTION_ROUTINE table function to list the routines and triggers. This list can be compared to the output from the MON_GET_ROUTINE and MON_GET_ROUTINE_EXEC_LIST table functions.

num_tbsps - Number of table spaces monitor element

The number of table spaces associated with a logged event.

Table 1074. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilstart	Always collected

num_threshold_violations - Number of threshold violations monitor element

The number of threshold violations that have taken place in this database since it was last activated.

This monitor element is an alias of the “thresh_violations - Number of threshold violations monitor element” on page 1408 monitor element, which is returned by some monitoring (MON_*) table functions.

Table 1075. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1076. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

This element can be used to help determine whether or not thresholds are effective for this particular application or whether the threshold violations are excessive.

num_transmissions - Number of Transmissions

Number of data transmissions between the DB2 Connect gateway and the host that was used to process this DCS statement. (One data transmission consists of either one send or one receive.)

Note:

This is a legacy monitor element that is not relevant for DB2 UDB Version 8.1.2 or higher. If you are using DB2 UDB Version 8.1.2 or higher, refer to the **num_transmissions_group** monitor element.

Element identifier

num_transmissions

Element type

counter

-->

Table 1077. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Statement	dcs_stmt	Statement

Usage Use this element to get a better understanding of the reasons why a particular statement took longer to execute. For example, a query returning a large result set may need many data transmissions to complete.

num_transmissions_group - Number of Transmissions Group

The range of data transmissions between the DB2 Connect gateway and the host that was used to process this DCS statement. (One data transmission consists of either one send or one receive.)

Table 1078. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Statement	dcs_stmt	Statement

Usage Use this element to get a better understanding of the reasons why a particular statement took longer to execute. For example, a query returning a large result set may need many data transmissions to complete.

The constants representing the ranges of transmissions are described as follows and are defined in sqlmon.h.

API Constant	Description
SQLM_DCS_TRANS_GROUP_2	2 transmissions
SQLM_DCS_TRANS_GROUP_3TO7	3 to 7 transmissions
SQLM_DCS_TRANS_GROUP_8TO15	8 to 15 transmissions
SQLM_DCS_TRANS_GROUP_16TO64	16 to 64 transmissions
SQLM_DCS_TRANS_GROUP_GT64	Greater than 64 transmissions

number_in_bin - Number in bin monitor element

This element holds the count of the number of activities or requests that fall within the histogram bin.

Table 1079. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	-

Usage

Use this element to represent the height of a bin in the histogram.

object_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element

The number of group buffer pool (GBP) independent data pages found in a local buffer pool (LBP) by an agent.

Table 1080. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1081. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

object_data_gbp_invalid_pages - GBP invalid data pages for a table monitor element

The number of times that a data page is requested from the group buffer pool (GBP) for a table. The page is requested because the version of the page in the local buffer pool (LBP) is invalid. Outside of a DB2 pureScale environment, this value is null.

Table 1082. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested data page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\frac{(\text{object_data_lbp_pages_found} + \text{object_xda_lbp_pages_found})}{(\text{object_data_l_reads} + \text{object_xda_l_reads})}$$

To determine how often a requested data page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$\frac{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads} - \text{object_data_GBP_p_reads} - \text{object_xda_p_reads})}{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads})}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_data_gbp_l_reads - GBP data logical reads for a table monitor element

The number of times that a group buffer pool (GBP) dependent data page is requested from the GBP for a table. The page is requested because a valid version of the page does not exist in the local buffer pool (LBP).

Table 1083. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED

Table 1083. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested data page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\frac{(\text{object_data_lbp_pages_found} + \text{object_xda_lbp_pages_found})}{(\text{object_data_l_reads} + \text{object_xda_l_reads})}$$

To determine how often a requested data page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$\frac{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads} - \text{object_data_GBP_p_reads} - \text{object_xda_p_reads})}{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads})}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_data_gbp_p_reads - GBP data physical reads for a table monitor element

The number of times that a group buffer pool (GBP) dependent data page is read into the local buffer pool (LBP) from disk for a table. The page is read from disk into the LBP because the page is not in the GBP.

Table 1084. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested data page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\frac{(\text{object_data_lbp_pages_found} + \text{object_xda_lbp_pages_found})}{(\text{object_data_l_reads} + \text{object_xda_l_reads})}$$

To determine how often a requested data page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$\frac{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads} - \text{object_data_GBP_p_reads} - \text{object_xda_p_reads})}{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads})}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or

GBP might be limiting the throughput of your database.

object_data_lbp_pages_found - LBP data pages found for a table monitor element

The number of times that a data page for a table is present in the local buffer pool (LBP).

Table 1085. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested data page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\frac{(\text{object_data_lbp_pages_found} + \text{object_xda_lbp_pages_found})}{(\text{object_data_l_reads} + \text{object_xda_l_reads})}$$

To determine how often a requested data page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$\frac{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads} - \text{object_data_GBP_p_reads} - \text{object_xda_p_reads})}{(\text{object_data_GBP_l_reads} + \text{object_xda_l_reads})}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_data_l_reads - Buffer pool data logical reads for a table monitor element

The number of data pages that are logically read from the buffer pool for a table.

Table 1086. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

This monitor element tracks the number of accesses to the following data:

- Data that is in the buffer pool when the database manager needs to process the page

- Data that is read into the buffer pool before the database manager can process the page

Calculate the data page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_data_p_reads} + \text{object_xda_p_reads}) / (\text{object_data_l_reads} + \text{object_xda_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

object_data_p_reads - Buffer pool physical data reads for a table monitor element

The number of data pages that are physically read for a table.

Table 1087. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

Calculate the data page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_data_p_reads} + \text{object_xda_p_reads}) / (\text{object_data_l_reads} + \text{object_xda_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

object_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element

The number of Group Buffer Pool (GBP) independent index pages found in Local Buffer Pool (LBP) by agent.

Table 1088. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Table 1089. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE

Table 1089. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of Work	uow_metrics	REQUEST METRICS BASE

object_index_gbp_invalid_pages - GBP invalid index pages for an index monitor element

The number of times that an index page is requested from the group buffer pool (GBP) for an index. The page is requested because the version of the page in the local buffer pool (LBP) is invalid.

Table 1090. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested index page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\text{object_index_lbp_pages_found} / \text{object_index_l_reads}$$

To determine how often a requested index page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$(\text{object_index_gbp_l_reads} - \text{object_index_gbp_p_reads}) / \text{object_index_gbp_l_reads}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_index_gbp_l_reads - GBP index logical reads for an index monitor element

The number of times that a group buffer pool (GBP) dependent index page is requested from the GBP for an index. The page is requested because a valid version of the page does not exist in the local buffer pool (LBP).

Table 1091. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested index page is found in the LBP, use the following formula, which uses the values of monitor elements:

object_index_lbp_pages_found / object_index_l_reads

To determine how often a requested index page is found in the GBP, use the following formula, which also uses the values of monitor elements:

(object_index_gbp_l_reads - object_index_gbp_p_reads) / object_index_gbp_l_reads

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_index_gbp_p_reads - GBP index physical reads for an index monitor element

The number of times that a group buffer pool (GBP) dependent index page is read into the local buffer pool (LBP) from disk for an index. The page is read from disk into the LBP because the page is not in the GBP.

Table 1092. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested index page is found in the LBP, use the following formula, which uses the values of monitor elements:

object_index_lbp_pages_found / object_index_l_reads

To determine how often a requested index page is found in the GBP, use the following formula, which also uses the values of monitor elements:

(object_index_gbp_l_reads - object_index_gbp_p_reads) / object_index_gbp_l_reads

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_index_lbp_pages_found - LBP index pages found for an index monitor element

The number of times that an index page for an index is present in the local buffer pool (LBP).

Table 1093. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED

Table 1093. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested index page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\text{object_index_lbp_pages_found} / \text{object_index_l_reads}$$

To determine how often a requested index page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$(\text{object_index_gbp_l_reads} - \text{object_index_gbp_p_reads}) / \text{object_index_gbp_l_reads}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_index_l_reads - Buffer pool index logical reads for an index monitor element

The number of index pages that are logically read from the buffer pool for an index.

Table 1094. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

This monitor element tracks the number of accesses to the following pages:

- Index pages that are in the buffer pool when the database manager needs to process the pages
- Index pages that are read into the buffer pool before the database manager can process the pages

Calculate the index page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_index_p_reads} / \text{object_index_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

object_index_p_reads - Buffer pool index physical reads for an index

The number of index pages that are physically read for an index.

Table 1095. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	DATA OBJECT METRICS EXTENDED
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	DATA OBJECT METRICS EXTENDED

Usage

Calculate the index page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_index_p_reads} / \text{object_index_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

object_name - Object name monitor element

A table name or an index name, depending on the value of the **objtype** monitor element.

Table 1096. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_AUTO_MAINT_QUEUE table function - Get information about automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

Table 1097. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilphase utilstart	Always collected

Usage

For the change history event monitor, if the **object_type** element is INDEX, PARTIONGROUP, or TABLE, then this is the name of the index, partition group, or table.

object_requested - Requested object monitor element

The type of lock the requester is trying to acquire from the owner. Values can be LOCK for database locks, or TICKET for WLM tickets..

Table 1098. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

object_schema - Object schema monitor element

A table schema or an index schema, depending on the value of the **objtype** monitor element.

Table 1099. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_AUTO_MAINT_QUEUE table function - Get information about automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

Table 1100. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilphase utilstart	Always collected

Usage

For the change history event monitor, if the **object_type** element is INDEX or TABLE, then this is the schema of the index or table, otherwise it is an empty string.

object_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element

The number of group buffer pool (GBP) independent XML storage object (XDA) data pages found in a local buffer pool (LBP) by an agent.

Table 1101. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED

Table 1101. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1102. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

object_xda_gbp_invalid_pages - GBP invalid XDA data pages for a table monitor element

The number of times that a data page for an XML storage object (XDA) is requested from the group buffer pool (GBP) for a table. The page is requested because the version of the page in the local buffer pool (LBP) is invalid.

Table 1103. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested XDA page is found in the LBP, use the following formula, which uses the values of monitor elements:

object_xda_lbp_pages_found / object_xda_l_reads

To determine how often a requested XDA page is found in the GBP, use the following formula, which also uses the values of monitor elements:

(object_xda_gbp_l_reads - object_xda_gbp_p_reads) / object_xda_gbp_l_reads

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_xda_gbp_l_reads - GBP XDA data logical read requests for a table monitor element

The number of times that a group buffer pool (GBP) dependent data page for an XML storage object (XDA) is requested from the GBP for a table. The page is requested because a valid version of the page does not exist in the local buffer pool (LBP).

Table 1104. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested XDA page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\text{object_xda_lbp_pages_found} / \text{object_xda_l_reads}$$

To determine how often a requested XDA page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$(\text{object_xda_gbp_l_reads} - \text{object_xda_gbp_p_reads}) / \text{object_xda_gbp_l_reads}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_xda_gbp_p_reads - GBP XDA data physical read requests for a table monitor element

The number of times that a group buffer pool (GBP) dependent data page for an XML storage object (XDA) is read into the local buffer pool (LBP) from disk for a table. The page is read from disk into the LBP because the page is not in the GBP.

Table 1105. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested XDA page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\text{object_xda_lbp_pages_found} / \text{object_xda_l_reads}$$

To determine how often a requested XDA page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$(\text{object_xda_gbp_l_reads} - \text{object_xda_gbp_p_reads}) / \text{object_xda_gbp_l_reads}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_xda_lbp_pages_found - LBP XDA data pages found for a table monitor element

The number of times that an XML storage object (XDA) data page for a table is present in the local buffer pool (LBP).

Table 1106. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

To determine how often a requested data page is found in the LBP, use the following formula, which uses the values of monitor elements:

$$\frac{(\text{object_data_lbp_pages_found} + \text{object_xda_lbp_pages_found})}{(\text{object_data_l_reads} + \text{object_xda_l_reads})}$$

To determine how often a requested data page is found in the GBP, use the following formula, which also uses the values of monitor elements:

$$\frac{(\text{object_data_gbp_l_reads} + \text{object_xda_l_reads} - \text{object_data_gbp_p_reads} - \text{object_xda_p_reads})}{(\text{object_data_gbp_l_reads} + \text{object_xda_l_reads})}$$

LBP and GBP hit rates are important factors in the overall performance of a cluster caching facility. Using these formulas can help you determine whether the LBP or GBP might be limiting the throughput of your database.

object_xda_l_reads - Buffer pool XDA data logical reads for a table monitor element

The number of data pages for XML storage objects (XDAs) that are logically read from the buffer pool for a table.

Table 1107. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

This monitor element tracks the number of accesses to the following data:

- Data that is in the buffer pool when the database manager needs to process the page.
- Data that is read into the buffer pool before the database manager can process the page

Calculate the data page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_data_p_reads} + \text{object_xda_p_reads}) / (\text{object_data_l_reads} + \text{object_xda_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

object_xda_p_reads - Buffer pool XDA data physical reads for a table monitor element

The number of data pages for XML storage objects (XDAs) that are physically read for a table.

Table 1108. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

Calculate the data page hit ratio by using the following formula, which uses the values of monitor elements:

$$(1 - (\text{object_data_p_reads} + \text{object_xda_p_reads}) / (\text{object_data_l_reads} + \text{object_xda_l_reads}))$$

If the hit ratio is low, increasing the number of buffer pool pages might improve performance.

objtype - Object type monitor element

The type of object for which monitoring data is being reported. This monitor element is an alias of the object_type monitor element.

Table 1109. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Table 1109. Table Function Monitoring Information (continued)

Table Function	Monitor Element	Collection Level
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS	BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status on a usage list	ACTIVITY METRICS	BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS	BASE

Table 1110. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilphase utilstart	Always collected

Usage Notes

- When this element is returned by the ADMIN_GET_TAB_COMPRESS_INFO table function or the ADMIN_GET_TAB_DICTIONARY_INFO table function, the returned value for the object_type monitor element can be either 'XML' or 'DATA'.
- When this element is returned by the MON_GET_RTS_RQST table function, the returned value for the object_type monitor element is 'TABLE'.
- When this element is returned by the MON_GET_AUTO_MAINT_QUEUE table function, the returned value for the object_type monitor element can be 'DATABASE', 'TABLE', 'NICKNAME', or 'VIEW'.
- When this element is returned by the MON_GET_AUTO_RUNSTATS_QUEUE table function, the returned value for the object_type monitor element can be 'TABLE', 'NICKNAME', or 'VIEW'.
- When this element is returned by the change history event monitor, the returned value for the object_type monitor element can be 'DATABASE', 'INDEX', 'PARTITIONGROUP', 'TABLE' or 'TABLESPACE'.

olap_func_overflows - OLAP Function Overflows monitor element

The number of times that OLAP function data exceeded the available sort heap space.

Table 1111. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1112. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage

At the database level, use this element in conjunction with `total_olap_funcs` to calculate the percentage of OLAP functions that overflowed to disk. If this percentage is high and the performance of applications using OLAP functions needs to be improved, then you should consider increasing the sort heap size.

At the application level, use this element to evaluate OLAP function performance for individual applications.

open_cursors - Number of Open Cursors

The number of cursors currently open for an application.

Table 1113. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dc_s_appl	Statement

Usage Use this element to assess how much memory is being allocated. The amount of memory allocated by the DB2 client, DB2 Connect, or the database agent on the target database is related to the number of cursors that are currently open. Knowing this information can help with capacity planning. For example, each open cursor that is doing blocking has a buffer size of `RQRIOBLK`. If `deferred_prepare` is enabled, then two buffers will be allocated.

This element does not include cursors that were closed by an early close. An early close occurs when the host database returns the last record to the client. The cursor is closed at the host and gateway, but is still open at the client. Early close cursors can be set using the DB2 Call Level Interface.

open_loc_curs - Open Local Cursors

The number of local cursors currently open for this application, including those cursors counted by `open_loc_curs_blk`.

Element identifier

`open_loc_curs`

Element type

gauge

Table 1114. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Usage You may use this element in conjunction with `open_loc_curs_blk` to calculate the percentage of local cursors that are blocking cursors. If the percentage is low, you may be able to improve performance by improving the row blocking in the application.

For cursors used by remote applications, see `open_rem_curs`.

open_loc_curs_blk - Open Local Cursors with Blocking

The number of local blocking cursors currently open for this application.

Element identifier

open_loc_curs_blk

Element type

gauge

Table 1115. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Usage You may use this element in conjunction with *open_loc_curs* to calculate the percentage of local cursors that are blocking cursors. If the percentage is low, you may be able to improve performance by improving the row blocking in the application:

- Check the pre-compile options for record blocking for treatment of ambiguous cursors
- Redefine cursors to allow for blocking (for example, if possible, specify FOR FETCH ONLY on your cursors).

rej_curs_blk and *acc_curs_blk* provide additional information that may help you tune your configuration parameters to improve row blocking in your application.

For blocking cursors used by remote applications, see *open_rem_curs_blk*.

open_rem_curs - Open Remote Cursors

The number of remote cursors currently open for this application, including those cursors counted by *open_rem_curs_blk*.

Element identifier

open_rem_curs

Element type

gauge

Table 1116. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Usage You may use this element in conjunction with *open_rem_curs_blk* to calculate the percentage of remote cursors that are blocking cursors. If the percentage is low, you may be able to improve performance by improving the row blocking in the application. See *open_rem_curs_blk* for more information.

For the number of open cursors used by applications connected to a local database, see *open_loc_curs*.

open_rem_curs_blk - Open Remote Cursors with Blocking

The number of remote blocking cursors currently open for this application.

Element identifier

open_rem_curs_blk

Element type

gauge

Table 1117. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Usage You can use this element in conjunction with *open_rem_curs* to calculate the percentage of remote cursors that are blocking cursors. If the percentage is low, you may be able to improve performance by improving the row blocking in the application:

- Check the pre-compile options for record blocking for treatment of ambiguous cursors
- Redefine cursors to allow for blocking (for example, if possible, specify FOR FETCH ONLY on your cursors).

rej_curs_blk and *acc_curs_blk* provide additional information that may help you tune your configuration parameters to improve row blocking in your application.

For the number of open blocking cursors used by applications connected to a local database see *open_loc_curs_blk*.

os_level - Operating system level monitor element

The modification level of the operating system running on this host. Reported for Linux systems only.

Table 1118. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

os_name - Operating system name monitor element

The name of the operating system running on this host.

Table 1119. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

os_release - Operating system release monitor element

The release of the operating system running on this host.

Table 1120. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

os_version - Operating system version monitor element

The version of the operating system running on this host.

Table 1121. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

outbound_appl_id - Outbound Application ID

This identifier is generated when the application connects to the DRDA host database. It is used to connect the DB2 Connect gateway to the host, while the **appl_id** monitor element is used to connect a client to the DB2 Connect gateway.

Element identifier

outbound_appl_id

Element type

information

Table 1122. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage

You may use this element in conjunction with **appl_id** to correlate the client and server parts of the application information.

This identifier is unique across the network.

This element will be blank when the gateway concentrator is on, or if the DCS application is not in a logical unit of work.

Format

Network.LU Name.Application instance

Example

CAIBMTOR.OSFDBM0.930131194520

outbound_bytes_received - Outbound Number of Bytes Received

The number of bytes received by the DB2 Connect gateway from the host, excluding communication protocol usage (for example, TCP/IP). For the data transmission level: Number of bytes received by the DB2 Connect gateway from the host during the processing of all the statements that used this number of data transmissions.

Table 1123. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl	Basic
DCS Statement	dcs_stmt	Statement

Table 1123. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring at the statement level, this counter cannot be reset. This counter can be reset at other levels.

Usage

Use this element to measure the throughput from the host databases to the DB2 Connect gateway.

outbound_bytes_received_bottom - Minimum Outbound Number of Bytes Received

The lowest number of bytes received per statement or chain by the DB2 Connect gateway from the host during the processing of all the statements or chains against this DCS database, or in this DCS application, that used this number of data transmissions.

Table 1124. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

Usage Use this element in conjunction with "outbound number of bytes received" as yet another parameter that illustrates the throughput from the host database to the DB2 Connect gateway.

outbound_bytes_received_top - Maximum Outbound Number of Bytes Received

Maximum number of bytes received per statement or chain by the DB2 Connect gateway from the host during the processing of all the statements or chains against this DCS database, or in this DCS application, that used this number of data transmissions.

Table 1125. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

Usage Use this element in conjunction with "outbound number of bytes received" as yet another parameter that illustrates the throughput from the host database to the DB2 Connect gateway.

outbound_bytes_sent - Outbound Number of Bytes Sent

The number of bytes sent by the DB2 Connect gateway to the host, excluding communication protocol usage (for example, TCP/IP). For the data transmission level: Number of bytes sent by the DB2 Connect gateway to the host during the processing of all the statements that used this number of data transmissions.

Table 1126. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dc_s_dbase	Basic
DCS Application	dc_s_appl	Basic
DCS Statement	dc_s_stmt	Statement
Data Transmission	stmt_transmissions	Statement

For snapshot monitoring at the statement level, this counter cannot be reset. This counter can be reset at other levels.

Usage Use this element to measure the throughput from the DB2 Connect gateway to the host database.

outbound_bytes_sent_bottom - Minimum Outbound Number of Bytes Sent

The lowest number of bytes sent per statement or chain by the DB2 Connect gateway to the host during the processing of all the statements or chains against this DCS database, or in this DCS application, that used this number of data transmissions.

Table 1127. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

Usage Use this element in conjunction with "outbound number of bytes sent" as yet another parameter that illustrates the throughput from the DB2 Connect Gateway to the host database.

outbound_bytes_sent_top - Maximum Outbound Number of Bytes Sent

Maximum number of bytes sent per statement or chain by the DB2 Connect gateway to the host during the processing of all the statements or chains against this DCS database, or in this DCS application, that used this number of data transmissions.

Table 1128. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Statement

Usage Use this element in conjunction with "outbound number of bytes sent" as yet another parameter that illustrates the throughput from the DB2 Connect Gateway to the host database.

outbound_comm_address - Outbound Communication Address

This is the communication address of the target database. For example, it could be an IP address and port number for TCP/IP.

Element identifier

outbound_comm_address

Element type
information

Table 1129. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl_info	Basic

Usage Use this element for problem determination on DCS applications.

outbound_comm_protocol - Outbound Communication Protocol

The communication protocol used between the DB2 Connect gateway and the host.

Table 1130. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

Usage

Use this element for problem determination on DCS applications. The valid value is:

- SQLM_PROT_TCPIP

outbound_sequence_no - Outbound Sequence Number

This element will be blank when the gateway concentrator is on, or if the DCS application is not in a logical unit of work.

Table 1131. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl_info	Basic

overflow_accesses - Accesses to overflowed records monitor element

The number of accesses (reads and writes) to overflowed rows of this table.

Table 1132. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1133. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

For snapshot monitoring, this counter can be reset.

Table 1134. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage

Overflowed rows indicate that data fragmentation has occurred. If this number is high, you may be able to improve table performance by reorganizing the table using the **REORG** utility, which cleans up this fragmentation.

A row overflows if it is updated and no longer fits in the data page where it was originally written. This usually happens as a result of an update of a VARCHAR or an ALTER TABLE statement.

overflow_creates - Overflow creates monitor element

The number of overflowed rows created on this table.

Table 1135. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Usage

package_id - Package identifier monitor element

A unique identifier for the package.

Table 1136. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the package list.	Always collected

Usage

The value of this element matches a value from column PKGID of view SYSCAT.PACKAGES.

package_elapsed_time - Package elapsed time monitor element

The elapsed time spent executing sections within the package. Value is in milliseconds.

Table 1137. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the package list.	Always collected

package_list_count - Package list count monitor element

The number of entries that are present within the package listing for a particular unit of work

Table 1138. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected

package_list_exceeded - Package list exceeded monitor element

Indicates whether the number of packages used within the unit of work has exceeded the capacity of the package list. Possible values are YES and NO.

Table 1139. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected

package_list_size - Size of package list monitor element

The count of the number of package identifiers included in the package list.

Table 1140. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of Work	uow	

package_name - Package name monitor element

The name of the package that contains the SQL statement.

Table 1141. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1142. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement

Table 1143. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details ¹	event_detailed_dlconn	-
Statements	event_stmt	-
Activities	event_activitystmt	-
Package cache	-	COLLECT BASE DATA

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You may use this element to help identify the application program and the SQL statement that is executing.

package_schema - Package schema monitor element

The schema name of the package associated with an SQL statement.

Table 1144. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1145. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Package cache	-	COLLECT BASE DATA

package_version_id - Package version monitor element

For a given package name and creator, there can exist (starting in DB2 Version 8) multiple versions. The package version identifies the version identifier of the package that contains the SQL statement currently executing.

The version of a package is determined at precompile (PREP) of the embedded SQL program using the VERSION keyword. If not specified at precompile time the package version has a value of "" (empty string).

Table 1146. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1147. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Table 1148. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Statements	event_stmt	Always collected
Activities	event_activitystmt	Always collected
Package cache	-	COLLECT BASE DATA

Usage

Use this element to help identify the package and the SQL statement that is currently executing.

packet_receive_errors - Packet receive errors monitor element

Number of errors receiving packets since the network adapter started.

Table 1149. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

packets_received - Packets received monitor element

Number of packets received since the network adapter started.

Table 1150. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

packet_send_errors - Packet send errors monitor element

Number of errors sending packets since the network adapter started.

Table 1151. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

packets_sent - Packets sent monitor element

Number of packets sent since the network adapter started.

Table 1152. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

page_allocations - Page allocations monitor element

Number of pages that have been allocated to the index.

Table 1153. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

page_reorgs - Page reorganizations monitor element

The number of page reorganizations executed for a table.

Table 1154. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	DATA OBJECT METRICS EXTENDED

Table 1155. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

For snapshot monitoring, this counter can be reset.

Table 1156. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage

Although a page might have enough space, the page could become fragmented in the following situations:

- When a new row is inserted
- When an existing row is updated, and the update results in an increased record size

A page might require reorganization when it becomes fragmented. Reorganization moves all fragmented space to a contiguous area, where the new record can be written. Such a page reorganization (page reorg) might require thousands of instructions. It also generates a log record of the operation.

Too many page reorganizations can result in less than optimal insert performance. You can use the REORG TABLE utility to reorganize a table and eliminate fragmentation. You can also use the APPEND parameter for the ALTER TABLE statement to indicate that all inserts are appended at the end of a table to avoid page reorganizations.

In situations where updates to rows causes the row length to increase, the page may have enough space to accommodate the new row, but a page reorg may be required to defragment that space. If the page does not have enough space for the new larger row, an overflow record is created causing *overflow_accesses* during reads. You can avoid both situations by using fixed length columns instead of varying length columns.

page_reclaims_x - Page reclaims exclusive access monitor element

The number of times a page related to the object was reclaimed by another member in the DB2 pureScale instance before its planned release, where the member that reclaimed the page required exclusive access.

Table 1157. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

Page reclaims related to internally maintained object space maps are counted separately.

page_reclaims_s - Page reclaims shared access monitor element

The number of times a page related to the object was reclaimed by another member in the DB2 pureScale instance before its planned release, where the member that reclaimed the page required shared access.

Table 1158. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

Page reclaims related to internally maintained object space maps are counted separately.

page_reclaims_initiated_x - Page reclaims initiated exclusive access monitor element

The number of times a page accessed in exclusive mode caused the page to be reclaimed from another member. Page reclaims related to internally maintained object space maps are counted separately.

Table 1159. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

page_reclaims_initiated_s - Page reclaims initiated shared access monitor element

The number of times a page accessed in shared mode caused the page to be reclaimed from another member. Page reclaims related to internally maintained object space maps are counted separately.

Table 1160. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

pages_from_block_ios - Total number of pages read by block I/O monitor element

The total number of pages read by block I/O into the block area of the buffer pool.

Table 1161. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1162. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Buffer Pool

Usage

If block-based buffer pool is enabled, this element reports the total number of pages read by block I/O. Otherwise, this element returns 0.

To calculate the average number of pages sequentially prefetched per block-based I/O, divide the value of the **pages_from_block_ios** monitor element by the value of the **block_ios** monitor element. If this value is much less than the BLOCKSIZE option you have defined for the block-based buffer pool in the CREATE BUFFERPOOL or ALTER BUFFERPOOL statement, then block-based I/O is not being used to its full advantage. One possible cause for this is a mismatch between the extent size for the table space being sequentially prefetched and the block size of the block-based buffer pool.

pages_from_vectored_ios - Total number of pages read by vectored I/O monitor element

The total number of pages read by vectored I/O into the page area of the buffer pool.

Table 1163. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1164. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Buffer Pool

pages_merged - Pages merged monitor element

Number of index pages that have been merged.

Table 1165. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

pages_read - Number of pages read monitor element

The number of pages (data, index, and XML) read in from the physical table space containers for regular and large table spaces.

Table 1166. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE

Usage

pages_written - Number of pages written monitor element

The number of pages (data, index, and XML) physically written to the table space container.

Table 1167. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE

Usage

parent_activity_id - Parent activity ID monitor element

The unique ID of the activity's parent activity within the parent activity's unit of work. If there is no parent activity, the value of this monitor element is 0.

Table 1168. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 1169. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this element along with the **parent_uow_id** element and **app1_id** element to uniquely identify the parent activity of the activity described in this activity record.

parent_uow_id - Parent unit of work ID monitor element

The unique unit of work identifier within an application handle. The ID of the unit of work in which the activity's parent activity originates. If there is no parent activity, the value is 0.

Table 1170. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 1171. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this element along with the **parent_activity_id** element and **appl_id** element to uniquely identify the parent activity of the activity described in this activity record.

partial_record - Partial Record monitor element

Indicates that an event monitor record is only a partial record.

Table 1172. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	-
Tables	event_table	-
Tablespaces	event_tablespace	-
Bufferpools	event_bufferpool	-
Connection	event_conn	-
Statements	event_stmt	-
Statements	event_subsection	-
Transactions	event_xact	-
Activities	event_activity	-

Usage

Most event monitors do not output their results until database deactivation. You can use the FLUSH EVENT MONITOR <monitorName> statement to force monitor values to the event monitor output writer. This allows you to force event monitor

records to the writer without needing to stop and restart the event monitor. This element indicates whether an event monitor record was the result of flush operation and so is a partial record.

Flushing an event monitor does not cause its values to be reset. This means that a complete event monitor record is still generated when the event monitor is triggered.

At the event_activity logical data grouping, the possible values of **partial_record** monitor element are:

- 0 The activity record was generated normally at the end of activity.
- 1 The activity record was generated as a result of calling the WLM_CAPTURE_ACTIVITY_IN_PROGRESS stored procedure.
- 2 Information is missing for this activity because not enough storage was available to create the records. Information may be missing from the event_activity, event_activystmt, or event_activityvals records.

participant_no - Participant within Deadlock

A sequence number uniquely identifying this participant within this deadlock.

Element identifier

participant_no

Element type

information

Table 1173. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage Use this in your monitoring application to correlate deadlock connection event records with deadlock event records.

participant_no_holding_lk - Participant Holding a Lock on the Object Required by Application

The participant number of the application that is holding a lock on the object that this application is waiting to obtain.

Element identifier

participant_no_holding_lk

Element type

information

Table 1174. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage This element can help you determine which applications are in contention for resources.

participant_type - Participant type monitor element

The type of lock participant which can be either Requestor or Owner.

Table 1175. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

partition_key - Partitioning key monitor element

The partitioning key for the event monitor tables. This value is chosen so that each event monitor process inserts data into the database partition on which the process is running; that is, insert operations are performed locally on the database partition where the event monitor process is running.

Table 1176. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Threshold Violation	event_thresholdviolations	
Threshold Violation	control	
Statistics	event_qstats	
Statistics	event_scstats	
Statistics	event_histogrambin	
Statistics	event_wcstats	
Statistics	event_wlstats	
Statistics	control	
Locking	lock	
Locking	lock_participants	
Locking	lock_participant_activities	
Locking	lock_activity_values	
Locking	control	
Package Cache	pkgcache_metrics	
Package Cache	pkgcache_stmt_args	
Package Cache	control	
Unit of Work	uow	
Unit of Work	uow_metrics	
Unit of Work	uow_package_list	
Unit of Work	uow_executable_list	
Unit of Work	control	
Activities	event_activity	
Activities	event_activitystmt	
Activities	event_activityvals	
Activities	event_activitymetrics	
Activities	control	

Table 1176. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary dbdbmcfg ddlstmexec evmonstart regvar txncompletion utillocation utilphase utilstart utilstop	Always collected

partition_number - Partition Number

This element is only used in the target SQL tables by write-to-table event monitors in a partitioned database environment or DB2 pureScale environment. This value indicates the number of the member where event monitor data is inserted.

Table 1177. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB_MEMBERS table function	ACTIVITY METRICS BASE

Table 1178. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
-	-	Always collected

passthru_time - Pass-Through Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to PASSTHRU statements from all applications or a single application running on this federated server instance since the start of the federated server instance or the last reset of the database monitor counters.

The monitor stores the most recent of the values. The response time is measured as the difference between the time the federated server submits a PASSTHRU statement to the data source, and the time it takes the data source to respond, indicating that the statement has been processed.

Table 1179. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine how much actual time is spent at this data source processing statements in pass-through mode.

passthru - Pass-Through

This element contains a count of the total number of SQL statements that the federated server has passed through directly to this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

Table 1180. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine what percentage of your SQL statements can be handled natively by the federated server, and what percentage requires pass-through mode. If this value is high, you should determine the cause and investigate ways to better use the native support.

past_activities_wrapped - Past activities list wrapped monitor element

Indicates whether the activities list has wrapped. The default limit on the number of past activities to be kept by any one application is 250. This default can be overridden using the *DB2_MAX_INACT_STMTS* registry variable.

Users may want to choose a different value for the limit to increase or reduce the amount of system monitor heap used for inactive statement information.

Table 1181. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

phase_start_event_id - Phase start event ID

The *EVENT_ID* of corresponding *UTILPHASESTART*.

Table 1182. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILPHASE	Always collected

Usage

For the change history event monitor:

- If the event is the stopping of a utility phase or processing stage (*UTILPHASESTOP*), this is the *EVENT_ID* of the corresponding start of the utility phase (*UTILPHASESTART*), otherwise -1.

Use with the PHASE_START_EVENT_TIMESTAMP and member elements to associate the phase stop record with the corresponding start record.

phase_start_event_timestamp - Phase start event timestamp

Time of the corresponding UTILPHASESTART

Table 1183. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILPHASE	Always collected

Usage

For the change history event monitor:

- If the event is the stopping of a utility phase or processing stage (UTILPHASESTOP), this is the time of the corresponding start of the utility phase (UTILPHASESTART), otherwise empty.

Use with the PHASE_START_EVENT_ID and member elements to associate the phase stop record with the corresponding start record.

pipedsorts_accepted - Piped Sorts Accepted

The number of piped sorts that have been accepted.

Table 1184. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

For snapshot monitoring, this counter can be reset.

Usage Each active sort on the system allocates memory, which may result in sorting taking up too much of the available system memory.

When the number of accepted piped sorts is low compared to the number requested, you can improve sort performance by adjusting one or both of the following configuration parameters:

- sortheap
- sheapthres

If piped sorts are being rejected, you might consider decreasing your sort heap or increasing your sort heap threshold. You should be aware of the possible implications of either of these options. If you increase the sort heap threshold, then there is the possibility that more memory will remain allocated for sorting. This could cause the paging of memory to disk. If you decrease the sort heap, you might require an extra merge phase that could slow down the sort.

pipedsortsrequested - Piped Sorts Requested

The number of piped sorts that have been requested.

Table 1185. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

For snapshot monitoring, this counter can be reset.

Usage Each active sort on the system allocates memory, which may result in sorting taking up too much of the available system memory.

The sort list heap (*sortheap*) and sort heap threshold (*sheapthres*) configuration parameters help to control the amount of memory used for sort operations. These parameters are also used to determine whether a sort will be piped.

Since piped sorts may reduce disk I/O, allowing more piped sorts can improve the performance of sort operations and possibly the performance of the overall system. A piped sort is not be accepted if the sort heap threshold will be exceeded when the sort heap is allocated for the sort. See *pipedsortsaccepted* for more information if you are experiencing piped sort rejections.

The SQL EXPLAIN output will show whether the optimizer requests a piped sort.

pkgcacheinserts - Package cache inserts monitor element

The total number of times that a requested section was not available for use and had to be loaded into the package cache. This count includes any implicit prepares performed by the system.

Table 1186. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 1186. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1187. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1188. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

In conjunction with the **pkg_cache_lookups** monitor element, use this monitor element to calculate the package cache hit ratio using the following formula:

$$1 - (\text{Package Cache Inserts} / \text{Package Cache Lookups})$$

pkg_cache_lookups - Package cache lookups monitor element

The package cache lookups monitor element counts the number of times that an application looked for a section or package in the package cache. At a database level, it indicates the overall number of references since the database was started, or monitor data was reset.

This counter includes the cases where the section is already loaded in the cache and when the section has to be loaded into the cache. In a concentrator environment where agents are being associated with different applications, additional package cache lookups may be required as a result of a new agent not having the required section or package available in local storage.

Table 1189. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1190. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 1190. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1191. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

To calculate the package cache hit ratio use the following formula:

$$1 - (\text{Package Cache Inserts} / \text{Package Cache Lookups})$$

The package cache hit ratio tells you whether or not the package cache is being used effectively. If the hit ratio is high (more than 0.8), the cache is performing well. A smaller hit ratio may indicate that the package cache should be increased.

You will need to experiment with the size of the package cache to find the optimal number for the **pckcachesz** configuration parameter. For example, you might be able to use a smaller package cache size if there is no increase in the **pkg_cache_inserts** element when you decrease the size of the cache. Decreasing the package cache size frees up system resources for other work. It is also possible that you could improve overall system performance by increasing the size of the package cache if by doing so, you decrease the number of **pkg_cache_inserts**. This experimentation is best done under full workload conditions.

You can use this element with **ddl_sql_stmts** to determine whether or not the execution of DDL statements is impacting the performance of the package cache. Sections for dynamic SQL statements can become invalid when DDL statements are executed. Invalid sections are implicitly prepared by the system when next used. The execution of a DDL statement could invalidate a number of sections and the resulting additional processing time required when preparing those sections could significantly impact performance. In this case, the package cache hit ratio reflects the implicit recompilation of invalid sections. It does not reflect the insertion of new sections into the cache, so increasing the size of the package cache will not improve overall performance. You might find it less confusing to tune the cache for an application on its own before working in the full environment.

It is necessary to determine the role that DDL statements are playing in the value of the package cache hit ratio before deciding on what action to take. If DDL statements rarely occur, then cache performance may be improved by increasing its

size. If DDL statements are frequent, then improvements may require that you limit the use of DDL statements (possibly to specific time periods).

The **static_sql_stmts** and **dynamic_sql_stmts** counts can be used to help provide information about the quantity and type of sections being cached.

Note: You may want to use this information at the database level to calculate the average package cache hit ratio all each applications. You should look at this information at an application level to find out the exact package cache hit ratio for a given application. It may not be worthwhile to increase the size of the package cache in order to satisfy the cache requirements of an application that only executes infrequently.

pkg_cache_num_overflows - Package Cache Overflows

The number of times that the package cache overflowed the bounds of its allocated memory.

Table 1192. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

For snapshot monitoring, this counter can be reset.

Table 1193. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Use this element with the **pkg_cache_size_top** monitor element to determine whether the size of the package cache needs to be increased to avoid overflowing.

pkg_cache_size_top - Package cache high watermark

The largest size reached by the package cache.

Note: The **pkg_cache_size_top** monitor element is deprecated starting with DB2 Version 9.5. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1194. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 1195. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

If the package cache overflowed, then this element contains the largest size reached by the package cache during the overflow.

Check the **pkg_cache_num_overflows** monitor element to determine if such a condition occurred.

You can determine the minimum size of the package cache required by your workload by:

maximum package cache size / 4096

Rounding the result up to a whole number, indicates the minimum number of 4K pages required by the package cache to avoid overflow.

pool_async_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found by asynchronous EDUs in a local buffer pool monitor element monitor element

The number of group buffer pool (GBP) independent data pages found in a local buffer pool by asynchronous EDUs.

Table 1196. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1197. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_async_data_gbp_invalid_pages - Asynchronous group buffer pool invalid data pages monitor element

The number of times a data page was attempted to be read from the group buffer pool by a prefetcher because the page was invalid in the local buffer pool.

Table 1198. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_gbp_l_reads - Asynchronous group buffer pool data logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 1199. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_gbp_p_reads - Asynchronous group buffer pool data physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 1200. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_lbp_pages_found - Asynchronous local buffer pool data pages found monitor element

The number of times a data page was present in the local buffer pool when a prefetcher attempted to access it.

Table 1201. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_read_reqs - Buffer pool asynchronous read requests monitor element

The number of asynchronous read requests by the prefetcher to the operating system. These requests are typically large block I/Os of multiple pages.

Table 1202. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1203. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1204. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

To calculate the average number of data pages in each read request, use the following formula:

$$\text{pool_async_data_reads} / \text{pool_async_data_read_reqs}$$

This average can help you determine the average read I/O size used by the prefetcher. This data can also be helpful in understanding the large block I/O requirements of the measured workload.

The maximum size of a prefetcher read I/O is the value specified on the EXTENTSIZE option of the CREATE TABLESPACE statement for the table space involved, but it can be smaller under some circumstances:

- when some pages of the extent are already in the buffer pool
- when exceeding operating system capabilities
- when the EXTENTSIZE option value is very large, such that doing a large I/O would be detrimental to overall performance

pool_async_data_reads - Buffer pool asynchronous data reads monitor element

Indicates the number of data pages read in from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces.

Table 1205. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1206. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1207. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

You can use this element with **pool_data_p_reads** to calculate the number of physical reads that were performed synchronously (that is, physical data page reads that were performed by database manager agents). Use the following formula:

$$1 - ((\text{pool_data_p_reads} + \text{pool_index_p_reads}) - (\text{pool_async_data_reads} + \text{pool_async_index_reads})) / (\text{pool_data_l_reads} + \text{pool_index_l_reads})$$

By comparing the ratio of asynchronous to synchronous reads, you can gain insight into how well the prefetchers are working. This element can be helpful when you are tuning the **num_ioservers** configuration parameter.

Asynchronous reads are performed by database manager prefetchers.

pool_async_data_writes - Buffer pool asynchronous data writes monitor element

The number of times a buffer pool data page was physically written to disk by either an asynchronous page cleaner, or a prefetcher. A prefetcher may have written dirty pages to disk to make space for the pages being prefetched.

Table 1208. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1209. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1210. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage You can use this element with the **pool_data_writes** monitor element to calculate the number of physical write requests that were performed synchronously (that is, physical data page writes that were performed by database manager agents). Use the following formula:

$$\text{pool_data_writes} - \text{pool_async_data_writes}$$

By comparing the ratio of asynchronous to synchronous writes, you can gain insight into how well the buffer pool page cleaners are performing. This ratio can be helpful when you are tuning the `num_iocleaners` configuration parameter.

pool_async_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found by asynchronous EDUs in a local buffer pool monitor element monitor element

The number of group buffer pool (GBP) independent index pages found in a local buffer pool by asynchronous EDUs.

Table 1211. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1212. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_async_index_gbp_invalid_pages - Asynchronous group buffer pool invalid index pages monitor element

The number of times an index page was attempted to be read from the group buffer pool by a prefetcher because the page was invalid in the local buffer pool.

Table 1213. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_gbp_l_reads - Asynchronous group buffer pool index logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 1214. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_gbp_p_reads - Asynchronous group buffer pool index physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 1215. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_lbp_pages_found - Asynchronous local buffer pool index pages found monitor element

The number of times an index page was present in the local buffer pool when a prefetcher attempted to access it.

Table 1216. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_read_reqs - Buffer pool asynchronous index read requests monitor element

The number of asynchronous read requests for index pages.

Table 1217. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1218. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1219. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage To calculate the number of index pages read per asynchronous request, use the following formula:

$$\text{pool_async_index_reads} / \text{pool_async_index_read_reqs}$$

This average can help you determine the amount of asynchronous I/O done for index pages in each interaction with the prefetcher.

pool_async_index_reads - Buffer pool asynchronous index reads monitor element

Indicates the number of index pages read in from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces.

Table 1220. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1221. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1222. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

You can use this element with the **pool_index_p_reads** monitor element to calculate the number of physical reads that were performed synchronously (that is, physical index page reads that were performed by database manager agents). Use the following formula:

$$1 - ((\text{pool_data_p_reads} + \text{pool_index_p_reads}) - (\text{pool_async_data_reads} + \text{pool_async_index_reads})) / (\text{pool_data_l_reads} + \text{pool_index_l_reads})$$

By comparing the ratio of asynchronous to synchronous reads, you can gain insight into how well the prefetchers are working. This element can be helpful when you are tuning the **num_ioservers** configuration parameter.

Asynchronous reads are performed by database manager prefetchers.

pool_async_index_writes - Buffer pool asynchronous index writes monitor element

The number of times a buffer pool index page was physically written to disk by either an asynchronous page cleaner, or a prefetcher. A prefetcher may have written dirty pages to disk to make space for the pages being prefetched.

Table 1223. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1224. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1225. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

You can use this element with the **pool_index_writes** monitor element to calculate the number of physical index write requests that were performed synchronously (that is, physical index page writes that were performed by database manager agents). Use the following formula:

$$\text{pool_index_writes} - \text{pool_async_index_writes}$$

By comparing the ratio of asynchronous to synchronous writes, you can gain insight into how well the buffer pool page cleaners are performing. This ratio can be helpful when you are tuning the **num_iocleaners** configuration parameter.

pool_async_read_time - Buffer Pool Asynchronous Read Time

Indicates the total amount of time spent reading in data and index pages from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces. This value is given in milliseconds.

Element identifier

pool_async_read_time

Element type

counter

Table 1226. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1227. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1228. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage You can use this element to calculate the elapsed time for synchronous reading, using the following formula:

$$\text{pool_read_time} - \text{pool_async_read_time}$$

You can also use this element to calculate the average asynchronous read time using the following formula:

$$\text{pool_async_read_time} / \text{pool_async_data_reads}$$

These calculations can be used to understand the I/O work being performed.

pool_async_write_time - Buffer pool asynchronous write time monitor element

The total elapsed time spent writing data or index pages from the buffer pool to disk by database manager page cleaners. This value is reported in milliseconds.

Table 1229. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1230. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool

Table 1230. Snapshot Monitoring Information (continued)

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1231. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

To calculate the elapsed time spent writing pages synchronously, use the following formula:

$$\text{pool_write_time} - \text{pool_async_write_time}$$

You can also use this element to calculate the average asynchronous write time using the following formula:

$$\frac{\text{pool_async_write_time}}{(\text{pool_async_data_writes} + \text{pool_async_index_writes})}$$

These calculations can be used to understand the I/O work being performed.

pool_async_xda_gbp_indep_pages_found_in_lbp - Group buffer pool independent XML storage object(XDA) pages found by asynchronous EDUs in a local buffer pool monitor element monitor element

The number of group buffer pool (GBP) independent XML storage object (XDA) pages found in a local buffer pool by asynchronous EDUs.

Table 1232. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1233. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_async_xda_gbp_invalid_pages - Asynchronous group buffer pool invalid XDA data pages monitor element

The number of times a request for a data page for an XML storage object (XDA) was made from the group buffer pool by a prefetcher due to the page being marked invalid in the local buffer pool.

Table 1234. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}}{\text{pool_async_xda_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_gbp_l_reads - Group buffer pool XDA data asynchronous logical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 1235. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}}{\text{pool_async_xda_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_gbp_p_reads - Group buffer pool XDA data asynchronous physical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 1236. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads} \right) / \text{pool_async_xda_gbp_l_reads}$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_lbp_pages_found - Asynchronous local buffer pool XDA data pages found monitor element

The number of times a data page for an XML storage object (XDA) was requested by a prefetcher from and found in the local buffer pool.

Table 1237. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads} \right) / \text{pool_async_xda_gbp_l_reads}$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_read_reqs - Buffer pool asynchronous XDA read requests monitor element

The number of asynchronous read requests for XML storage object (XDA) data.

Table 1238. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1239. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1240. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage To calculate the average number of XML storage object data pages read per asynchronous request, use the following formula:

$$\text{pool_async_xda_reads} / \text{pool_async_xda_read_reqs}$$

This average can help you determine the amount of asynchronous I/O done in each interaction with the prefetcher.

pool_async_xda_reads - Buffer pool asynchronous XDA data reads monitor element

Indicates the number of XML storage object (XDA) data pages read in from the table space containers (physical) by asynchronous engine dispatchable units (EDUs) for all types of table spaces.

Table 1241. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1242. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1243. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage

Use the **pool_async_xda_reads** and **pool_xda_p_reads** monitor elements to calculate the number of physical reads that were performed synchronously on XML storage object data pages (that is, physical data page reads that were performed by database manager agents on XML data). Use the following formula:

$$\text{pool_xda_p_reads} - \text{pool_async_xda_reads}$$

By comparing the ratio of asynchronous to synchronous reads, you can gain insight into how well the prefetchers are working. This element can be helpful when you are tuning the **num_ioservers** configuration parameter.

Asynchronous reads are performed by database manager prefetchers.

pool_async_xda_writes - Buffer pool asynchronous XDA data writes monitor element

The number of times a buffer pool data page for an XML storage object (XDA) was physically written to disk by either an asynchronous page cleaner, or a prefetcher. A prefetcher may have written dirty pages to disk to make space for the pages being prefetched.

Table 1244. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1245. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1246. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected

Usage You can use this element with the **pool_xda_writes** monitor element to calculate the number of physical write requests that were performed synchronously on XML storage object data pages (that is, physical data page writes that were performed by database manager agents on XML data). Use the following formula:

$$\text{pool_xda_writes} - \text{pool_async_xda_writes}$$

By comparing the ratio of asynchronous to synchronous writes, you can gain insight into how well the buffer pool page cleaners are performing. This ratio can be helpful when you are tuning the **num_iocleaners** configuration parameter.

pool_config_size - Configured Size of Memory Pool

The internally configured size of a memory pool in DB2 database system. The value is given in bytes.

Table 1247. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	memory_pool	Basic
Database	memory_pool	Basic
Application	memory_pool	Basic

Table 1248. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbmemuse	Always collected
Connection	event_connmemuse	Always collected

Usage To track system memory usage, use this value in conjunction with **pool_cur_size**, **pool_id**, and **pool_watermark**.

To see if a memory pool is nearly full, compare **pool_config_size** to **pool_cur_size**. For example, assume that the utility heap is too small. You can diagnose this specific problem by taking snapshots at regular intervals, and looking in the utility heap section of the snapshot output. If required, the **pool_cur_size** might be allowed to exceed the **pool_config_size** to prevent an out of memory failure. If this occurs very infrequently, no further action is likely required. However if **pool_cur_size** is consistently close to or larger than **pool_config_size**, you might consider increasing the size of the utility heap.

pool_cur_size - Current Size of Memory Pool

The current size of a memory pool. The value is given in bytes.

Table 1249. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	memory_pool	Basic
Database	memory_pool	Basic
Application	memory_pool	Basic

Table 1250. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbmemuse	Always collected
Connection	event_connmemuse	Always collected

Usage To track system memory usage, use this value in conjunction with *pool_config_size*, *pool_id*, and *pool_watermark*.

To see if a memory pool is nearly full, compare *pool_config_size* to *pool_cur_size*. For example, assume that the utility heap is too small. You can diagnose this specific problem by taking snapshots at regular intervals, and looking in the utility heap section of the snapshot output. If the value of *pool_cur_size* is consistently close to *pool_config_size*, you may want to consider increasing the size of the utility heap.

pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element

The number of group buffer pool (GBP) independent data pages found in a local buffer pool (LBP) by an agent.

Table 1251. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1251. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1252. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element

The number of times a data page was invalid in the local buffer pool and was read from the group buffer pool instead. Outside of a DB2 pureScale environment, this value is null.

Table 1253. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1254. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was attempted to be read from the group buffer pool because the page was either invalid or not present in the Local Buffer Pool (LBP).

Table 1255. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1255. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1256. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was read into the local buffer pool from disk because it was not found in the GBP.

Table 1257. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1257. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1258. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_lbp_pages_found - Local buffer pool found data pages monitor element

The number of times a data page was present in the local buffer pool.

Table 1259. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1260. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_l_reads - Buffer pool data logical reads monitor element

The number of data pages which have been requested from the buffer pool (logical) for regular and large table spaces.

Table 1261. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1261. Table Function Monitoring Information (continued)

Table Function	Monitor Element	Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS	BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected	
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected	
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS	BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS	BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS	BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS	BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE

Table 1262. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1263. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE

Table 1263. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This count includes accesses to data that is:

- Already in the buffer pool when the database manager needs to process the page.
- Read into the buffer pool before the database manager can process the page.

You can use the **pool_data_l_reads** and **pool_data_p_reads** monitor elements to calculate the data page hit ratios. For example, the following formula returns the data page hit ratios in a DB2 environment without the IBM DB2 pureScale Feature:

$$\frac{(\text{pool_data_lbp_pages_found} - \text{pool_async_data_lbp_pages_found} - \text{pool_temp_data_l_reads})}{(\text{pool_data_l_reads})} \times 100$$

For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

Increasing buffer pool size will generally improve the hit ratio, but you will reach a point of diminishing return. Ideally, if you could allocate a buffer pool large enough to store your entire database, then once the system is up and running you would get a hit ratio of 100%. However, this is unrealistic in most cases. The significance of the hit ratio really depends on the size of your data, and the way it is accessed. A very large database where data is accessed evenly would have a poor hit ratio. There is little you can do with very large tables.

To improve hit ratios for smaller, frequently accessed tables and indexes, assign them to individual buffer pools.

pool_data_p_reads - Buffer pool data physical reads monitor element

Indicates the number of data pages read in from the table space containers (physical) for regular and large table spaces.

Table 1264. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1265. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1266. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element with the **pool_data_l_reads** and **pool_async_data_reads** monitor elements to calculate the number of physical reads that were performed synchronously (that is, physical data page reads that were performed by database manager agents). Use the following formula:

$$1 - ((\text{pool_data_p_reads} + \text{pool_index_p_reads}) - (\text{pool_async_data_reads} + \text{pool_async_index_reads})) / (\text{pool_data_l_reads} + \text{pool_index_l_reads})$$

By comparing the ratio of asynchronous to synchronous reads, you can gain insight into how well the prefetchers are working. This information can be helpful when you are tuning the **num_ioservers** configuration parameter.

pool_data_writes - Buffer pool data writes monitor element

The number of times a buffer pool data page was physically written to disk.

Table 1267. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1268. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1269. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

If a buffer pool data page is written to disk for a high percentage of the value of the **pool_data_p_reads** monitor element, you may be able to improve performance by increasing the number of buffer pool pages available for the database.

A buffer pool data page is written to disk for the following reasons:

- To free a page in the buffer pool so another page can be read
- To flush the buffer pool

The system does not always write a page to make room for a new one. If the page has not been updated, it can simply be replaced. This replacement is not counted for this element.

The data page can be written by an asynchronous page-cleaner agent before the buffer pool space is required, as reported by the **pool_async_data_writes** monitor element. These asynchronous page writes are included in the value of this element in addition to synchronous page writes.

When calculating this percentage, disregard the number of physical reads required to initially fill the buffer pool. To determine the number of pages written:

1. Run your application (to load the buffer).
2. Note the value of this element.

3. Run your application again.
4. Subtract the value recorded in step 2 from the new value of this element.

In order to prevent the buffer pool from being deallocated between the runnings of your application, you should do one of the following:

- Activate the database with the **ACTIVATE DATABASE** command.
- Have an idle application connected to the database.

If all applications are updating the database, increasing the size of the buffer pool may not have much impact on performance since most of the buffer pool pages contain updated data, which must be written to disk. However, if the updated pages can be used by other units of work before being written out, the buffer pool can save a write and a read, which will improve your performance.

pool_drty_pg_steal_clns - Buffer pool victim page cleaners triggered monitor element

The number of times a page cleaner was invoked because a synchronous write was needed during the victim buffer replacement for the database.

Table 1270. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE

Table 1271. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1272. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Using the following formula, you may calculate what percentage of all cleaner invocations are represented by this element:

$$\frac{\text{pool_drty_pg_steal_clns}}{(\text{pool_drty_pg_steal_clns} + \text{pool_drty_pg_thrsh_clns} + \text{pool_lsn_gap_clns})}$$

If this ratio is low, it may indicate that you have defined too many page cleaners. If your **chnpggs_thresh** configuration parameter is set too low, you may be writing out pages that you will dirty later. Aggressive cleaning defeats one purpose of the buffer pool, that is to defer writing to the last possible moment.

If this ratio is high, it may indicate that you have not defined enough page cleaners. Not having enough page cleaners increases recovery time after failures.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is OFF:

- The **pool_drty_pg_steal_clns** monitor element is inserted into the monitor stream.
- The **pool_drty_pg_steal_clns** monitor element counts the number of times a page cleaner was invoked because a synchronous write was needed during the victim buffer replacement for the database.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is ON:

- The **pool_drty_pg_steal_clns** monitor element inserts 0 into the monitor stream.
- There is no explicit triggering of the page cleaners when a synchronous write is needed during victim buffer replacement. To determine whether or not the right number of page cleaners is configured for the database or for specific buffer pools, refer to the **pool_no_victim_buffer** monitor element.

Note: Although dirty pages are written out to disk, the pages are not removed from the buffer pool right away, unless the space is needed to read in new pages.

pool_drty_pg_thrsh_clns - Buffer pool threshold cleaners triggered monitor element

The number of times a page cleaner was invoked because a buffer pool had reached the dirty page threshold criterion for the database.

Table 1273. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE

Table 1274. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1275. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage The threshold is set by the **chnpggs_thresh** configuration parameter. It is a percentage applied to the buffer pool size. When the number of dirty pages in the pool exceeds this value, the cleaners are triggered.

If the **chnpggs_thresh** configuration parameter value is set too low, pages might be written out too early, requiring them to be read back in. If it is set too high, then too many pages may accumulate, requiring users to write out pages synchronously.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is OFF:

- The **pool_drty_pg_thrsh_clns** monitor element is inserted into the monitor stream.

- The **pool_drty_pg_thrsh_clns** monitor element counts the number of times a page cleaner was invoked because a buffer pool had reached the dirty page threshold criterion for the database.

When the DB2_USE_ALTERNATE_PAGE_CLEANSING registry variable is ON:

- The **pool_drty_pg_thrsh_clns** monitor element inserts 0 into the monitor stream.
- Page cleaners are always active, attempting to ensure there are sufficient free buffers for victims available instead of waiting to be triggered by the criterion value.

pool_failed_async_data_reqs - Failed data prefetch requests monitor element

The number of times an attempt to queue a data prefetch request was made but failed. One possible reason is the prefetch queue is full.

Table 1276. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1276. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1277. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async...reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    POOL_FAILED_ASYNC_DATA_REQS +

```

```

    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
+
  (
    POOL_QUEUED_ASYNC_DATA_REQS +
    POOL_QUEUED_ASYNC_INDEX_REQS +
    POOL_QUEUED_ASYNC_XDA_REQS +
    POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
    POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
    POOL_QUEUED_ASYNC_TEMP_XDA_REQS
  )
) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async..._pages** and **pool_queued_async..._reqs** to determine the average prefetch request size.

pool_failed_async_index_reqs - Failed index prefetch requests monitor element

The number of times an attempt to queue an index prefetch request was made but failed. One possible reason is the prefetch queue is full and a request could not be obtained from the free list.

Table 1278. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1278. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1279. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitiymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async..._reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can

fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async..._pages** and **pool_queued_async..._reqs** to determine the average prefetch request size.

pool_failed_async_other_reqs - Failed non-prefetch requests monitor element

The number of times an attempt to queue a non-prefetch request was made but failed. This element is for non-prefetch work done by prefetchers. One possible reason for the failed request is that the prefetch queue is full.

Table 1280. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1280. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1281. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element reports the number of requests for work that is not related to the prefetching dictated by an access plan that could not be added to the prefetch queue. Utilities like the backup utility use the prefetcher mechanism to perform their tasks, but in a way that is different from the way an access plan for an SQL statement does. A request might fail to be added to a prefetch queue because the queue is full.

pool_failed_async_temp_data_reqs - Failed data prefetch requests for temporary table spaces monitor element

The number of times an attempt to queue a data prefetch request for temporary table spaces was made but failed. One possible reason is the prefetch queue is full and a request could not be obtained from the free list.

Table 1282. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1282. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1283. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_sclistats (reported in the metrics document)	REQUEST METRICS BASE

Table 1283. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async..._reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
(
  POOL_FAILED_ASYNC_DATA_REQS +
  POOL_FAILED_ASYNC_INDEX_REQS +
  POOL_FAILED_ASYNC_XDA_REQS +
  POOL_FAILED_ASYNC_TEMP_DATA_REQS +
  POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
  POOL_FAILED_ASYNC_TEMP_XDA_REQS
)
÷
(
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
+
  (
    POOL_QUEUED_ASYNC_DATA_REQS +
    POOL_QUEUED_ASYNC_INDEX_REQS +
    POOL_QUEUED_ASYNC_XDA_REQS +
    POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
    POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
    POOL_QUEUED_ASYNC_TEMP_XDA_REQS
  )
) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async..._pages** and **pool_queued_async..._reqs** to determine the average prefetch request size.

pool_failed_async_temp_index_reqs - Failed index prefetch requests for temporary table spaces monitor element

The number of times an attempt to queue an index prefetch request for temporary table spaces was made but failed. One possible reason is the prefetch queue is full and a request could not be obtained from the free list.

Table 1284. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1284. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1285. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async...reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  )
+
  (
    POOL_QUEUED_ASYNC_DATA_REQS +
    POOL_QUEUED_ASYNC_INDEX_REQS +
  )

```

```

    POOL_QUEUED_ASYNC_XDA_REQS +
    POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
    POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
    POOL_QUEUED_ASYNC_TEMP_XDA_REQS
  )
) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async_..._pages** and **pool_queued_async_..._reqs** to determine the average prefetch request size.

pool_failed_async_temp_xda_reqs - Failed XDA prefetch requests for temporary table spaces monitor element

The number of times an attempt to queue a XML storage object (XDA) data prefetch request for temporary table spaces was made but failed. One possible reason is the prefetch queue is full and a request could not be obtained from the free list.

Table 1286. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 1286. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1287. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async_..._reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

$$1 - \frac{\text{POOL_FAILED_ASYNC_DATA_REQS}}{\text{POOL_FAILED_ASYNC_DATA_REQS} + \dots}$$

```

POOL_FAILED_ASYNC_INDEX_REQS +
POOL_FAILED_ASYNC_XDA_REQS +
POOL_FAILED_ASYNC_TEMP_DATA_REQS +
POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
POOL_FAILED_ASYNC_TEMP_XDA_REQS
)
÷
(
(
POOL_FAILED_ASYNC_DATA_REQS +
POOL_FAILED_ASYNC_INDEX_REQS +
POOL_FAILED_ASYNC_XDA_REQS +
POOL_FAILED_ASYNC_TEMP_DATA_REQS +
POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
POOL_FAILED_ASYNC_TEMP_XDA_REQS
)
+
(
POOL_QUEUED_ASYNC_DATA_REQS +
POOL_QUEUED_ASYNC_INDEX_REQS +
POOL_QUEUED_ASYNC_XDA_REQS +
POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
POOL_QUEUED_ASYNC_TEMP_XDA_REQS
)
) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async_..._pages** and **pool_queued_async_..._reqs** to determine the average prefetch request size.

pool_failed_async_xda_reqs - Failed XDA prefetch requests monitor element

The number of times an attempt to queue a XML storage object (XDA) data prefetch request was made but failed. One possible reason is the prefetch queue is full and a request could not be obtained from the free list.

Table 1288. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1288. Table Function Monitoring Information (continued)

Table Function	Monitor Element	Collection Level
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS	BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS	BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected	
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected	
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS	BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS	BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS	BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS	BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE

Table 1289. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1289. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_failed_async..._reqs** elements tells you how many prefetch requests could not be added to a prefetch queue. Requests can fail to be added to the prefetch queue if the prefetch queue is too small, or if the prefetcher is running too slowly. When requests cannot be added to a prefetch queue, a database agent typically performs disk IO synchronously, which is less efficient than prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) × 100

```

This formula calculates the ratio of successful prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. Requests can fail to be added to the prefetch queue if there are a large number of requests being created, or if the prefetcher is running too slowly due to poor configuration or poor tuning. If the percentage of successful requests is low, this can indicate a bottleneck in the prefetching mechanism. You might need to configure more prefetchers by modifying the value for the configuration parameter **num_ioservers**. The condition of prefetch queues being full can also be caused by agents submitting too many small requests; you can use the related monitor elements **pool_queued_async..._pages** and **pool_queued_async..._reqs** to determine the average prefetch request size.

pool_id - Memory Pool Identifier

The type of memory pool.

Table 1290. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	memory_pool	Basic
Database	memory_pool	Basic
Application	memory_pool	Basic

Table 1291. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbmemuse	-
Connection	event_connmemuse	-

Usage

To track system memory usage, use this value in conjunction with **pool_config_size**, **pool_cur_size**, and **pool_watermark**.

Use **pool_id** to identify the memory pools discussed in the system monitor output. The various memory pool identifiers can be found in `sqlmon.h`. Under normal operating conditions, one or more of each of the following pools can be expected.

API Constant	Description
SQLM_HEAP_APPLICATION	Application Heap
SQLM_HEAP_DATABASE	Database Heap
SQLM_HEAP_LOCK_MGR	Lock Manager Heap
SQLM_HEAP_UTILITY	Backup/Restore/Utility Heap
SQLM_HEAP_STATISTICS	Statistics Heap
SQLM_HEAP_PACKAGE_CACHE	Package Cache Heap
SQLM_HEAP_CAT_CACHE	Catalog Cache Heap
SQLM_HEAP_MONITOR	Database Monitor Heap
SQLM_HEAP_STATEMENT	Statement Heap
SQLM_HEAP_FCMBP	FCMBP Heap
SQLM_HEAP_IMPORT_POOL	Import Pool
SQLM_HEAP_OTHER	Other Memory
SQLM_HEAP_BP	Buffer Pool Heap
SQLM_HEAP_APPL_SHARED	Applications Shared Heap
SQLM_HEAP_SHARED_SORT	Sort Shared Heap

pool_index_gbp_indep_pages _found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element

The number of group buffer pool (GBP) independent index pages found in a local buffer pool (LBP) by an agent.

Table 1292. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1292. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1293. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element

The number of times an index page was attempted to be read from the group bufferpool because the page was invalid in the local buffer pool.

Table 1294. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1294. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1295. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was attempted to be read from the group buffer pool because the page was either invalid or not present in the local buffer pool.

Table 1296. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1297. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements

The number of times a Group Buffer Pool (GBP) dependent index page was read into the local buffer pool from disk because it was not found in the GBP.

Table 1298. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1298. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1299. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_lbp_pages_found - Local buffer pool index pages found monitor element

The number of times an index page was present in the local buffer pool.

Table 1300. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1300. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1301. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_l_reads - Buffer pool index logical reads monitor element

Indicates the number of index pages which have been requested from the buffer pool (logical) for regular and large table spaces.

Table 1302. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1303. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1304. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This count includes accesses to index pages that are:

- Already in the buffer pool when the database manager needs to process the page
- Read into the buffer pool before the database manager can process the page.

In conjunction with **pool_index_p_reads**, and **pool_async_index_reads** you can use **pool_index_l_reads** to calculate the index page hit ratio for the buffer pool. For example, the following formula returns the index page hit ratios in a DB2 environment without the IBM DB2 pureScale Feature

$$\frac{((\text{pool_index_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_temp_index_l_reads}))}{(\text{pool_index_l_reads})} \times 100$$

For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

If the hit ratio is low, increasing the number of buffer pool pages may improve performance.

pool_index_p_reads - Buffer pool index physical reads monitor element

Indicates the number of index pages read in from the table space containers (physical) for regular and large table spaces.

Table 1305. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1305. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1306. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1307. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

In conjunction with the **pool_index_l_reads**, and **pool_async_index_reads** you can use **pool_index_p_reads** to calculate the index page hit ratio for the buffer pool. For example, the following formula returns the index page hit ratios in a DB2 environment without the IBM DB2 pureScale Feature

$$\frac{((\text{pool_index_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_temp_index_l_reads})}{(\text{pool_index_l_reads}) \times 100}$$

For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

pool_index_writes - Buffer pool index writes monitor element

Indicates the number of times a buffer pool index page was physically written to disk.

Table 1308. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, “Monitor element collection levels,” on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1308. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1309. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1310. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Like a data page, a buffer pool index page is written to disk for the following reasons:

- To free a page in the buffer pool so another page can be read
- To flush the buffer pool

The system does not always write a page to make room for a new one. If the page has not been updated, it can simply be replaced. This replacement is not counted for this element.

The index page can be written by an asynchronous page-cleaner agent before the buffer pool space is required. These asynchronous index page writes are included in the value of this element in addition to synchronous index page writes (see the **pool_async_index_writes** monitor element).

If a buffer pool index page is written to disk for a high percentage of the value of the **pool_index_p_reads** monitor element, you may be able to improve performance by increasing the number of buffer pool pages available for the database.

When calculating this percentage, disregard the number of physical reads required to initially fill the buffer pool. To determine the number of pages written:

1. Run your application (to load the buffer).
2. Note the value of this element.
3. Run your application again.
4. Subtract the value recorded in step 2 from the new value of this element.

In order to prevent the buffer pool from being deallocated between the runnings of your application, you should do one of the following:

- Activate the database with the **ACTIVATE DATABASE** command.
- Have an idle application connected to the database.

If all applications are updating the database, increasing the size of the buffer pool may not have much impact on performance, since most of the pages contain updated data which must be written to disk.

pool_lsn_gap_clns - Buffer pool log space cleaners triggered monitor element

The number of times a page cleaner was invoked because the logging space used had reached a predefined criterion for the database.

Table 1311. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE

Table 1312. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1313. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

This element can be used to help evaluate whether you have enough space for logging, and whether you need more log files or larger log files.

The page cleaning criterion is determined by the setting for the **softmax** configuration parameter. Page cleaners are triggered if the oldest page in the buffer pool contains an update described by a log record that is older than the current log position by the criterion value.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is OFF:

- The **pool_1sn_gap_c1ns** monitor element is inserted into the monitor stream.
- Page cleaners are triggered if the oldest page in the buffer pool contains an update described by a log record that is older than the current log position by the criterion value.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is ON:

- The **pool_1sn_gap_c1ns** monitor element inserts 0 into the monitor stream.
- Page cleaners write pages proactively instead of waiting to be triggered by the criterion value.

pool_no_victim_buffer - Buffer pool no victim buffers monitor element

Number of times an agent did not have a preselected victim buffer available.

Table 1314. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE

Table 1315. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Tablespace	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1316. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespace	event_tablespace	Always collected

Usage This element can be used to help evaluate whether you have enough page cleaners for a given buffer pool when using proactive page cleaning.

When the DB2_USE_ALTERNATE_PAGE_CLEANING registry variable is ON, the pool_no_victim_buffer element counts the number of times that an agent did not find a preselected victim buffer available for immediate use, and was forced to search the buffer pool for a suitable victim buffer.

If the value of `pool_no_victim_buffer` element is high relative to the number of logical reads in the buffer pool, then the DB2 database system is having difficulty ensuring that sufficient numbers of good victims are available for use. Increasing the number of page cleaners will increase the ability of DB2 to provide preselected victim buffers.

When the `DB2_USE_ALTERNATE_PAGE_CLEANSING` registry variable is OFF, the `pool_no_victim_buffer` element has no predictive value, and can be safely ignored. In this configuration, the DB2 database system does not attempt to ensure that agents have preselected victim buffers available to them, so most accesses to the buffer pool will require that the agent search the buffer pool to find a victim buffer.

pool_queued_async_data_pages - Data pages prefetch requests monitor element

The number of data pages successfully requested for prefetching.

Table 1317. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1317. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1318. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitiymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\frac{(\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \text{POOL_QUEUED_ASYNC_XDA_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES})}{(\text{POOL_QUEUED_ASYNC_DATA_REQS} + \text{POOL_QUEUED_ASYNC_INDEX_REQS} + \text{POOL_QUEUED_ASYNC_XDA_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS})}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size,

which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated `pool_failed_async...reqs` monitor element

pool_queued_async_data_reqs - Data prefetch requests monitor element

The number of data prefetch requests successfully added to the prefetch queue.

Table 1319. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1319. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1320. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  )
+
  (
    POOL_QUEUED_ASYNC_DATA_REQS +
    POOL_QUEUED_ASYNC_INDEX_REQS +
  )

```

```

    POOL_QUEUED_ASYNC_XDA_REQS +
    POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
    POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
    POOL_QUEUED_ASYNC_TEMP_XDA_REQS
  )
) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more prefetchers by modifying the **num_ioservers** configuration parameter.

pool_queued_async_index_pages - Index pages prefetch requests monitor element

The number of index pages successfully requested for prefetching.

Table 1321. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1321. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1322. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\frac{(\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \text{POOL_QUEUED_ASYNC_XDA_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES})}{(\text{POOL_QUEUED_ASYNC_DATA_REQS} + \text{POOL_QUEUED_ASYNC_INDEX_REQS} + \text{POOL_QUEUED_ASYNC_XDA_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS})}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size, which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to

a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated **pool_failed_async..._reqs** monitor element

pool_queued_async_index_reqs - Index prefetch requests monitor element

The number of index prefetch requests successfully added to the prefetch queue.

Table 1323. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1323. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1324. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  )
+
  (
    POOL_QUEUED_ASYNC_DATA_REQS +
    POOL_QUEUED_ASYNC_INDEX_REQS +

```

```

POOL_QUEUED_ASYNC_XDA_REQS +
POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
POOL_QUEUED_ASYNC_TEMP_XDA_REQS
)
) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more prefetchers by modifying the **num_ioservers** configuration parameter.

pool_queued_async_other_reqs - Other requests handled by prefetchers monitor element

The number of requests for non-prefetch work successfully added to the prefetch queue. This is for other work done by prefetchers.

Table 1325. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1325. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1326. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element reports the number of requests added to the prefetch queue for IO work that is not related to the prefetching dictated by an access plan. Utilities like the backup utility use the prefetcher mechanism to perform their tasks, but in a way that is different from the way an access plan for an SQL statement does.

pool_queued_async_temp_data_pages - Data pages prefetch requests for temporary table spaces monitor element

The number of data pages for temporary table spaces successfully requested for prefetching.

Table 1327. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1328. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\frac{\begin{aligned} &(\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_XDA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES}) \end{aligned}}{\begin{aligned} &(\text{POOL_QUEUED_ASYNC_DATA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_INDEX_REQS} + \\ &\text{POOL_QUEUED_ASYNC_XDA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS}) \end{aligned}}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size, which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated **pool_failed_async..._reqs** monitor element

pool_queued_async_temp_data_reqs - Data prefetch requests for temporary table spaces monitor element

The number of data prefetch requests for temporary table spaces successfully added to the prefetch queue.

Table 1329. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1330. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more

prefetchers by modifying the `num_ioservers` configuration parameter.

pool_queued_async_temp_index_pages - Index pages prefetch requests for temporary table spaces monitor element

The number of index pages for temporary table spaces successfully requested for prefetching.

Table 1331. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1331. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1332. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async_..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\begin{aligned} & (\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_XDA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES}) \\ & \div \\ & (\text{POOL_QUEUED_ASYNC_DATA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_INDEX_REQS} + \\ & \text{POOL_QUEUED_ASYNC_XDA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS}) \end{aligned}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size, which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated **pool_failed_async_..._reqs** monitor element

pool_queued_async_temp_index_reqs - Index prefetch requests for temporary table spaces monitor element

The number of index prefetch requests for temporary table spaces successfully added to the prefetch queue.

Table 1333. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1334. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more

prefetchers by modifying the `num_ioservers` configuration parameter.

pool_queued_async_temp_xda_pages - XDA data pages prefetch requests for temporary table spaces monitor element

The number of XML storage object (XDA) data pages for temporary table spaces successfully requested for prefetching.

Table 1335. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1335. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1336. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\frac{\begin{aligned} &(\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_XDA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES}) \end{aligned}}{\begin{aligned} &(\text{POOL_QUEUED_ASYNC_DATA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_INDEX_REQS} + \\ &\text{POOL_QUEUED_ASYNC_XDA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \\ &\text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS}) \end{aligned}}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size, which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated **pool_failed_async..._reqs** monitor element

pool_queued_async_temp_xda_reqs - XDA data prefetch requests for temporary table spaces monitor element

The number of XML storage object (XDA) data prefetch requests for temporary table spaces successfully added to the prefetch queue.

Table 1337. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1338. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more

prefetchers by modifying the `num_ioservers` configuration parameter.

pool_queued_async_xda_pages - XDA pages prefetch requests monitor element

The number of XML storage object (XDA) data pages successfully requested for prefetching.

Table 1339. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1339. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1340. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This monitor element, along with the other **pool_queued_async..._pages** elements tells you how many pages of data were retrieved by prefetch requests. You can use this information to determine whether prefetch requests are being performed efficiently on your system. For example, you can calculate the average number of pages per prefetch request using a formula like the one that follows:

$$\begin{aligned} & (\text{POOL_QUEUED_ASYNC_DATA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_INDEX_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_XDA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_DATA_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_INDEX_PAGES} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_XDA_PAGES}) \\ & \div \\ & (\text{POOL_QUEUED_ASYNC_DATA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_INDEX_REQS} + \\ & \text{POOL_QUEUED_ASYNC_XDA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_DATA_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_INDEX_REQS} + \\ & \text{POOL_QUEUED_ASYNC_TEMP_XDA_REQS}) \end{aligned}$$

If the average number of pages per request is low, and there is a significant amount of prefetching on the system, then your system might be performing more IO operations than necessary. In general, request size is based on prefetch size, which should be at least as large as extent size. So a small average request size might indicate that prefetch size is set too low, and that increasing prefetch size to a multiple of extent size may improve performance. Also note that a small average request size may mean that the prefetch queues fill up too quickly, so it is worthwhile to also monitor the associated **pool_failed_async..._reqs** monitor element

pool_queued_async_xda_reqs - XDA prefetch requests monitor element

The number of XML storage object (XDA) data prefetch requests successfully added to the prefetch queue.

Table 1341. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1342. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Usage

This element, along with the other **pool_queued_async*_reqs** elements tells you how many prefetch requests have been added to the prefetch queue. You can use this information to see how often the database manager does prefetching. You can use these elements in conjunction with other prefetcher monitor elements to determine how effectively prefetching is done on your system. For example, you can see what the percentage of requests were successfully added to the prefetch queue using a formula like the one that follows:

```

1 -
  (
    POOL_FAILED_ASYNC_DATA_REQS +
    POOL_FAILED_ASYNC_INDEX_REQS +
    POOL_FAILED_ASYNC_XDA_REQS +
    POOL_FAILED_ASYNC_TEMP_DATA_REQS +
    POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
    POOL_FAILED_ASYNC_TEMP_XDA_REQS
  )
÷
  (
    (
      POOL_FAILED_ASYNC_DATA_REQS +
      POOL_FAILED_ASYNC_INDEX_REQS +
      POOL_FAILED_ASYNC_XDA_REQS +
      POOL_FAILED_ASYNC_TEMP_DATA_REQS +
      POOL_FAILED_ASYNC_TEMP_INDEX_REQS +
      POOL_FAILED_ASYNC_TEMP_XDA_REQS
    )
  +
    (
      POOL_QUEUED_ASYNC_DATA_REQS +
      POOL_QUEUED_ASYNC_INDEX_REQS +
      POOL_QUEUED_ASYNC_XDA_REQS +
      POOL_QUEUED_ASYNC_TEMP_DATA_REQS +
      POOL_QUEUED_ASYNC_TEMP_INDEX_REQS +
      POOL_QUEUED_ASYNC_TEMP_XDA_REQS
    )
  ) * 100

```

This formula calculates the ratio of failed prefetch requests to the total number of requests made. A failed prefetch request is one that could not be added to the prefetch queue. If the percentage is low, you might need to configure more

prefetchers by modifying the `num_ioservers` configuration parameter.

pool_read_time - Total buffer pool physical read time monitor element

Indicates the total amount of time spent reading in data and index pages from the table space containers (physical) for all types of table spaces. This value is given in milliseconds.

Table 1343. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1343. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1344. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1345. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

You can use this element with **pool_data_p_reads** and **pool_index_p_reads** monitor elements to calculate the average page-read time. This average is important since it may indicate the presence of an I/O wait, which in turn may indicate that you should be moving data to a different device.

At the database and table space levels, this element includes the value of the `pool_async_read_time` monitor element.

pool_secondary_id - Memory Pool Secondary Identifier

An additional identifier to help determine the memory pool for which monitor data is returned.

Element identifier

pool_secondary_id

Element type

Information

Table 1346. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	memory_pool	Basic
Database	memory_pool	Basic
Application	memory_pool	Basic

Table 1347. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbmemuse	Always collected
Connection	event_connmemuse	Always collected

Usage Use together with `pool_id` to determine the memory pool for which monitor data is returned. Data for `pool_secondary_id` only appears when necessary. For example, it appears when the `pool_id` indicated is Buffer Pool Heap to determine which buffer pool the monitor data relates to.

When a database is created, it has a default buffer pool, called IBMDEFAULTBP, with a size determined by the platform. This buffer pool has a secondary id of "1". In addition to this buffer pool and any buffer pools that you create, a set of system buffer pools are created by default, each corresponding to a different page size. IDs for these buffer pools can appear in snapshots for `pool_secondary_id`:

- System 32k buffer pool
- System 16k buffer pool
- System 8k buffer pool
- System 4k buffer pool

pool_sync_data_gbp_reads - Synchronous group buffer pool data reads monitor element

On a DB2 pureScale environment, the number of times a data page was expected to be in the bufferpool, but was instead retrieved from the group bufferpool. This value will be 0 for environments outside of a DB2 pureScale environment.

pool_sync_data_reads - Synchronous buffer pool data reads monitor element

The number of times a data page was expected to be in the bufferpool, but was instead read from disk.

pool_sync_index_gbp_reads - Synchronous group buffer pool index reads monitor element

On a DB2 pureScale environment, the number of times an index page was expected to be in the bufferpool, but was instead retrieved from the group bufferpool. This value will be 0 for environments outside of a DB2 pureScale environment.

pool_sync_index_reads - Synchronous buffer pool index reads monitor element

The number of times an index page was expected to be in the bufferpool, but was instead read from disk.

pool_sync_xda_gbp_reads - Synchronous group buffer pool XDA data reads monitor element

On a DB2 pureScale environment, the number of times an XML page was expected to be in the bufferpool, but was instead retrieved from the group bufferpool. This value will be 0 for environments outside of a DB2 pureScale environment.

pool_sync_xda_reads - Synchronous buffer pool XDA data reads monitor element

The number of times an XML page was expected to be in the bufferpool, but was instead read from disk.

pool_temp_data_l_reads - Buffer pool temporary data logical reads monitor element

Indicates the number of data pages which have been requested from the buffer pool (logical) for temporary table spaces.

Table 1348. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1348. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1349. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1350. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

In conjunction with the **pool_temp_data_p_reads** element, you can calculate the data page hit ratio for buffer pools located in temporary table spaces.

For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

pool_temp_data_p_reads - Buffer pool temporary data physical reads monitor element

Indicates the number of data pages read in from the table space containers (physical) for temporary table spaces.

Table 1351. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE

Table 1351. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1352. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1353. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 1353. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespaces	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

The functionality to record buffer pool information at the statement level is supported for API and CLP snapshot requests.

In conjunction with the **pool_temp_data_l_reads** element, you can calculate the data page hit ratio for buffer pools located in temporary table spaces. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583

pool_temp_index_l_reads - Buffer pool temporary index logical reads monitor element

Indicates the number of index pages which have been requested from the buffer pool (logical) for temporary table spaces.

Table 1354. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, “Monitor element collection levels,” on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1354. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1355. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1356. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element, in conjunction with the **pool_temp_index_p_reads** element, to calculate the index page hit ratio for buffer pools located in temporary table spaces. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

pool_temp_index_p_reads - Buffer pool temporary index physical reads monitor element

Indicates the number of index pages read in from the table space containers (physical) for temporary table spaces.

Table 1357. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE

Table 1357. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1358. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1359. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 1359. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this element, in conjunction with the **pool_temp_index_1_reads** element, to calculate the index page hit ratio for buffer pools located in temporary table spaces. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583.

pool_temp_xda_l_reads - Buffer pool temporary XDA data logical reads monitor element

Indicates the number of pages for XML storage object (XDA) data which have been requested from the buffer pool (logical) for temporary table spaces.

Table 1360. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, “Monitor element collection levels,” on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE

Table 1360. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1361. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1362. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 1362. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

You can use the **pool_temp_xda_l_reads** monitor element in conjunction with **pool_temp_xda_p_reads**, **pool_temp_data_l_reads**, and **pool_temp_data_p_reads** monitor elements to calculate the data page hit ratio for buffer pools located in temporary table spaces by using the following formula:

$$1 - ((\text{pool_temp_data_p_reads} + \text{pool_temp_xda_p_reads}) / (\text{pool_temp_data_l_reads} + \text{pool_temp_xda_l_reads}))$$

pool_temp_xda_p_reads - Buffer pool temporary XDA data physical reads monitor element

Indicates the number of pages for XML storage object (XDA) data read in from the table space containers (physical) for temporary table spaces.

Table 1363. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1363. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1364. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1365. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE

Table 1365. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

You can use the **pool_temp_xda_p_reads** monitor element in conjunction with **pool_temp_xda_l_reads**, **pool_temp_data_l_reads**, and **pool_temp_data_p_reads** monitor elements to calculate the data page hit ratio for buffer pools located in temporary table spaces by using the following formula:

$$1 - ((\text{pool_temp_data_p_reads} + \text{pool_temp_xda_p_reads}) / (\text{pool_temp_data_l_reads} + \text{pool_temp_xda_l_reads}))$$

pool_watermark - Memory Pool Watermark

The largest size of a memory pool since its creation. The value is given in bytes.

Element identifier

pool_watermark

Element type

Information

Table 1366. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	memory_pool	Basic
Database	memory_pool	Basic
Application	memory_pool	Basic

Table 1367. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbmemuse	Always collected
Connection	event_connmemuse	Always collected

Usage On continuously running systems, you can use the *pool_watermark* and *pool_config_size* elements together to predict potential memory problems.

For example, take a snapshot at regular intervals (for example, daily), and examine the *pool_watermark* and *pool_config_size* values. If you observe that the value of *pool_watermark* is becoming increasingly close to

pool_config_size (a premature indication of potential future memory-related problems), this may indicate that you should increase the size of the memory pool.

pool_write_time - Total buffer pool physical write time monitor element

Provides the total amount of time spent physically writing data or index pages from the buffer pool to disk. Elapsed time is given in milliseconds.

Table 1368. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1368. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1369. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1370. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element with **pool_data_writes** and **pool_index_writes** monitor elements to calculate the average page-write time. This average is important since it may indicate the presence of an I/O wait, which in turn may indicate that you should be moving data to a different device.

At the database and table space levels, this element includes the value of the **pool_async_write_time** monitor element.

pool_xda_gbp_indep_pages _found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element

The number of group buffer pool (GBP) independent XML storage object (XDA) data pages found in a local buffer pool (LBP) by an agent.

Table 1371. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 1371. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1372. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow_metrics	REQUEST METRICS BASE

pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element

The number of times a request for a data page for an XML storage object (XDA) was made from the group buffer pool due to the page being marked invalid in the local buffer pool.

Table 1373. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1373. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1374. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was attempted to be read from the group buffer pool because the page was either invalid or not present in the local buffer pool.

Table 1375. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 1375. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1376. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(pool_xda_lbp_pages_found - pool_async_xda_lbp_pages_found) / pool_xda_l_reads$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(pool_xda_gbp_l_reads - pool_xda_gbp_p_reads) / pool_xda_gbp_l_reads$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help

you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was read into the local buffer pool from disk because it was not found in the group buffer pool.

Table 1377. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1377. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1378. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_l_reads - Buffer pool XDA data logical reads monitor element

Indicates the number of data pages for XML storage objects (XDAs) which have been requested from the buffer pool (logical) for regular and large table spaces.

Table 1379. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1380. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1381. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	Always collected
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This count includes accesses to data that is:

- Already in the buffer pool when the database manager needs to process the page
- Read into the buffer pool before the database manager can process the page.

Use the **pool_xda_l_reads**, **pool_xda_p_reads**, **pool_data_l_reads**, and **pool_data_p_reads** monitor elements to calculate the data page hit ratio for the buffer pool. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583

For example, the overall buffer pool hit ratio can be calculated as follows:

$$\frac{((\text{pool_data_lbp_pages_found} + \text{pool_index_lbp_pages_found} + \text{pool_xda_lbp_pages_found}) - \text{pool_async_data_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found})}{\text{pool_data_lbp_pages_found} + \text{pool_index_lbp_pages_found} + \text{pool_xda_lbp_pages_found}}$$

$$\frac{\text{pool_data_l_reads} + \text{pool_index_l_reads} + \text{pool_xda_l_reads} + \text{pool_temp_data_l_reads} + \text{pool_temp_xda_l_reads} + \text{pool_temp_index_l_reads}}{\text{pool_temp_xda_l_reads} + \text{pool_temp_index_l_reads}} \times 100$$

This calculation takes into account all of the pages (index and data) that are cached by the buffer pool.

Increasing buffer pool size will generally improve the hit ratio, but you will reach a point of diminishing return. Ideally, if you could allocate a buffer pool large enough to store your entire database, then once the system is up and running you would get a hit ratio of 100%. However, this is unrealistic in most cases. The significance of the hit ratio depends on the size of your data, and the way it is accessed. A very large database where data is accessed evenly would have a poor hit ratio. There is little you can do with very large tables. In such case, you would focus your attention on smaller, frequently accessed tables, and on the indexes.

pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element

The number of times a data page for an XML storage object (XDA) was requested from and found in the local buffer pool.

Table 1382. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 1382. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1383. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(pool_xda_lbp_pages_found - pool_async_xda_lbp_pages_found) / pool_xda_l_reads$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(pool_xda_gbp_l_reads - pool_xda_gbp_p_reads) / pool_xda_gbp_l_reads$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_p_reads - Buffer pool XDA data physical reads monitor element

Indicates the number of data pages for XML storage objects (XDAs) read in from the table space containers (physical) for regular and large table spaces.

Table 1384. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1384. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1385. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool
Application	stmt	Buffer Pool
Dynamic SQL	dynsql	Buffer Pool, Statement

For snapshot monitoring, this counter can be reset.

Table 1386. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Statement	event_stmt	Always collected
Activities	event_activity	Buffer Pool, Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use the **pool_async_xda_reads** and **pool_xda_p_reads** monitor elements to calculate the number of physical reads that were performed synchronously on XML storage object data pages (that is, physical data page reads that were performed by database manager agents on XML data). Use the following formula:

$$\text{pool_xda_p_reads} - \text{pool_async_xda_reads}$$

By comparing the ratio of asynchronous to synchronous reads, you can gain insight into how well the prefetchers are working. This element can be helpful when you are tuning the **num_ioservers** configuration parameter.

Use the **pool_xda_l_reads**, **pool_xda_p_reads**, **pool_data_l_reads**, and **pool_data_p_reads** monitor elements to calculate the data page hit ratio for the buffer pool. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583

pool_xda_writes - Buffer pool XDA data writes monitor element

Indicates the number of times a buffer pool data page for an XML storage object (XDA) was physically written to disk.

Table 1387. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, “Monitor element collection levels,” on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1387. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1388. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 1389. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This monitor element helps you to assess whether performance may be improved by increasing the number of buffer pool pages available for the database. For databases containing XML data, you should consider the ratio of buffer pool page writes to buffer pool page reads both for XML data (using the **pool_xda_writes** and the **pool_xda_p_reads** monitor elements) and for relational data types (using the **pool_data_writes** and the **pool_data_p_reads** monitor elements).

Use the `pool_xda_l_reads`, `pool_xda_p_reads`, `pool_data_l_reads`, and `pool_data_p_reads` monitor elements to calculate the data page hit ratio for the buffer pool. For more information, see “Formulas for calculating buffer pool hit ratios” on page 1583

port_number - Port number monitor element

The TCP/IP port that a member is listening on for client connections.

Table 1390. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB_MEMBERS table function	Always collected
MON_GET_SERVERLIST table function - get member priority details	Always collected

post_shrthreshold_hash_joins - Post threshold hash joins

The total number of hash joins that were throttled back by the sort memory throttling algorithm. A throttled hash join is a hash join that was granted less memory than requested by the sort memory manager.

Table 1391. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	-

For snapshot monitoring, this counter can be reset.

Table 1392. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

A hash join is throttled back when the memory allocation from the shared sort heap is close to the limit set by database configuration parameter `sheapthres_shr`. This throttling will significantly reduce the number of overflows over `sheapthres_shr` limit in a system that is not properly configured. The data reported in this element only reflects hash joins using memory allocated from the shared sort heap.

post_shrthreshold_sorts - Post shared threshold sorts monitor element

The total number of sorts that were throttled back by the sort memory throttling algorithm. A throttled sort is a sort that was granted less memory than requested by the sort memory manager.

Table 1393. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1394. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Sort

For snapshot monitoring, this counter can be reset.

Table 1395. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

A sort is throttled back when the memory allocation for sorts is close to the limit set by database configuration parameter **sheapthres_shr**. This throttling will significantly reduce the number of overflows over **sheapthres_shr** limit in a system that is not properly configured. The data reported in this element only reflects sorts using memory allocated from the shared sort heap.

post_threshold_hash_joins - Hash Join Threshold

The total number of times that a hash join heap request was limited due to concurrent use of shared or private sort heap space.

Element identifier

post_threshold_hash_joins

Element type

counter

Table 1396. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

For snapshot monitoring, this counter can be reset.

Usage If this value is large (greater than 5% of hash_join_overflows), the sort heap threshold should be increased.

post_threshold_olap_funcs - OLAP Function Threshold monitor element

The number of OLAP functions that have requested a sort heap after the sort heap threshold has been exceeded.

Table 1397. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

For snapshot monitoring, this counter can be reset.

Usage

Sorts, hash joins, and OLAP functions are examples of operations which use a sort heap. Under normal conditions, the database manager will allocate sort heap using the value specified by the `sorheap` configuration parameter. If the amount of memory allocated to sort heaps exceeds the sort heap threshold (`sheapthres` configuration parameter), the database manager will allocate subsequent sort heaps using a value less than that specified by the `sorheap` configuration parameter.

OLAP functions which start after the sort heap threshold has been reached may not receive an optimum amount of memory to execute.

To improve sort, hash join, OLAP function performance, and overall system performance, modify the sort heap threshold and sort heap size configuration parameters.

If this element's value is high, increase the sort heap threshold (`sheapthres`).

post_threshold_peas - Partial early aggregation threshold monitor element

The number of times that partial early aggregation operations received less memory than requested due to sort heap threshold being exceeded.

Table 1398. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1398. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 1399. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 1399. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1400. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with the **total_peas** monitor element to determine if partial early aggregation operations are getting sufficient sort heap memory most of the time. If the ratio of the **post_threshold_peas** monitor element to the **total_peas** monitor element is high, your database performance may be sub-optimal. You should consider increasing the sort heap size or the sort heap threshold, or both.

post_threshold_peds - Partial early distincts threshold monitor element

The number of times that partial early distinct operations received less memory than requested due to sort heap threshold being exceeded.

Table 1401. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 1402. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1402. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1403. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with the **total_peds** monitor element to determine if partial early distinct operations are getting sufficient sort heap memory most of the time. If the ratio of the **post_threshold_peds** monitor element to the **total_peds** monitor element is high, your database performance may be sub-optimal. You should consider increasing the sort heap size or the sort heap threshold, or both.

post_threshold_sorts - Post threshold sorts monitor element

The number of sorts that have requested heaps after the sort heap threshold has been exceeded.

Table 1404. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1405. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Sort

For snapshot monitoring, this counter can be reset.

Table 1406. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Under normal conditions, the database manager will allocate sort heap using the value specified by the **sortheap** configuration parameter. If the amount of memory allocated to sort heaps exceeds the sort heap threshold (**sheapthres** configuration parameter), the database manager will allocate sort heap using a value less than that specified by the **sortheap** configuration parameter.

Each active sort on the system allocates memory, which may result in sorting taking up too much of the system memory available. Sorts that start after the sort heap threshold has been reached may not receive an optimum amount of memory to execute, but, as a result, the entire system may benefit. By modifying the sort heap threshold and sort heap size configuration parameters, sort operation performance and overall system performance can be improved. If this element's value is high, you can:

- Increase the sort heap threshold (**sheapthres**) or,
- Adjust applications to use fewer or smaller sorts via SQL query changes.

prefetch_wait_time - Time waited for prefetch monitor element

The time an application spent waiting for an I/O server (prefetcher) to finish loading pages into the buffer pool. The value is given in milliseconds.

Table 1407. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1407. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT _TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1408. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Application	appl	Buffer Pool

Table 1409. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document)	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Database	event_db	Bufferpool
Connection	event_db	Bufferpool

Usage This element can be used to experiment with changing the number of I/O servers, and I/O server sizes.

prefetch_waits - Prefetcher wait count monitor element

The number of times waited for an I/O server (prefetcher) to finish loading pages into the buffer pool.

Table 1410. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1410. Table Function Monitoring Information (continued)

Table Function	Monitor Element	Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS	BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected	
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected	
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS	BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS	BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS	BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS	BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE

Table 1411. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in details_xml document) event_activitymetrics	ACTIVITY METRICS BASE
Package Cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

prep_time - Preparation time monitor element

Time in milliseconds required to prepare an SQL statement (if the activity is an SQL statement; otherwise, the value is 0).

Table 1412. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1413. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected
Package cache	-	COLLECT BASE DATA

Usage

The prep_time monitor element indicates how much time was spent preparing the SQL statement, if this activity was an SQL statement, when the statement was first introduced to the DB2 package cache. This preparation time is not part of the activity lifetime nor does it represent time spent during a specific invocation of the statement if the statement has already been cached in the package cache before that invocation.

prep_time_best - Statement best preparation time monitor element

The shortest amount of time in milliseconds that was required to prepare a specific SQL statement.

Table 1414. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

Usage

Use this value in conjunction with **prep_time_worst** to identify SQL statements that are expensive to compile.

prep_time_worst - Statement worst preparation time monitor element

The longest amount of time in milliseconds that was required to prepare a specific SQL statement.

Table 1415. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

Usage

Use this value in conjunction with **prep_time_best** to identify SQL statements that are expensive to compile.

prev_uow_stop_time - Previous Unit of Work Completion Timestamp

This is the time the unit of work completed.

Element identifier

prev_uow_stop_time

Element type

timestamp

Table 1416. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work, Timestamp
DCS Application	dcs_appl	Unit of Work, Timestamp

Table 1417. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transaction	event_xact	Always collected

Usage You may use this element with *uow_stop_time* to calculate the total elapsed time between COMMIT/ROLLBACK points, and with *uow_start_time* to calculate the time spent in the application between units of work. The time of one of the following actions:

- For applications currently within a unit of work, this is the time that the latest unit of work completed.
- For applications not currently within a unit of work (the application has completed a unit of work, but not yet started a new one), this is the stop time of the last unit of work that completed before the one that just completed. The stop time of the one just completed is indicated *uow_stop_time*.
- For applications within their first unit of work, this is the database connection request completion time.

priority - Priority value monitor element

Describes the relative capacity of a member to handle work. The higher the value, the more work a client should drive to that member.

Table 1418. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_SERVERLIST table function - get member priority details	Always collected

Usage Notes

- This monitor element represents the relative load of a member, also known as the weight. For example, if member A has a priority value of 80 and member B has a priority value of 40, this means that member A should receive double the amount of work that is given to member B.

- This value does not represent a percentage.
- The maximum value of this monitor element is 100.

priv_workspace_num_overflows - Private Workspace Overflows

The number of times that the private workspaces overflowed the bounds of its allocated memory.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1419. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1420. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Use this element with `priv_workspace_size_top` to determine whether the size of the private workspace needs to be increased to avoid overflowing. Overflows of the private workspace may cause performance degradation as well as out of memory errors from the other heaps allocated out of agent private memory.

At the database level, the element reported will be from the same private workspace as that which was reported as having the same Maximum Private Workspace size. At the application level, it is the number of overflows for the workspace of every agent that have serviced the current application.

priv_workspace_section_inserts - Private Workspace Section Inserts

Inserts of SQL sections by an application into the private workspace.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1421. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1422. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage The working copy of executable sections are stored in the private workspace.

This counter indicates when a copy was not available and had to be inserted. At the database level, it is the cumulative total of all inserts for every application across all private workspaces in the database. At the application level, it is the cumulative total of all inserts for all sections in the private workspace for this application.

In a concentrator environment where agents are being associated with different applications, additional private workspace inserts may be required as a result of a new agent not having the required section available in its private workspace.

priv_workspace_section_lookups - Private Workspace Section Lookups

Lookups of SQL sections by an application in its agents' private workspace.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1423. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1424. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Each application has access to the private workspace of the agent working for it.

This counter indicates how many times the private workspace was accessed in order to locate a specific section for an application. At the database level, it is the cumulative total of all lookups for every application across all private workspaces in the database. At the application level, it is the cumulative total of all lookups for all sections in the private workspace for this application.

You can use this element in conjunction with Private Workspace Section Inserts to tune the size of the private workspace. The size of the private workspace is controlled by the `applheapsz` configuration parameter.

priv_workspace_size_top - Maximum Private Workspace Size

The largest size reached by the Private Workspace.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1425. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

Table 1426. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Each agent has a private workspace that the application it is servicing has access to. This element indicates the maximum number of bytes required from a private workspace by any agent servicing it. At the database level, it is the maximum number of bytes required of all the private workspaces for all agents attached to the current database. At the application level, it is the maximum size from among all of the agents' private workspaces that have serviced the current application.

When the private workspace overflows, memory is temporarily borrowed from other entities in agent private memory. This can result in memory shortage errors from these entities or possibly performance degradation. You can reduce the chance of overflow by increasing APPLHEAPSZ.

product_name - Product Name

Details of the version of the DB2 instance that is running.

Table 1427. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

progress_completed_units - Completed Progress Work Units

The number of work units for the current phase which have been completed.

Table 1428. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

The value of this element will typically increase as the utility operates. This element will always be less than or equal to *progress_total_units* (if both elements are defined).

Note:

1. This element might not be included for all utilities.
2. This element is expressed in units displayed by the *progress_work_metric* monitor element.

Usage Use this element to determine the amount of completed work within a phase. By itself, this element can be used to monitor the activity of a running utility. This element should constantly increase as the utility executes. If the *progress_completed_units* fails to increase over a long period of time then the utility might be stalled.

If *progress_total_units* is defined, then this element can be used to calculate the percentage of completed work:

percentage complete = $\text{progress_completed_units} / \text{progress_total_units} * 100$

progress_description - Progress Description

Describes the phase of work.

Table 1429. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

Example values for the load utility include:

- DELETE
- LOAD
- REDO

Usage Use this element to obtain a general description of a phase.

progress_list_attr - Current Progress List Attributes

This element describes how to interpret a list of progress elements.

Table 1430. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress list	Basic

Usage

The value for this element is one of the following constants:

- `SQLM_ELM_PROGRESS_LIST_ATTR_SERIAL` - The elements in the list are to be interpreted as a set of serial phases meaning that completed work must equal the total work for element *n* before the completed work of element *n+1* is first updated. This attribute is used to describe progress of a task which consists of a set of serial phases where a phase must fully complete before the next phase begins.
- `SQLM_ELM_PROGRESS_LIST_ATTR_CONCURRENT` - Any element in the progress list can be updated at any time.

Use this element to determine how the elements of a progress list will be updated.

progress_list_cur_seq_num - Current Progress List Sequence Number

If the utility contains multiple sequential phases, then this element displays the number of the current phase.

Table 1431. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress_list	Basic

Usage Use this element to determine the current phase of a multiphase utility. See “progress_seq_num - Progress Sequence Number.”

progress_seq_num - Progress Sequence Number

Phase number.

Note: The phase number displays only for utilities that consist of multiple phases of execution.

Table 1432. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

Usage Use this element to determine the order of phases within a multiphase utility. The utility will execute phases serially in order of increasing progress sequence numbers. The current phase of a multiphase utility can be found by matching the *progress_seq_num* with the value of *progress_list_current_seq_num*.

progress_start_time - Progress Start Time

A timestamp representing the start of the phase.

Table 1433. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

Usage Use this element to determine when a phase started. This element is omitted if the phase has not yet begun.

progress_total_units - Total Progress Work Units

Total amount of work to perform in order for the phase to be complete.

Table 1434. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

Some utilities might not be able to quantify the total work so they will continuously update this element. Other utilities might not be able to provide an estimate for the total work so this element might be omitted entirely.

This element is expressed in units displayed by the *progress_work_metric* monitor element.

Usage Use this element to determine the total amount of work in the phase. Use this element with *progress_completed_units* to calculate the percentage of work completed within a phase:

percentage complete = $\text{progress_completed_units} / \text{progress_total_units} * 100$

progress_work_metric - Progress Work Metric

The metric for interpreting the *progress_total_units* and *progress_completed_units* elements.

Table 1435. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	progress	Basic

Example values include:

- SQLM_WORK_METRIC_BYTES
- SQLM_WORK_METRIC_EXTENTS

Note:

1. This element might not be included for all utilities.
2. Values for this element can be found in *sqlmon.h*

Usage Use this element to determine what *progress_total_units* and *progress_completed_units* use as their reporting metric.

pseudo_deletes - Pseudo deletes monitor element

The number of keys that have been marked pseudo deleted.

Table 1436. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

pseudo_empty_pages - Pseudo empty pages monitor element

The number of pages that have been identified as pseudo empty. Pseudo empty pages are pages where all the keys have been pseudo deleted.

Table 1437. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

Usage

Note: This monitor element does not report the current number of pseudo empty pages.

query_actual_degree - Actual runtime degree of intrapartition parallelism monitor element

The actual runtime degree of intrapartition parallelism reported at the statement, activity, transaction, or workload level.

Table 1438. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1439. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	-	Always collected
Locking		

query_card_estimate - Query Number of Rows Estimate

An estimate of the number of rows that will be returned by a query.

Table 1440. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement
Activities	event_activity	-

Usage This estimate by the SQL compiler can be compared with the run time actuals.

This element also returns information for the following SQL statements when you are monitoring DB2 Connect.

- INSERT, UPDATE, and DELETE
Indicates the number of rows affected.

- PREPARE

Estimate of the number of rows that will be returned. Only collected if the DRDA server is DB2 for Linux, UNIX, and Windows, DB2 for VM and VSE, or DB2 for OS/400®.

- FETCH

Set to the number of rows fetched. Only collected if the DRDA server is DB2 for OS/400.

If information is not collected for a DRDA server, then the element is set to zero.

query_cost_estimate - Query cost estimate monitor element

Estimated cost for a query, as determined by the SQL compiler. This value is reported in timerons.

Table 1441. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 1442. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement
Activities	event_activity	-
Package cache	-	COLLECT BASE DATA

Usage

This monitor element allows correlation of actual run time with the compile-time estimates.

This element also returns information for the following SQL statements when you are monitoring DB2 Connect.

- PREPARE
Represents the relative cost of the prepared SQL statement.
- FETCH
Contains the length of the row retrieved. Only collected if the DRDA server is DB2 for OS/400.

If information is not collected for a DRDA server, then the element is set to zero.

Note: If the DRDA server is DB2 for OS/390[®] and z/OS, this estimate could be higher than 2**32 - 1 (the maximum integer number that can be expressed through an unsigned long variable). In that case, the value returned by the monitor for this element will be 2**32 - 1.

query_data_tag_list - Estimated query data tag list monitor element

The query_data_tag_list monitor element is a comma separated list of data tag values that the compiler estimates will be referenced in a statement.

A data tag value is in the list if the compiler predicts the statement will access a table whose data table space has a non-zero data tag attribute defined. The list does not contain duplicate values.

Table 1443. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1444. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	ACTIVITY METRICS BASE
Package cache	-	COLLECT BASE DATA

Usage note

If none of the data table spaces accessed by the query have a data tag defined, the list is empty.

queue_assignments_total - Queue assignments total monitor element

The number of times any connection or activity was assigned to this threshold queue since the last reset.

Table 1445. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1446. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-

Usage

This element can be used to determine the number of times any connection or activity was queued in this particular queue in a given period of time determined by the statistics collection interval. This can help to determine the effectiveness of queuing thresholds.

queue_start_time - Queue start timestamp monitor element

The date and time the application started waiting in the queue to to obtain a threshold ticket.

Table 1447. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

queue_size_top - Queue size top monitor element

Highest queue size that has been reached since the last reset.

Table 1448. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1449. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-

Usage

Use this element to gauge the effectiveness of queuing thresholds and to detect when queuing is excessive.

queue_time_total - Queue time total monitor element

Sum of the times spent in the queue for all connections or activities placed in this queue since the last reset. Units are milliseconds.

Table 1450. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1451. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	Always collected

This element is used to gauge the effectiveness of queuing thresholds and to detect when queuing is excessive.

Usage notes

queue_time_total is not reset at the end of a statistic collection interval. If **queue_time_total** is used over multiple intervals, it can be greater than the product of **wlm_collect_int** and **queue_size_top**.

queued_agents - Queued threshold agents monitor element

The total number of agents currently queued in the threshold.

Table 1452. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participants	

quiescer_agent_id - Quiescer Agent Identification

Agent ID of the agent holding a quiesce state.

Element identifier

quiescer_agent_id

Element type

information

Table 1453. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_quiescer	Basic

Usage Use this element in conjunction with quiescer_auth_id to determine who is responsible for quiescing a table space.

quiescer_auth_id - Quiescer User Authorization Identification

Authorization ID of the user holding a quiesce state.

Element identifier

quiescer_auth_id

Element type

information

Table 1454. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_quiescer	Basic

Usage Use this element to determine who is responsible for quiescing a table space.

quiescer_obj_id - Quiescer Object Identification

The object ID of the object that causes a table space to be quiesced.

Element identifier

quiescer_obj_id

Element type

information

Table 1455. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_quiescer	Basic

Usage Use this element in conjunction with `quiescer_ts_id` and `quiescer_auth_id` to determine who is responsible for quiescing a table space. The value of this element matches a value from column `TABLEID` of view `SYSCAT.TABLES`.

quiescer_state - Quiescer State

The type of quiesce being done (for example, "SHARE", "INTENT TO UPDATE", or "EXCLUSIVE").

Element identifier
`quiescer_state`

Element type
information

Table 1456. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_quiescer	Basic

Usage The value of this element matches the value of constants `SQLB QUIESCED_SHARE`, `SQLB QUIESCED_UPDATE`, or `SQLB QUIESCED_EXCLUSIVE` from `sqlutil.h`.

quiescer_ts_id - Quiescer Table Space Identification

The table space ID of the object that causes a table space to be quiesced.

Element identifier
`quiescer_ts_id`

Element type
information

Table 1457. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_quiescer	Basic

Usage Use this element in conjunction with `quiescer_obj_id` and `quiescer_auth_id` to determine who is responsible for quiescing a table space. The value of this element matches a value from column `TBSPACEID` of view `SYSCAT.TABLES`.

range_adjustment - Range Adjustment

This value represents the offset into the container array in which a range actually starts.

Table 1458. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_container_id - Range Container

An integer that uniquely defines a container within a range.

Table 1459. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_end_stripe - End Stripe

This value represents the number of the last stripe in a range.

Table 1460. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_max_extent - Maximum Extent in Range

This value represents the maximum extent number that is mapped by a range.

Table 1461. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_max_page_number - Maximum Page in Range

This value represents the maximum page number that is mapped by a range.

Table 1462. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_num_containers - Number of Containers in Range

This value represents the number of containers in the current range.

Table 1463. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_number - Range Number

This value represents the number of a range within the table space map.

Table 1464. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_offset - Range Offset

The offset from stripe 0 of the beginning of the stripe set to which a range belongs.

Table 1465. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_start_stripe - Start Stripe

This value represents the number of the first stripe in a range.

Table 1466. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

range_stripe_set_number - Stripe Set Number

This value represents the stripe set in which a range resides.

Table 1467. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_range	Basic

Usage This element is applicable only to a DMS table space.

reclaim_wait_time - Reclaim wait time monitor element

In a DB2 pureScale environment, this element represents the amount of time spent waiting on page locks, where the lock request caused a page to be reclaimed. The unit of measurement for time is in milliseconds.

Table 1468. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE

Table 1468. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1469. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected

Usage

The time spent waiting for reclaims on space map pages is counted separately and reported in the `spacemappage_reclaim_wait_time` monitor element.

reclaimable_space_enabled - Reclaimable space enabled indicator monitor element

If the table space is enabled for reclaimable storage, then this monitor element returns a value of 1. Otherwise, it returns a value of 0.

Table 1470. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

regvar_collection_type - Registry variable collection type

Indicates when the registry variable value was collected.

Table 1471. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	REGVAR	Always collected

Usage

The change history event monitor collected this value as:

- I The initial value that was captured when the event monitor was activated.
- U Updated value

regvar_level - Registry variable level

Indicates the level of the registry variable.

Table 1472. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	REGVAR	Always collected

Usage

For the change history event monitor, the level of the registry variable is one of:

- E Environment
- G Global
- I Instance-level
- P Database partition

regvar_name - Registry variable name

The name of the registry variable.

Table 1473. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	REGVAR	Always collected

Usage

For the change history event monitor, this element identifies the registry variable that was updated as part of a REGVAR event, or captured at event monitor startup as part of a REGVARVALUES event. These events represent the following:

REGVAR

Changing a registry variable value

REGVARVALUES

Capturing registry variable values at event monitor startup

regvar_old_value - Registry variable old value

The old value for the registry variable.

Table 1474. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	REGVAR	Always collected

Usage

For the change history event monitor, if the registry variable value was not set, this value is an empty string.

regvar_value - Registry variable value

This is the value for the registry variable.

Table 1475. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	REGVAR	Always collected

Usage

For the change history event monitor, if the value was not set, this value is an empty string.

Only immediate registry variable updates generate REGVAR events.

rej_curs_blk - Rejected Block Cursor Requests

The number of times that a request for an I/O block at server was rejected and the request was converted to non-blocked I/O.

Element identifier

rej_curs_blk

Element type

counter

Table 1476. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Table 1477. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage If there are many cursors blocking data, the communication heap may become full. When this heap is full, an error is not returned. Instead, no more I/O blocks are allocated for blocking cursors. If cursors are unable to block data, performance can be affected.

If a large number of cursors were unable to perform data blocking, you may be able to improve performance by:

- Increasing the size of the *query_heap* database manager configuration parameter.

rem_cons_in - Remote Connections To Database Manager

The current number of connections initiated from remote clients to the instance of the database manager that is being monitored.

Table 1478. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

Shows the number of connections from remote clients to databases in this instance. This value will change frequently, so you may need to sample it at specific intervals over an extended period of time to get a realistic view of system usage. This number does not include applications that were initiated from the same instance as the database manager.

When used in conjunction with the `local_cons` monitor element, these elements can help you adjust the setting of the `max_coordagents` and `max_connections` configuration parameters.

rem_cons_in_exec - Remote Connections Executing in the Database Manager

The number of remote applications that are currently connected to a database and are currently processing a unit of work within the database manager instance being monitored.

Table 1479. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage

This number can help you determine the level of concurrent processing occurring on the database manager. This value will change frequently, so you may need to sample it at specific intervals over an extended period of time to get a realistic view of system usage. This number does not include applications that were initiated from the same instance as the database manager.

When used in conjunction with the `local_cons_in_exec` monitor element, this element can help you adjust the setting of the `max_coordagents` configuration parameter.

If `max_coordagents` is set to `AUTOMATIC`, then you do not need to make any adjustments. If it is not set to `AUTOMATIC` and if the sum of `rem_cons_in_exec` and `local_cons_in_exec` is close to `max_coordagents`, you should increase the value of `max_coordagents`.

remote_lock_time - Remote Lock Time

This element contains the aggregate amount of time, in milliseconds, that this data source spends in a remote lock from all applications or a single application running on this federated server instance since the start of the federated server instance or the last reset of the database monitor counters.

The monitor stores the most recent of these values. The response time is measured as the difference between the time the federated server submits a remote lock to the data source, and the time the federated server releases a remote lock at the data source.

Table 1480. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine how much actual time is spent at this data source in a remote lock.

remote_locks - Remote Locks

This element contains a count of the total number of remote locks that the federated server has called at this data source on behalf of any application since the start of the federated server instance or the last reset of the database monitor counters, whichever is latest.

Table 1481. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine how many remote locks were made remotely at the data source.

remote_member - Remote member monitor element

The numeric identifier for the database member to which data was sent or from which data was received, using the fast communication manager (FCM).

Table 1482. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

Usage

All the metrics returned by the MON_GET_FCM_CONNECTION_LIST table function apply to the FCM connection between the members described in the **member** and **remote_member** monitor elements.

reopt - Reopt bind option monitor element

The REOPT bind option used to precompile this package. Possible values are: NONE, ONCE, and ALWAYS.

Table 1483. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participant_activities	

reorg_completion - Reorganization Completion Flag

Table reorganization success indicator, which includes the reclamation of extents from a multidimensional clustering (MDC) or insert time clustering (ITC) table. For partitioned tables, this value indicates the completion status for the data partition.

Table 1484. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage This element will have a value of 0 if a table or data partition reorganize operation is successful. If a table or data partition reorganize operation is unsuccessful, this element will have a value of -1. Success and failure values are defined in sqlmon.h as follows:

- Success: SQLM_REORG_SUCCESS
- Failure: SQLM_REORG_FAIL

In the case of an unsuccessful table reorganization, see the history file for any diagnostic information, including warnings and errors. This data can be accessed by using the LIST HISTORY command. For partitioned tables, the completion status is indicated per data partition. If index re-create fails on a partitioned table, the failed status is updated on all data partitions. See the administration notification log for further diagnostic information.

reorg_current_counter - Reorganize Progress

A unit of progress that indicates the amount of reorganization that has been completed. The amount of progress this value represents is relative to the value of reorg_max_counter, which represents the total amount of table reorganization that is to be done.

Table 1485. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage

You can determine the percentage of table reorganization that has been completed using the following formula:

$$\text{table reorg progress} = \text{reorg_current_counter} / \text{reorg_max_counter} * 100$$

reorg_end - Table Reorganize End Time

The end time of a table reorganization including a reorganization to reclaim extents from a multidimensional clustering (MDC) or insert time clustering (ITC) table. For partitioned tables, this time indicates the end time for each data partition reorganization.

Table 1486. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_index_id - Index Used to Reorganize the Table

The index being used to reorganize the table.

Table 1487. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_long_tbsp_id - Table Space Where Long Objects are Reorganized monitor element

The table space in which any long objects (LONG VARCHAR or LOB data) will be reorganized. For partitioned tables, this is the table space in which each partition's LONG VARCHAR and LOB will be reorganized.

Table 1488. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_max_counter - Total Amount of Reorganization

A value that indicates the total amount of work to be done in a reorganization. This value includes a reorganization to reclaim extents from multidimensional clustering (MDC) or insert time clustering (ITC) tables.

This value can be used with reorg_current_counter, which represents the amount of work completed, to determine the progress of a reorganization.

Table 1489. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_max_phase - Maximum Reorganize Phase

The maximum number of reorganization phases that occurs during reorganization processing. This number applies to classic (offline) reorganizations and to reorganizations with the RECLAIM EXTENTS option.

The range of values is 2 - 4 ([SORT], BUILD, REPLACE,[INDEX_RECREATE]). The value could also indicate the total amount of work to be done in a reorganization

to reclaim extents from a multidimensional clustering (MDC) or insert time clustering (ITC) table. When such a reorganization occurs, this value is 3 (SCAN, DRAIN, RELEASE).

Table 1490. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_phase - Table reorganization phase monitor element

Indicates the reorganization phase of the table. For partitioned tables, this will also indicate the reorganization phase for each data partition. This applies to offline table reorganizations only.

Table 1491. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage

For partitioned tables, the reorganization occurs on a data partition by data partition basis. For classic table reorganization, the following phases are possible (phases are listed with their corresponding defines from the `sqlmon.h` file):

- Sort: `SQLM_REORG_SORT`
- Build: `SQLM_REORG_BUILD`
- Replace: `SQLM_REORG_REPLACE`
- Index Recreate: `SQLM_REORG_INDEX_RECREATE`
- Dictionary Build: `SQLM_REORG_DICT_SAMPLE`

For partitioned tables, the Index Recreate phase for partitioned indexes (if any) might be directly entered after the replace phase for that data partition. The **reorg_phase** element will indicate the Index Recreate phase only after the successful completion of all prior phases on every data partition.

During XDA object compression, the XML data reorganization phase involves reorganizing the XML storage object of the table. The XML dictionary build phase involves attempting to create a compression dictionary for the XML storage object. For XDA object compression, the following two phases are possible:

- XML Reorg: `SQLM_REORG_XML_DATA`
- XML Dictionary Build: `SQLM_REORG_XML_DICT_SAMPLE`

For partitioned tables, where reclamation of extents is being performed, the following phases are possible:

- Scan: `SQLM_REORG_SCAN`
- Drain: `SQLM_REORG_DRAIN`
- Release: `SQLM_REORG_RELEASE`

reorg_phase_start - Reorganize Phase Start Time

The start time of a phase of table reorganization or reclaim reorganization. For partitioned tables, this will also indicate the start time of a reorganization phase for each data partition. During the index re-create phase, data groups for all data partitions are updated at the same time for nonpartitioned indexes.

Table 1492. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_rows_compressed - Rows Compressed

Number of rows compressed in the table during reorganization.

Table 1493. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage A running count of the number of rows compressed in the table during reorganization. Some records may never be compressed (if the record size is less than the minimum record length).

It is important to note that this row count does not measure the effectiveness of data compression. It only displays the number of records meeting compression criteria.

reorg_rows_rejected_for_compression - Rows Rejected for Compression

Number of rows that were not compressed during reorganization due to the record length being less than or equal to the minimum record length.

Table 1494. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage A record will not be compressed if it is less than or equal to the minimum record length. The number of rows rejected reflects a running count for these records that fail to meet this compression requirement.

reorg_start - Table Reorganize Start Time

The start time of a table reorganization including a reorganization to reclaim extents from a multidimensional clustering (MDC) or insert time clustering (ITC) table. For partitioned tables, this indicates the start time for each data partition reorganization.

Table 1495. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_status - Table Reorganize Status

The status of an in-place (online) table or a data partition level reorganization. This is not applicable to classic (offline) table reorganizations.

Table 1496. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage An in-place table or data partition reorganization can be in one of the following states (states are listed with their corresponding defines from sqlmon.h):

- Started/Resumed: SQLM_REORG_STARTED
- Paused: SQLM_REORG_PAUSED
- Stopped: SQLM_REORG_STOPPED
- Completed: SQLM_REORG_COMPLETED
- Truncate: SQLM_REORG_TRUNCATE

An inplace table or data partition reorganization to reclaim extents can be in one of the following states:

- Started: SQLM_REORG_STARTED
- Stopped: SQLM_REORG_STOPPED
- Completed: SQLM_REORG_COMPLETED

reorg_tbspc_id - Table Space Where Table or Data partition is Reorganized

The table space in which the table will be reorganized. For partitioned tables, this indicates the table space where each data partition is reorganized.

Table 1497. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_type - Table Reorganize Attributes

Table reorganize attribute settings.

Table 1498. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

Usage The following are possible attribute settings. Each attribute setting is based upon a bit flag value defined in db2ApiDf.h.

- Allow Write Access: DB2REORG_ALLOW_WRITE
- Allow Read Access: DB2REORG_ALLOW_READ
- Allow No Access: DB2REORG_ALLOW_NONE
- Recluster Via Index Scan: DB2REORG_INDEXSCAN
- Reorg Long Field LOB Data: DB2REORG_LONGLOB
- No Table Truncation: DB2REORG_NOTRUNCATE_ONLINE

- Replace Compression Dictionary: DB2REORG_RESET_DICTIONARY
- Keep Compression Dictionary: DB2REORG_KEEP_DICTIONARY
- Reclaim Extents: DB2REORG_RECLAIM_EXTS

In addition to the preceding attribute settings, the following attributes are listed in the CLP output of the GET SNAPSHOT FOR TABLES command. These attribute settings are based on the values of other attribute settings or table reorganize monitor elements.

- Reclustering: If the value of the reorg_index_id monitor element is non-zero, then the table reorganize operation has this attribute.
- Reclaiming: If the value of the reorg_index_id monitor element is zero, then the table reorganize operation has this attribute.
- Inplace Table Reorg: If the reorg_status monitor element has a value that is not null, then the in-place (online) reorganization method is in use.
- Table Reorg: If the reorg_phase monitor element has a value that is not null, then the classic (offline) reorganization method is in use.
- Recluster Via Table Scan: If the DB2REORG_INDEXSCAN flag is not set, then the table reorganize operation has this attribute.
- Reorg Data Only: If the DB2REORG_LONGLOB flag is not set, then the table reorganize operation has this attribute.

reorg_xml_regions_compressed - XML regions compressed monitor element

Number of XML regions that were compressed during the table reorganization process.

Table 1499. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

reorg_xml_regions_rejected_for_compression - XML regions rejected for compression monitor element

Number of XML regions that were not compressed during the table reorganization process.

Table 1500. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table_reorg	Basic

req_agent_tid - Thread identifier for agent waiting to acquire lock monitor element

Thread identifier of the agent or system entity that is waiting to acquire the lock.

Table 1501. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

req_application_handle - Identifier for application waiting to acquire lock monitor element

System-wide unique ID for the application that is waiting to acquire the lock.

Table 1502. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

req_executable_id - Identifier for statement section waiting to acquire lock monitor element

The binary token generated on the data server that uniquely identifies the SQL statement section which is waiting to acquire a lock. For non-SQL activities, a 0-length string value is returned.

Table 1503. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

req_member - Member of application waiting to acquire lock monitor element

Database member where the application waiting to acquire this lock is located.

Table 1504. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

request_exec_time_avg - Request execution time average monitor element

Arithmetic mean of the execution times for requests associated with this service subclass since the last reset. If the internally tracked average has overflowed, the value -2 is returned. This monitor element returns -1 when COLLECT AGGREGATE REQUEST DATA for the service subclass is set to NONE. Units are milliseconds.

When you remap activities between service subclasses with a REMAP ACTIVITY action, the request_exec_time_avg mean counts the partial request in each subclass involved in remapping.

Table 1505. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	COLLECT AGGREGATE REQUEST DATA

Table 1506. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-

Usage

Use this statistic to quickly understand the average amount of time that is spent processing each request on a member in this service subclass.

This average can also be used to determine whether or not the histogram template used for the request execution time histogram is appropriate. Compute the average request execution time from the request execution time histogram. Compare the computed average with this monitor element. If the computed average deviates from the true average reported by this monitor element, consider altering the histogram template for the request execution time histogram, using a set of bin values that are more appropriate for your data.

rf_log_num - Log being rolled forward monitor element

The log being processed in the rollforward operation.

Table 1507. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	rollforward	Basic

Usage

If a rollforward is in progress, this element identifies the log involved. In a DB2 pureScale environment, the **rf_log_num** monitor element identifies the log file from each log stream that is currently involved in the rollforward operation.

rf_status - Log Phase

The status of the recovery.

Element identifier
rf_status

Element type
information

Table 1508. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	rollforward	Basic

Usage This element indicates the progression of a recovery. It indicates if the recovery is in an undo (rollback) or redo (rollforward) phase.

rf_timestamp - Rollforward Timestamp

The timestamp of the last committed transaction..

Element identifier
rf_timestamp

Element type
timestamp

Table 1509. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	rollforward	Timestamp

Usage If a rollforward is in progress, this is the timestamp of the last committed transaction processed by rollforward recovery. This is an indicator of how far the rollforward operation has progressed.

rf_type - Rollforward Type

The type of rollforward in progress.

Element identifier
rf_type

Element type
information

Table 1510. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	rollforward	Basic

Usage An indicator of whether recovery is happening at a database or table space level.

rollback_sql_stmts - Rollback Statements Attempted

The total number of SQL ROLLBACK statements that have been attempted.

Element identifier
rollback_sql_stmts

Element type
counter

Table 1511. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic
DCS Database	dc_s_dbase	Basic
DCS Application	dc_s_appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1512. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage A rollback can result from an application request, a deadlock, or an error situation. This element **only** counts the number of rollback statements issued from applications.

At the application level, this element can help you determine the level of database activity for the application and the amount of conflict with other applications. At the database level, it can help you determine the amount of activity in the database and the amount of conflict between applications on the database.

Note: You should try to minimize the number of rollbacks, since higher rollback activity results in lower throughput for the database.

It may also be used to calculate the total number of units of work, by calculating the sum of the following expression:

```
commit_sql_stmts
+ int_commits
+ rollback_sql_stmts
+ int_rollbacks
```

rolled_back_agent_id - Rolled Back Agent

Agent that was rolled back when a deadlock occurred.

Element identifier
rolled_back_agent_id

Element type
information

Table 1513. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_deadlock	Always collected

Usage A system administrator can use this information to determine which application did not complete its updates, and determine which applications should be restarted.

rolled_back_appl_id - Rolled Back Application

Application id that was rolled back when a deadlock occurred.

Element identifier

rolled_back_appl_id

Element type

information

Table 1514. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_deadlock	Always collected

Usage A system administrator can use this information to determine which application did not complete its updates, and determine which applications should be restarted.

rolled_back_participant_no - Rolled back application participant monitor element

The participant number identifying the rolled back application.

Table 1515. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks ¹	event_deadlock	Always collected

1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

A system administrator can use this information to determine which application did not complete its updates, and determine which application should be started.

rolled_back_sequence_no - Rolled Back Sequence Number

The sequence number of the application that was rolled back when a deadlock occurred.

Element identifier

rolled_back_sequence_no

Element type
information

Table 1516. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_deadlock	Always collected

Usage A system administrator can use this information to determine which application did not complete its updates, and determine which applications should be restarted.

root_node_splits - Root node splits monitor element

Number of times the root node of the index was split during an insert operation.

Table 1517. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE

routine_id - Routine ID monitor element

A unique routine identifier. This monitor element returns 0 if the activity is not part of a routine.

Table 1518. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in the DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 1519. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitystmt	Always collected
Unit of work	uow_package_list	Always collected
Package cache	pkgcache_metrics	ACTIVITY METRICS BASE

Usage

The value of this element matches a value from column ROUTINEID of view SYSCAT.ROUTINES. When the activity is part of an SQL PL routine that you declare in another SQL PL routine, the value of this element is the ROUTINEID of the outer routine.

routine_module_name - Routine module name monitor element

Unqualified name of the module to which the routine belongs.

This element is NULL when the routine does not belong to a module.

Table 1520. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

routine_name - Routine name monitor element

Unqualified name of the routine.

This element might be system generated for subroutines and dynamically prepared compound SQL statements or anonymous blocks in PL/SQL.

Table 1521. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

routine_schema - Routine schema monitor element

Schema name of the routine when the routine does not belong to a module, otherwise this is the schema name of the module to which the routine belongs.

This element might be system generated for subroutines and dynamically prepared compound SQL statements or anonymous blocks in PL/SQL.

Table 1522. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

routine_type - Routine type monitor element

Identifies the type of routine.

The routine type can be one of the following:

- C** Dynamically prepared compound SQL statement or PL/SQL anonymous block
- F** Function
- P** Procedure
- T** Trigger

Table 1523. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

rows_deleted - Rows deleted monitor element

This is the number of row deletions attempted.

Table 1524. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1525. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1526. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gain insight into the current level of activity within the database.

This count does not include the attempts counted in the **int_rows_deleted** monitor element.

rows_fetched - Rows fetched monitor element

The number of rows read from the table.

This monitor element is an alias of the **rows_read** monitor element.

Note: This monitor element reports only the values for the member for which this information is recorded. In multimember database environments, these values might not reflect the correct totals for the whole activity.

Table 1527. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Statement

Usage

See the **rows_read** monitor element for details.

rows_inserted - Rows inserted monitor element

The number of row insertions attempted.

Table 1528. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1529. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1530. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gain insight into the current level of activity within the database.

In a federated system, multiple rows can be inserted, per INSERT statement, because the federated server can push INSERT FROM SUBSELECT to the data source, when appropriate.

This count does not include the attempts counted in the **int_rows_inserted** monitor element.

rows_modified - Rows modified monitor element

The number of rows inserted, updated, or deleted.

This monitor element is an alias of the **rows_written** monitor element.

Table 1531. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1531. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1532. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1532. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Activities	event_activity	Statement
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

See the `rows_written` monitor element for details.

rows_read - Rows read monitor element

The number of rows read from the table.

Table 1533. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Table 1533. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	REQUEST METRICS BASE

Table 1534. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Table	table	Table
Application	appl	Basic
Application	stmt	Basic
Application	subsection	Statement
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Table 1535. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	Always collected
Tables	event_table	Always collected
Statements	event_stmt	Always collected

Table 1535. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This element helps you identify tables with heavy usage for which you may want to create additional indexes. To avoid the maintenance of unnecessary indexes, use the SQL EXPLAIN statement to determine if the package uses an index.

This count is *not* the number of rows that were returned to the calling application. Rather, it is the number of rows that had to be read in order to return the result set. For example, the following statement returns one row to the application, but many rows are read to determine the average salary:

```
SELECT AVG(SALARY) FROM USERID.EMPLOYEE
```

This count includes the value in the **overflow_accesses** monitor element. Additionally, this count does not include any index accesses. That is, if an access plan uses index access only and the table is not touched to look at the actual row, then the value of the **rows_read** monitor element is not incremented.

rows_returned - Rows returned monitor element

The rows_returned monitor element is the number of rows that have been selected and returned to the application.

This element has a value of 0 for partial activity records (for example, if an activity is collected while it is still executing or when a full activity record could not be written to the event monitor due to memory limitations).

This monitor element is an alias of the **fetch_count** monitor element.

Table 1536. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1536. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	REQUEST METRICS BASE

Table 1537. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Activities	event_activity	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

This element can be used to help determine thresholds for rows returned to the application or can be used to verify that such a threshold is configured correctly and doing its job.

rows_returned_top - Actual rows returned top monitor element

The rows_returned_top monitor element is the high watermark for the actual rows returned of DML activities at all nesting levels in a service class or work class.

For service classes, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class is set to NONE. For work classes, this monitor element returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action, only the rows_returned_top high watermark of the service subclass where an activity completes is updated. High watermarks of service subclasses an activity is mapped to but does not complete in are unaffected.

Table 1538. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this element to know the highest DML activity actual rows returned reached on a member for a service class, workload, or work class in the time interval collected.

rows_selected - Rows Selected

This is the number of rows that have been selected and returned to the application.

Table 1539. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1540. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gain insight into the current level of activity within the database.

This element does not include a count of rows read for actions such as COUNT(*) or joins.

For a federated system;, you can compute the average time to return a row to the federated server from the data source:

$$\text{average time} = \text{rows returned} / \text{aggregate query response time}$$

You can use these results to modify CPU speed or communication speed parameters in SYSCAT.SERVERS. Modifying these parameters can impact whether the optimizer does or does not send requests to the data source.

Note: This element is collected at the dcs_dbase and dcs_appl snapshot monitor logical data groups if the gateway being monitored is at DB2 database version 7.2 or lower.

rows_updated - Rows updated monitor element

This is the number of row updates attempted.

Table 1541. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED

Table 1542. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1543. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gain insight into the current level of activity within the database.

This value does not include updates counted in the `int_rows_updated` monitor element. However, rows that are updated by more than one update statement are counted for each update.

rows_written - Rows Written

This is the number of rows changed (inserted, deleted or updated) in the table.

Table 1544. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic
Application	appl	Basic
Application	stmt	Basic
Application	subsection	Statement
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Table 1545. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected
Tables	event_table	Always collected
Statements	event_stmt	Always collected
Transactions	event_xact	Always collected

Usage A high value for table-level information indicates there is heavy usage of the table and you may want to use the Run Statistics (RUNSTATS) utility to maintain efficiency of the packages used for this table.

For application-connections and statements, this element includes the number of rows inserted, updated, and deleted in temporary tables.

At the application, transaction, and statement levels, this element can be useful for analyzing the relative activity levels, and for identifying candidates for tuning.

rqsts_completed_total - Total requests completed monitor element

The total number of requests executed, including both application and internal requests. For service subclasses, this monitor element is only updated where the request completes. If the request moved between different service subclasses, it is not counted twice.

Table 1546. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1546. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1547. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

savepoint_id - Savepoint ID

The ID of the savepoint set within a unit of work.

Table 1548. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	DDLSTMTEXC TXNCOMPLETION	Always collected

sc_work_action_set_id - Service class work action set ID monitor element

If this activity has been categorized into a work class of service class scope, this monitor element displays the ID of the work action set associated with the work class set to which the work class belongs. Otherwise, this monitor element displays the value of 0.

Table 1549. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
WLM_GET_ACTIVITY_DETAILS_COMPLETE table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1550. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

This element can be used with the **sc_work_class_id** element to uniquely identify the service class work class of the activity, if one exists.

sc_work_class_id - Service class work class ID monitor element

If this activity has been categorized into a work class of service class scope, this monitor element displays the ID of the work class assigned to this activity. Otherwise, this monitor element displays the value of 0.

Table 1551. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
WLM_GET_ACTIVITY_DETAILS_COMPLETE table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1552. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

This element can be used with the **sc_work_action_set_id** element to uniquely identify the service class work class of the activity, if one exists.

sec_log_used_top - Maximum Secondary Log Space Used

The maximum amount of secondary log space used (in bytes).

Table 1553. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1554. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 1555. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You may use this element in conjunction with *sec_logs_allocated* and *tot_log_used_top* to show your current dependency on secondary logs. If this value is high, you may need larger log files, or more primary log files, or more frequent COMMIT statements within your application.

As a result, you may need to adjust the following configuration parameters:

- logfilsiz
- logprimary
- logsecond
- logarchmeth1

The value will be zero if the database does not have any secondary log files. This would be the case if there were none defined.

Note: While the database system monitor information is given in bytes, the configuration parameters are set in pages, which are each 4K bytes.

sec_logs_allocated - Secondary Logs Allocated Currently

The total number of secondary log files that are currently being used for the database.

Table 1556. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1557. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage You may use this element in conjunction with *sec_log_used_top* and *tot_log_used_top* to show your current dependency on secondary logs. If

this value is consistently high, you may need larger log files, or more primary log files, or more frequent COMMIT statements within your application.

As a result, you may need to adjust the following configuration parameters:

- logfilsiz
- logprimary
- logsecond
- logarchmeth1

section_actuals - Section actuals monitor element

A binary string generated at the data server containing runtime statistics for a section that was executed. If section capture or actuals collection are not enabled, the value is a 0 length string. For non-SQL activities (for example, LOAD) the value is a 0 length string.

Table 1558. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

The data collected in the **section_actuals** monitor element or per connection using WLM_SET_CONN_ENV is used when a section explain is performed using the EXPLAIN_FROM_ACTIVITY stored procedure. This data is used during EXPLAIN processing to populate the EXPLAIN_ACTUALS explain table and represents the runtime statistics for the operators in the access plan.

Note:

- Section actuals are only available if they have been enabled (set to BASE) using the **section_actuals** database configuration parameter or if they have been enabled for a particular application using the WLM_SET_CONN_ENV stored procedure. For more information describing the stored procedure, see WLM_SET_CONN_ENV
- The **section_actuals** setting specified by the WLM_SET_CONN_ENV procedure for an application takes effect immediately.

section_env - Section environment monitor element

A blob that contains the section for an SQL statement. It is the actual section contents, that is the executable form of the query plan.

Table 1559. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitystmt	Always collected
Package cache	pkgcache	COLLECT DETAILED DATA

Usage

Use this element with the section explain procedures to explain the statement and view the access plan for the statement.

section_number - Section number monitor element

The internal section number in the package for a static SQL statement.

Table 1560. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1561. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement

Table 1562. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details ¹	event_detailed_dlconn	-
Statements	event_stmt	-
Activities	event_activitystmt	-
Package cache	-	COLLECT BASE DATA

- 1** This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

For static SQL statements, you can use this element along with **creator**, **package_version_id**, and **package_name** monitor elements to query the SYSCAT.STATEMENTS system catalog table and obtain the static SQL statement text, using the sample query as follows:

```
SELECT SEQNO, SUBSTR(TEXT,1,120)
FROM SYSCAT.STATEMENTS
WHERE PKGNAME = 'package_name' AND
```

```

        PKGSHEMA = 'creator'      AND
        VERSION = 'package_version_id' AND
        SECTNO   = section_number
ORDER BY SEQNO

```

Note: Exercise caution in obtaining static statement text, because this query against the system catalog table could cause lock contention. Whenever possible, only use this query when there is little other activity against the database.

section_type - Section type indicator monitor element

Indicates whether the SQL statement section is dynamic or static.

Table 1563. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1564. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

Usage

The possible values for this monitor element are:

- D: dynamic
- S: static

select_sql_stmts - Select SQL Statements Executed

The number of SQL SELECT statements that were executed.

Table 1565. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Table Space	tablespace	Basic
Application	appl	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1566. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to determine the level of database activity at the application or database level.

You can also use the following formula to determine the ratio of SELECT statements to the total statements:

```
select_sql_stmts
/ ( static_sql_stmts
+ dynamic_sql_stmts )
```

This information can be useful for analyzing application activity and throughput.

select_time - Query Response Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to queries from all applications or a single application running on this federated server instance since the start of the federated server instance or the last reset of the database monitor counters.

The monitor stores the most recent of the values.

Note: Due to query blocking, not all attempts by the federated server to retrieve a row result in communication processing; the request to get the next row can potentially be satisfied from a block of returned rows. As a result, the aggregate query response time does not always indicate processing at the data source, but it usually indicates processing at either the data source or client.

Table 1567. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

Usage

Use this element to determine how much actual time is spent waiting for data from this data source. This can be useful in capacity planning and tuning the CPU speed and communication rates in SYSCAT.SERVERS. Modifying these parameters can impact whether the optimizer does or does not send requests to the data source.

The response time is measured as the difference in time between the time the federated server requests a row from the data source, and the time the row is available for the federated server to use.

sequence_no - Sequence number monitor element

This identifier is incremented whenever a unit of work ends (that is, when a COMMIT or ROLLBACK terminates a unit of work). Together, the **appl_id** and **sequence_no** uniquely identify a transaction.

Table 1568. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Basic
DCS Application	dcs_appl_info	Basic

Table 1569. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	-
Connections	event_connheader	-
Statements	event_stmt	-
Transactions	event_xact	-
Deadlocks	event_dlconn	-
Deadlocks with Details	event_detailed_dlconn	-
Deadlocks with Details History	event_detailed_dlconn	-
Deadlocks with Details History	event_stmt_history	-
Deadlocks with Details History Values	event_detailed_dlconn	-
Deadlocks with Details History Values	event_stmt_history	-

sequence_no_holding_lk - Sequence Number Holding Lock

The sequence number of the application that is holding a lock on the object that this application is waiting to obtain.

Element identifier

sequence_no_holding_lk

Element type

information

Table 1570. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic
Lock	appl_lock_list	Basic

Table 1571. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	event_dlconn	Always collected
Deadlocks with Details	event_detailed_dlconn	Always collected

Usage This identifier is used in tandem with `appl_id` to uniquely identify a transaction that is holding a lock on the object that this application is waiting to obtain.

server_db2_type - Database Manager Type at Monitored (Server) Node

Identifies the type of database manager being monitored.

Table 1572. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Usage It contains one of the following types of configurations for the database manager:

API Symbolic Constant

Command Line Processor Output

sqlf_nt_server

Database server with local and remote clients

sqlf_nt_stand_req

Database server with local clients

The API symbolic constants are defined in the include file `sqlutil.h`.

server_instance_name - Server Instance Name

The name of the database manager instance for which the snapshot was taken.

Element identifier

`server_instance_name`

Element type

information

Table 1573. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Table 1574. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	<code>event_log_header</code>	Always collected

Usage If more than one instance of the database manager is present on the same system, this data item is used to uniquely identify the instance for which the snapshot call was issued. This information can be useful if you are saving your monitor output in a file or database for later analysis, and you need to differentiate the data from different instances of the database manager.

server_platform - Server Operating System

The operating system running the database server.

Element identifier
server_platform

Element type
information

Table 1575. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 1576. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage This element can be used for problem determination for remote applications. Values for this field can be found in the header file *sqlmon.h*.

server_prdid - Server Product/Version ID

The product and version that is running on the server.

Table 1577. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Table 1578. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	-

Usage It is in the form PPPVRRM, where:

- PPP** is SQL
- VV** identifies a 2-digit version number (with high-order 0 in the case of a 1-digit version)
- RR** identifies a 2-digit release number (with high-order 0 in the case of a 1-digit release)
- M** identifies a 1-character modification level (0-9 or A-Z)

server_version - Server Version

The version of the server returning the information.

Table 1579. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Usage

This field identifies the level of the database server collecting database system monitor information. This allows applications to interpret the data based on the level of the server returning the data. Valid values are:

SQLM_DBMON_VERSION1

Data was returned by DB2 Version 1

SQLM_DBMON_VERSION2

Data was returned by DB2 Version 2

SQLM_DBMON_VERSION5

Data was returned by DB2 Universal Database™ Version 5

SQLM_DBMON_VERSION5_2

Data was returned by DB2 Universal Database Version 5.2

SQLM_DBMON_VERSION6

Data was returned by DB2 Universal Database Version 6

SQLM_DBMON_VERSION7

Data was returned by DB2 Universal Database Version 7

SQLM_DBMON_VERSION8

Data was returned by DB2 Universal Database Version 8

SQLM_DBMON_VERSION9

Data was returned by DB2 for Linux, UNIX, and Windows Version 9

SQLM_DBMON_VERSION9_5

Data was returned by DB2 for Linux, UNIX, and Windows Version 9.5

service_class_id - Service class ID monitor element

Unique ID of service subclass. For a unit of work, this ID represents the service subclass ID of the workload with which the connection issuing the unit of work is associated.

Table 1580. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 1581. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE

Table 1581. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Locking	-	Always collected
Unit of work	-	Always collected
Statistics	event_histogrambin	Always collected
Statistics	event_scstats	Always collected

Usage

The value of this element matches a value from column SERVICECLASSID of view SYSCAT.SERVICECLASSES. Use this element to look up the service subclass name, or link information about a service subclass from different sources. For example, join service class statistics with histogram bin records.

The value of this element is 0 when the following conditions are met:

- The element is reported in an event_histogrambin logical data group.
- The histogram data is collected for an object that is not a service class.

service_level - Service Level

This is the current corrective service level of the DB2 instance.

Table 1582. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

service_subclass_name - Service subclass name monitor element

The name of a service subclass.

Table 1583. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1583. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE

Table 1584. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Locking	-	Always collected
Unit of work	-	Always collected
Activities	event_activity	Always collected
Statistics	event_scstats	Always collected
Statistics	event_qstats	Always collected

Usage

Use this element in conjunction with other activity elements for analysis of the behavior of an activity or with other statistics elements for analysis of a service class or threshold queue.

service_superclass_name - Service superclass name monitor element

The name of a service superclass.

Table 1585. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1585. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE

Table 1586. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Activities	event_activity	Always collected
Statistics	event_scstats	Always collected
Statistics	event_qstats	Always collected

Usage

Use this element in conjunction with other activity elements for analysis of the behavior of an activity or with other statistics elements for analysis of a service class or threshold queue.

session_auth_id - Session authorization ID monitor element

The current authorization ID for the session being used by this application. For monitoring workload management activities, this monitor element describes the session authorization ID under which the activity was injected into the system.

Table 1587. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1587. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 1588. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Lock	appl_lock_list	Basic

Table 1589. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Unit of work	-	Always collected
Activities	event_activity	Always collected
Threshold violations	event_activity	Always collected
Change history	changesummary	Always collected

Usage

You can use this element to determine what authorization ID is being used to prepare SQL statements, execute SQL statements, or both. This monitor element does not report any session authorization ID values set within executing stored procedures.

shr_workspace_num_overflows - Shared Workspace Overflows

The number of times that shared workspaces overflowed the bounds of their allocated memory.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1590. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1591. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Table 1591. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected

Usage Use this element with `shr_workspace_size_top` to determine whether the size of the Shared Workspaces need to be increased to avoid overflowing. Overflows of Shared Workspaces may cause performance degradation as well as out of memory errors from the other heaps allocated out of application shared memory.

At the database level, the element reported will be from the same shared workspace as that which was reported as having the Maximum Shared Workspace Size. At the application level, it is the number of overflows for the workspace used by the current application.

shr_workspace_section_inserts - Shared Workspace Section Inserts

Number of inserts of SQL sections by applications into shared workspaces.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1592. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1593. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage The working copy of executable sections are stored in shared workspaces. This counter indicates when a copy was not available and had to be inserted.

At the database level, it is the cumulative total of all inserts for every application across all shared workspaces in the database. At the application level, it is the cumulative total of all inserts for all sections in the shared workspace for this application.

shr_workspace_section_lookups - Shared Workspace Section Lookups

Lookups of SQL sections by applications in shared workspaces.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1594. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1595. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Each application has access to a shared workspace where the working copy of executable sections are kept.

This counter indicates how many times shared workspaces were accessed in order to locate a specific section for an application. At the database level, it is the cumulative total of all lookups for every application across all Shared Workspaces in the database. At the application level, it is the cumulative total of all lookups for all sections in the shared workspace for this application.

You can use this element in conjunction with Shared Workspace Section Inserts to tune the size of shared workspaces. The size of the shared workspace is controlled by the `app_ctl_heap_sz` configuration parameter.

shr_workspace_size_top - Maximum Shared Workspace Size

The largest size reached by shared workspaces.

Note: This monitor element has been deprecated. Using this monitor element will not generate an error. However, it does not return a valid value. This monitor element is no longer recommended and might be removed in a future release.

Table 1596. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

Table 1597. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage This element indicates the maximum number of bytes the shared workspaces required for the workload run against the database since it was activated. At the database level, it is the maximum size reached by all of the shared workspaces. At the application level, it is the maximum size of the shared workspace used by the current application.

If a shared workspace overflowed, then this element contains the largest size reached by that shared workspace during the overflow. Check Shared Workspace Overflows to determine if such a condition occurred.

When the shared workspace overflows, memory is temporarily borrowed from other entities in application shared memory. This can result in memory shortage errors from these entities or possibly performance degradation. You can reduce the chance of overflow by increasing APP_CTL_HEAP_SZ.

skipped_prefetch_data_p_reads - Skipped prefetch data physical reads monitor element

The number of data pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1598. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

The **skipped_prefetch_*_p_reads** elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the

prefetcher was able to retrieve the page, examine the **skipped_prefetch_uow_*_p_reads** monitor elements.

skipped_prefetch_index_p_reads - Skipped prefetch index physical reads monitor element

The number of index pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1599. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

The **skipped_prefetch_*_p_reads** elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the prefetcher was able to retrieve the page, examine the **skipped_prefetch_uow_*_p_reads** monitor elements.

skipped_prefetch_temp_data_p_reads - Skipped prefetch temporary data physical reads monitor element

The number of data pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1600. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

The **skipped_prefetch_*_p_reads** elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the prefetcher was able to retrieve the page, examine the **skipped_prefetch_uow_*_p_reads** monitor elements.

skipped_prefetch_temp_index_p_reads - Skipped prefetch temporary index physical reads monitor element

The number of index pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1601. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

The **skipped_prefetch_*_p_reads** elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the prefetcher was able to retrieve the page, examine the **skipped_prefetch_uow_*_p_reads** monitor elements.

skipped_prefetch_temp_xda_p_reads - Skipped prefetch temporary XDA data physical reads monitor element

The number of XML storage object (XDA) data pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1602. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

The **skipped_prefetch_*_p_reads** elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the prefetcher was able to retrieve the page, examine the **skipped_prefetch_uow_*_p_reads** monitor elements.

skipped_prefetch_uow_data_p_reads - Skipped prefetch unit of work data physical reads monitor element

The number of data pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by an agent in the same unit of work..

Table 1603. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_uow_*_p_reads** elements tells you the number of pages that were in a prefetch request that were read directly by an agent in the same unit of work that caused the prefetch request to be created. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

skipped_prefetch_uow_index_p_reads - Skipped prefetch unit of work index physical reads monitor element

The number of index pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by an agent in the same unit of work.

Table 1604. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_uow_*_p_reads** elements tells you the number of pages that were in a prefetch request that were read directly by an agent in the same unit of work that caused the prefetch request to be created. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

skipped_prefetch_uow_temp_data_p_reads - Skipped prefetch unit of work temporary data physical reads monitor element

The number of data pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by an agent in the same unit of work.

Table 1605. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_uow_*_p_reads** elements tells you the number of pages that were in a prefetch request that were read directly by an agent in the same unit of work that caused the prefetch request to be created. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry

variable not being set, which can restrict parallel prefetching within a table space container.

skipped_prefetch_uow_temp_index_p_reads - Skipped prefetch unit of work temporary index physical reads monitor element

The number of index pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by the synchronous transaction.

Table 1606. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

skipped_prefetch_uow_temp_xda_p_reads - Skipped prefetch unit of work temporary XDA data physical reads monitor element

The number of XML storage object (XDA) data pages for temporary table spaces that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by the synchronous transaction.

Table 1607. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

skipped_prefetch_uow_xda_p_reads - Skipped prefetch unit of work XDA data physical reads monitor element

The number of XML storage object (XDA) data pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool by an agent in the same unit of work.

Table 1608. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_uow_*_p_reads** elements tells you the number of pages that were in a prefetch request that were read directly by an agent in the same unit of work that caused the prefetch request to be created. Agents might be forced to read a page directly from disk if a system

has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the **db2_parallel_io** registry variable not being set, which can restrict parallel prefetching within a table space container.

skipped_prefetch_xda_p_reads - Skipped prefetch XDA physical reads monitor element

The number of XML storage object (XDA) data pages that an I/O server (prefetcher) skipped because the pages were already loaded into the buffer pool.

Table 1609. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

This monitor element, along with the other **skipped_prefetch_*_p_reads** elements tells you the number of times a page that was scheduled for retrieval by a prefetcher was not prefetched because it was already in a buffer pool. Pages that are already in a buffer pool might be there for a number of reasons:

- The page is a new page, and is not yet created on disk.
- Another agent might need the same page, and thus it was loaded it into the buffer pool by a different prefetch request. In this case, along with the preceding one, an increase in skipped prefetch requests might not be a problem, because the additional prefetch request that was generated was redundant.
- An agent retrieved them from disk directly before the prefetcher was able to complete the prefetch operation. Agents might be forced to read a page directly from disk if a system has an insufficient number of prefetchers configured, or if there is another type of prefetching bottleneck. . For example, in an OLTP system, where most of the workload is generally transactional in nature, it might be the case that the minimum number of prefetchers is configured by setting the configuration parameter **num_ioservers** to 1. However, if an operation that uses prefetching, such as a table scan is performed, the single prefetcher might not be able to keep up, and so the agent requests the pages directly. This behavior can cause a degradation in performance, because the application waits on IO that otherwise would have been performed by prefetchers. In this case, consider increasing the number of prefetchers by adjusting the configuration parameter **num_ioservers**. Other potential causes include having an excessively large prefetch size, which can cause prefetch times that are longer than normal, or the

`db2_parallel_io` registry variable not being set, which can restrict parallel prefetching within a table space container.

The `skipped_prefetch_*_p_reads` elements tell you about all skipped read requests, regardless of the reason the read was skipped. To see how many requests were skipped because an agent from the same unit of work performed a read before the prefetcher was able to retrieve the page, examine the `skipped_prefetch_uow_*_p_reads` monitor elements.

smallest_log_avail_node - Node with Least Available Log Space

This element is only returned for global snapshots and indicates the node with the least amount (in bytes) of available log space.

Element identifier

`smallest_log_avail_node`

Element type

information

Table 1610. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage Use this element, in conjunction with `appl_id_oldest_xact`, to ensure that adequate log space is available for the database. In a global snapshot, `appl_id_oldest_xact`, `total_log_used`, and `total_log_available` correspond to the values on this node.

snapshot_timestamp - Snapshot timestamp monitor element

The date and time that the snapshot was taken.

sort_heap_allocated - Total Sort Heap Allocated

The total number of allocated pages of sort heap space for all sorts at the level chosen and at the time the snapshot was taken.

Table 1611. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic
Database	dbase	Basic

Usage The amount of memory allocated for each sort may be some or all of the available sort heap size. Sort heap size is the amount of memory available for each sort as defined in the `sortheap` database configuration parameter.

It is possible for a single application to have concurrent sorts active. For example, in some cases a `SELECT` statement with a subquery can cause concurrent sorts.

Information may be collected at two levels:

- At the database manager level, it represents the sum of sort heap space allocated for all sorts in all active databases in the database manager
- At the database level, it represents the sum of the sort heap space allocated for all sorts in a database.

Normal memory estimates do not include sort heap space. If excessive sorting is occurring, the extra memory used for the sort heap should be added to the base memory requirements for running the database manager. Generally, the larger the sort heap, the more efficient the sort. Appropriate use of indexes can reduce the amount of sorting required.

You may use the information returned at the database manager level to help you tune the *sheapthres* configuration parameter. If the element value is greater than or equal to *sheapthres*, it means that the sorts are not getting the full sort heap as defined by the *sortheap* parameter.

sort_heap_top - Sort private heap high watermark

The private sort memory high watermark, in 4 KB pages, across the database manager.

Table 1612. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	db2	Basic

Usage This element can be used to determine if the SHEAPTHRES configuration parameter is set to an optimal value. For example, if this watermark approaches or exceeds SHEAPTHRES, it is likely that SHEAPTHRES should be increased. This is because private sorts are given less memory whenever SHEAPTHRES is exceeded, and this can adversely affect system performance.

sort_overflows - Sort overflows monitor element

The total number of sorts that ran out of sort heap and may have required disk space for temporary storage.

Table 1613. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1613. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1614. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic
Application	stmt	Basic
Dynamic SQL	dynsql	Basic

For snapshot monitoring, this counter can be reset.

Table 1615. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected

Table 1615. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Statement, Sort
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At a database or application level, use this element in conjunction with **total_sorts** to calculate the percentage of sorts that had to overflow to disk. If this percentage is high, you may want adjust the database configuration by increasing the value of **sortheap**.

At a statement level, use this element to identify statements that require large sorts. These statements may benefit from additional tuning to reduce the amount of sorting required.

When a sort overflows, additional processing time is required because the sort will require a merge phase and can potentially require more I/O, if data needs to be written to disk.

This element provides information for one statement, one application, or all applications accessing one database.

sort_shrheap_allocated - Sort Share Heap Currently Allocated

Total amount of shared sort memory allocated in the database.

Table 1616. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage This element can be used to assess the threshold for shared sort memory. If this value is frequently much higher or lower than the current shared sort memory threshold, it is likely that the threshold should be adjusted.

Note: The "shared sort memory threshold" is determined by the value of the SHEAPTHRES database manager configuration parameter if the SHEAPTHRES_SHR database configuration parameter is 0. Otherwise, it is determined by the value of SHEAPTHRES_SHR.

sort_shrheap_top - Sort share heap high watermark

Database-wide shared sort memory high watermark in 4 KB pages.

Table 1617. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage This element can be used to assess whether or not SHEAPTHRES (or

SHEAPTHRES_SHR) is set to an optimal value. For example, if this high watermark is persistently much lower than the shared sort memory threshold, it is likely that this threshold needs to be decreased, thus freeing memory for other database functions. Conversely, if this high watermark begins to approach the shared sort memory threshold, then this might indicate that this threshold needs to be increased. This is important because the shared sort memory threshold is a hard limit. When the total amount of sort memory reaches this threshold, no more shared sorts can be initiated.

This element, along with the high watermark for private sort memory, can also help users determine if the threshold for shared and private sorts need to be set independently of each other. Normally, if the SHEAPTHRES_SHR database configuration option has a value of 0, then the shared sort memory threshold is determined by the value of the SHEAPTHRES database manager configuration option. However, if there is a large discrepancy between the private and shared sort memory high watermarks, this might be an indication that the user needs to override SHEAPTHRES and set SHEAPTHRES_SHR to a more appropriate value that is based on the shared sort memory high watermark.

Note: This element reports the high watermark of sort reservation requests granted by the sort memory controller. Requests that are granted do not always result in a similar level of memory allocation, since they only permit consumers of sort heap to allocate memory as necessary, up to the granted amount, during the processing of an SQL request. It is normal for there to be a discrepancy between the value for this element and the high water mark of the shared sort memory pool (pool_watermark).

source_service_class_id - Source service class ID monitor element

The ID of the service subclass from which an activity was remapped when the threshold violation record to which this element belongs was generated. This element has a value of zero when the threshold action is anything other than a REMAP ACTIVITY action.

Table 1618. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element to trace the path of an activity through the service classes to which it was remapped. It can also be used to compute aggregates of how many activities were mapped out of a given service subclass.

sp_rows_selected - Rows Returned by Stored Procedures

This element contains the number of rows sent from the data source to the federated server at the start of the federated server instance, or the last reset of the database monitor counters as a result of stored procedure operations for this application.

Table 1619. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage This element has several uses. You can use it to compute the average number of rows sent to the federated server from the data source, per stored procedure, with the following formula:

$$\begin{aligned} & \text{rows per stored procedure} \\ & = \text{rows returned} \\ & / \# \text{ of stored procedures invoked} \end{aligned}$$

You can also compute the average time to return a row to the federated server from the data source for this application:

$$\text{average time} = \text{aggregate stored proc. response time} / \text{rows returned}$$

specific_name - Specific name monitor element

Name of the routine instance.

This element might be system generated.

Table 1620. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

sql_chains - Number of SQL Chains Attempted

Represents the number of SQL statements taking *n* data transmissions between the DB2 Connect gateway and the host during statement processing. The range *n* is specified by the *num_transmissions_group* element.

Table 1621. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Data Transmission	stmt_transmissions	Basic

For snapshot monitoring, this counter can be reset.

For example, if chaining is on, and if PREP and OPEN statements are chained together and the chain takes a total of two transmissions, *sql_chains* is reported as "1" and *sql_stmts* is reported as "2".

If chaining is off, then the *sql_chains* count equals the *sql_stmts* count.

Usage Use this element to get statistics on how many statements used 2, 3, 4 (and so on) data transmissions during their processing. (At least two data transmissions are necessary to process a statement: a send and a receive.) These statistics can give you a better idea of the database or application activity and network traffic at the database or application levels.

Note: The *sql_stmts* monitor element represents the number of attempts made to send an SQL statement to the server. At the transmission level, all statements within the same cursor count as a single SQL statement.

sql_req_id - Request Identifier for SQL Statement

The request identifier for an operation in an SQL statement.

Table 1622. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_stmt	-

Usage This identifier increments with each successive SQL operation processed by the database manager since the first application has connected to the database. Its value is unique across the database and uniquely identifies a statement operation.

sql_reqs_since_commit - SQL Requests Since Last Commit

Number of SQL requests that have been submitted since the last commit.

Table 1623. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Basic

Usage You can use this element to monitor the progress of a transaction.

sql_stmts - Number of SQL Statements Attempted

For data transmission snapshots, this element represents the number of SQL statements taking *n* data transmissions between the DB2 Connect gateway and the host during statement processing. The range *n* is specified by the *num_transmissions_group* element.

Table 1624. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl	Basic
Data Transmission	stmt_transmissions	Basic

For snapshot monitoring, this counter can be reset.

For DCS DATABASE snapshots, this statement count is the number of statements since the database was activated.

For DCS APPLICATION snapshots, this statement count is the number of statements since the connection to the database was established by this application.

Usage Use this element to measure database activity at the database or application level. To calculate the SQL statement throughput for a given period, you can divide this element by the elapsed time between two snapshots.

For the data transmission level: Use this element to get statistics on how many statements used 2, 3, 4 (and so on) data transmissions during their processing. (At least 2 data transmissions are necessary to process a statement: a send and a receive.) These statistics can give you a better idea of the database or application activity and network traffic at the database or application levels.

Note:

1. The *sql_stmts* monitor element represents the number of attempts made to send an SQL statement to the server:
 - At the application level and database level, each SQL statement within a cursor is counted separately.
 - At the transmission level, all statements within the same cursor count as a single SQL statement.

sqlca - SQL Communications Area (SQLCA)

The SQLCA data structure that was returned to the application at statement completion.

Table 1625. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_stmt	-
Activities	event_activity	-

Usage

The SQLCA data structure can be used to determine if the statement completed successfully. For information about the content of the SQLCA, see “SQLCA (SQL communications area)” in *SQL Reference Volume 1* or “SQLCA data structure” in *Administrative API Reference*.

sqlrowsread_threshold_id - SQL rows read threshold ID monitor element

The ID of the SQLROWSREAD threshold that was applied to the activity.

Table 1626. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which SQLROWSREAD threshold, if any, was applied to the activity.

sqlrowsread_threshold_value - SQL rows read threshold value monitor element

The upper bound of the SQLROWSREAD threshold that was applied to the activity.

Table 1627. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the SQLROWSREAD threshold applied to the activity, if any.

sqlrowsread_threshold_violated - SQL rows read threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the SQLROWSREAD threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 1628. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the SQLROWSREAD threshold that was applied to the activity.

sqlrowsreadinsc_threshold_id - SQL rows read in service class threshold ID monitor element

The ID of the SQLROWSREADINSC threshold that was applied to the activity.

Table 1629. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which SQLROWSREADINSC threshold, if any, was applied to the activity.

sqlrowsreadinsc_threshold_value - SQL rows read in service class threshold value monitor element

The upper bound of the SQLROWSREADINSC threshold that was applied to the activity.

Table 1630. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the SQLROWSREADINSC threshold applied to the activity, if any.

sqlrowsreadinsc_threshold_violated - SQL rows read in service class threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the SQLROWSREADINSC threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 1631. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the SQLROWSREADINSC threshold that was applied to the activity.

sqlrowsreturned_threshold_id - SQL rows read returned threshold ID monitor element

The ID of the SQLROWSRETURNED threshold that was applied to the activity.

Table 1632. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which SQLROWSRETURNED threshold, if any, was applied to the activity.

sqlrowsreturned_threshold_value - SQL rows read returned threshold value monitor element

The upper bound of the SQLROWSRETURNED threshold that was applied to the activity.

Table 1633. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the SQLROWSRETURNED threshold applied to the activity, if any.

sqlrowsreturned_threshold_violated - SQL rows read returned threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the SQLROWSRETURNED threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 1634. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the SQLROWSRETURNED threshold that was applied to the activity.

sqltemp space_threshold_id - SQL temporary space threshold ID monitor element

The ID of the SQLTEMPSPACE threshold that was applied to the activity.

Table 1635. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand which SQLTEMPSPACE threshold, if any, was applied to the activity.

sqltempespace_threshold_value - SQL temporary space threshold value monitor element

The upper bound of the SQLTEMPSPACE threshold that was applied to the activity.

Table 1636. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to understand the value of the SQLTEMPSPACE threshold applied to the activity, if any.

sqltempespace_threshold_violated - SQL temporary space threshold violated monitor element

This monitor element returns 'Yes' to indicate that the activity violated the SQLTEMPSPACE threshold. 'No' indicates that the activity has not yet violated the threshold.

Table 1637. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Usage

Use this element to determine if the activity violated the SQLTEMPSPACE threshold that was applied to the activity.

spacemappage_page_reclaims_x - Space map page reclaims exclusive access monitor element

The number of times a page related to a space map page was reclaimed by another member in the DB2 pureScale instance before its planned release. The member that reclaimed the page required exclusive access to the space map page.

Table 1638. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_x** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_x** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_x** monitor element.

spacemappage_page_reclaims_s - Space map page reclaims shared access monitor element

The number of times a page related to a space map page was reclaimed by another member in the DB2 pureScale instance before its planned release. The member that reclaimed the page required shared access to the space map page.

Table 1639. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_s** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_s** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_s** monitor element.

spacemappage_page_reclaims_initiated_x - Space map page reclaims initiated exclusive access monitor element

The number of times a page accessed in exclusive mode for a space map page caused the page to be reclaimed from another member.

Table 1640. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_initiated_x** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_initiated_x** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_initiated_x** monitor element.

spacemappage_page_reclaims_initiated_s - Space map page reclaims initiated shared access monitor element

The number of times a page accessed in shared mode of a space map page caused the page to be reclaimed from another member.

Table 1641. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_initiated_s** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_initiated_s** monitor element. Index

space map pages do not contain user data, therefore they are included only in the value of the `spacemappage_page_reclaims_initiated_s` monitor element.

spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element

In a DB2 pureScale environment, this element represents the amount of time spent waiting on page locks for pages related to internally maintained object space management where the lock request caused a reclaim from another member. The unit of measurement for time is in milliseconds.

Table 1642. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1642. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1643. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected

ss_exec_time - Subsection Execution Elapsed Time

The time in seconds that it took a subsection to execute.

Table 1644. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 1645. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	-

Usage Allows you to track the progress of a subsection.

ss_node_number - Subsection Node Number

Node where the subsection was executed.

Table 1646. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 1647. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	-

Usage Use to correlate each subsection with the database partition where it was executed.

ss_number - Subsection number monitor element

Identifies the subsection associated with the returned information.

Table 1648. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE

Table 1649. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 1650. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Always collected

Usage

This number relates to the subsection number in the access plan that can be obtained with **db2exp1n** command.

ss_status - Subsection status monitor element

The current status of an executing subsection.

Table 1651. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Usage

The current status values can be:

- executing (SQLM_SSEXEC in sqlmon.h)
- waiting for a lock
- waiting to receive data on a table queue
- waiting to send data on a table queue

ss_sys_cpu_time - System CPU Time used by Subsection

The total system CPU time (in seconds and microseconds) used by the currently executing statement subsection. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

Element identifier

ss_sys_cpu_time

Element type

time

Table 1652. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Timestamp

Table 1653. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Timestamp

Usage This element along with the other related CPU-time elements can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

ss_usr_cpu_time - User CPU Time used by Subsection

The total user CPU time (in seconds and microseconds) used by the currently executing statement subsection. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

Element identifier

ss_usr_cpu_time

Element type

time

Table 1654. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Timestamp

Table 1655. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Timestamp

Usage This element along with the other related CPU-time elements can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

ssl_port_number - SSL port number monitor element

The SSL TCP/IP port that a member is listening on for client connections.

Table 1656. Table Function Monitoring Information

Table Function	Monitor Element	Collection Level
MON_GET_SERVERLIST table function - get member priority details		Always collected

start_event_id - Start event ID

Unique identifier of the corresponding UTILSTART or UTILSTARTPROC event.

Table 1657. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTOP	Always collected

Usage

For the change history event monitor, unique identifier of the corresponding starting of a utility event (UTILSTART or UTILSTARTPROC). Use this element with the START_EVENT_TIMESTAMP and member elements to associate the stop record with the corresponding start record.

start_event_timestamp - Start event timestamp

Time of the corresponding UTILSTART or UTILSTARTPROC event.

Table 1658. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTOP	Always collected

Usage

For the change history event monitor, use with the START_EVENT_ID and member elements to associate the stop record with the corresponding start record.

start_time - Event Start Time

The date and time of unit of work start, statement start, or deadlock detection. This element, in the event_start API structure indicates the start of the event monitor.

Table 1659. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_start	Timestamp
Statements	event_stmt	Timestamp
Deadlocks	event_deadlock	Timestamp
Deadlocks	event_dlconn	Timestamp
Deadlocks with Details	event_detailed_dlconn	Timestamp

Usage You can use this element to correlate the deadlock connection records to the deadlock event record, and in conjunction with *stop_time* to calculate the elapsed statement or transaction execution time.

Note: When the Timestamp switch is OFF, this element reports "0".

static_sql_stmts - Static SQL Statements Attempted

The number of static SQL statements that were attempted.

Table 1660. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1661. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to calculate the total number of successful SQL statements at the database or application level:

```

dynamic_sql_stmts
+ static_sql_stmts
- failed_sql_stmts
= throughput during monitoring period

```

statistics_timestamp - Statistics timestamp monitor element

The time at which this statistics record was generated.

Table 1662. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wlstats	-
Statistics	event_wcstats	-
Statistics	event_qstats	-
Statistics	event_histogrambin	-

Usage

Use this element to determine when this statistics record was generated.

Use this element along with the **last_wlm_reset** element to identify the time interval over which the statistics in this statistics record were generated.

This monitor element can also be used to group together all statistics records that were generated for the same collection interval.

stats_cache_size - Size of statistics cache monitor element

The current size of the statistics cache, in bytes, which is used in a catalog partition to cache statistics information generated by real-time statistics gathering.

Note: Since the statistics cache resides in the catalog partition, only the snapshot taken at the catalog partition will report the statistics cache size. Snapshots taken at other partitions will report the value of zero instead. When taking a global snapshot, the values reported by all the database partitions are aggregated together.

Table 1663. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 1664. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	-

Table 1665. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Use this element to determine the size of the current statistics cache. This value changes frequently. In order to evaluate system usage, take the snapshot at specific intervals over an extended period of time. Use this element to adjust the value of the `catalogcache_sz` configuration parameter.

stats_fabricate_time - Total time spent on statistics fabrication activities monitor element

The `stats_fabricate_time` monitor element stores the total time spent on statistics fabrications by real-time statistics gathering, in milliseconds. Statistics fabrication is the statistics collection activity needed to generate statistics during query compilation.

If this monitor element is collected at the database level, it represents the total time spent on real-time statistics gathering activities for all the applications running on the database. If it is collected at the statement level, it represents the time spent on the latest real-time statistics gathering activities for the statement. The times reported by all the database partitions are aggregated together.

Table 1666. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 1667. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this element can be reset.

Table 1668. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Statement	event_stmt	Always collected

Usage

Use this element along with **stats_fabrications** to evaluate the performance impact of real-time statistics gathering at the database level. For snapshot monitor for dynamic SQL, you can use this element along with **total_exec_time** and **num_executions** to evaluate the impact of statistics fabrications. For the statement event monitor, you can combine this element with **stmt_start** and **stmt_stop** for further evaluation of real-time statistics gathering impact.

stats_fabrications - Total number of statistics fabrications monitor elements

The stats_fabrications monitor elements are the total number of statistics fabrications performed by real-time statistics during query compilation for all the database applications.

Rather than obtaining statistics by scanning data stored in a table or an index, statistics are fabricated based on metadata maintained by the index and data manager. Values reported by all the database partitions are aggregated together.

Table 1669. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	

Table 1669. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 1670. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement

For snapshot monitoring, this counter can be reset.

Table 1671. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Use this element to determine the frequency of statistics fabrications in the database. This value changes frequently. In order to get a better overview of the system usage, take the snapshot at specific intervals over an extended period of time. When used in conjunction with **stats_fabricate_time**, this element can help you evaluate the impact of statistics fabrications.

status_change_time - Application Status Change Time

The date and time the application entered its current status.

Element identifier

status_change_time

Element type

timestamp

Table 1672. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_id_info	Unit of Work, Timestamp
Lock	appl_lock_list	Unit of Work, Timestamp
DCS Application	dcs_appl_info	Unit of Work, Timestamp

Usage This element allows you to determine how long an application has been in its current status. If it has been in the same status for a long period of time, this may indicate that it has a problem.

stmt_elapsed_time - Most Recent Statement Elapsed Time

The elapsed execution time of the most recently completed statement.

Table 1673. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement, Timestamp
DCS Statement	dcs_stmt	Statement, Timestamp

Usage

Use this element as an indicator of the time it takes for a statement to complete.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

stmt_exec_time - Statement execution time monitor element

The total time spent executing this statement by all agents on this member. The value is given in milliseconds.

Table 1674. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1675. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 1675. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

stmt_first_use_time - Statement first use timestamp monitor element

This element shows the first time the statement entry was processed. For cursor operations, **stmt_first_use_time** shows when the cursor was opened. At application coordination nodes, this value reflects the application requests; at non-coordinator nodes, this value reflects when requests were received from the originating node.

Table 1676. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	timestamp
Deadlocks with Details History ¹	event_stmt_history	timestamp
Activities	event_activitystmt	timestamp

- 1** This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

stmt_history_id - Statement history identifier

This numeric element shows the position in which the statement was run within the unit of work indicated by the sequence_no element, relative to other statement history elements. The earliest statement run in the unit of work will have the lowest value.

If the same statement is run twice in the same unit of work, two different occurrences of the statement will be shown with two different stmt_history_id values.

Table 1677. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details History Values	event_stmt_history	-
Deadlocks with Details History Values	event_data_value	-
Deadlocks with Details History	event_stmt_history	-

Usage You can use this information to see the sequence of SQL statements that caused the deadlock.

stmt_history_list_size - Statement history list size

When a detailed deadlock event monitor with history is running, this element reports the number of bytes being used from the database monitor heap (MON_HEAP_SZ) to keep track of the statement history list entries.

Table 1678. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
application	appl	-
database	db	-

Usage You can use this element when tuning the database monitor heap.

stmt_invocation_id - Statement invocation identifier monitor element

An identifier that distinguishes one invocation of a routine from others at the same nesting level within a unit of work. It is unique within a unit of work for a specific nesting level.

Table 1679. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1680. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitystmt	-
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Unit of work	Reported in the package list.	-

1 This option has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element to uniquely identify the invocation in which a particular SQL statement has been executed. You can also use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

stmt_isolation - Statement isolation

This element shows the isolation value in effect for the statement while it was being run.

Table 1681. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks with Details History Values	event_stmt_history	-
Deadlocks with Details History	event_stmt_history	-
Activities	event_activitystmt	-

The possible isolation level values are:

- SQLM_ISOLATION_LEVEL_NONE 0 (no isolation level specified)
- SQLM_ISOLATION_LEVEL_UR 1 (uncommitted read)
- SQLM_ISOLATION_LEVEL_CS 2 (cursor stability)
- SQLM_ISOLATION_LEVEL_RS 3 (read stability)
- SQLM_ISOLATION_LEVEL_RR 4 (repeatable read)

Usage You can use this element in conjunction with other statement history entries to understand the cause of the deadlock and the execution behavior of a particular SQL statement.

stmt_last_use_time - Statement last use timestamp monitor element

This element shows the last time the statement entry was processed.

For cursor operations, **stmt_last_use_time** shows the time of the last action on the cursor where that action could be an open, fetch, or close. At application coordination nodes, this value reflects the application requests; at non-coordinator nodes, this value reflects when requests were received from the originating node.

Table 1682. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	timestamp
Deadlocks with Details History ¹	event_stmt_history	timestamp
Activities	event_activitystmt	timestamp

1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

stmt_lock_timeout - Statement lock timeout monitor element

This element shows the lock timeout value in effect for the statement while it was being run.

Table 1683. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Activities	event_activitystmt	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with other statement history entries to understand the cause of the deadlock and the execution behavior of a particular SQL statement.

stmt_nest_level - Statement nesting level monitor element

This element shows the level of nesting or recursion in effect when the statement was being run; each level of nesting corresponds to nested or recursive invocation of a stored procedure or user-defined function (UDF).

Table 1684. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1685. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Activities	event_activitystmt	-
Unit of work	Reported in the package list.	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element, along with `stmt_invocation_id` monitor element, to uniquely identify the invocation in which a particular SQL statement has been executed. You can also use this element in conjunction with other statement history entries to see the sequence of SQL statements that caused the deadlock.

`stmt_node_number` - Statement Node

Node where the statement was executed.

Table 1686. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Usage Used to correlate each statement with the node where it was executed.

`stmt_operation/operation` - Statement operation monitor element

The statement operation currently being processed or most recently processed (if none currently running).

Table 1687. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAPSHOT_STATEMENT table function	ACTIVITY METRICS BASE
SNAPSTMT administrative view and SNAP_GET_STMT table function - Retrieve statement snapshot information	ACTIVITY METRICS BASE

Table 1688. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
DCS Statement	dcs_stmt	Statement

Table 1689. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected
Statements	event_stmt	Always collected

1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element to determine the operation that is executing or recently finished.

It can be one of the following values:

For SQL operations:

- SELECT
- PREPARE
- EXECUTE
- EXECUTE IMMEDIATE
- OPEN
- FETCH
- CLOSE
- DESCRIBE
- STATIC COMMIT
- STATIC ROLLBACK
- FREE LOCATOR
- PREP_COMMIT
- CALL
- PREP_OPEN
- PREP_EXEC
- COMPILE
- DROP PACKAGE

For non-SQL operations:

- RUN STATISTICS
- REORG
- REBIND
- REDISTRIBUTE
- GET TABLE AUTHORIZATION
- GET ADMINISTRATIVE AUTHORIZATION

Note: API users should refer to the `sqlmon.h` header file containing definitions of database system monitor constants.

stmt_pkgcache_id - Statement package cache identifier monitor element

This element shows the internal package cache identifier (ID) for a dynamic SQL statement.

Table 1690. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1691. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Basic

Table 1692. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks with Details History Values ¹	event_stmt_history	Always collected
Deadlocks with Details History ¹	event_stmt_history	Always collected
Activities	event_activitystmt	Always collected
Package cache	-	COLLECT BASE DATA

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

In a multi-partitioned environment, each partition has a unique statement ID for a cached statement. A given statement may not have the same ID across partitions.

In a global dynamic SQL snapshot, only the first statement ID is returned.

stmt_query_id - Statement query identifier monitor element

This element shows the internal query identifier (ID) given to any SQL statement used as a cursor.

Table 1693. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Activities	event_activitystmt	-

Usage

You can use this element, along with the **stmt_nest_level** monitor element, to uniquely identify an invocation of a particular SQL statement. You can also use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmt_sorts - Statement Sorts

The total number of times that a set of data was sorted in order to process the stmt_operation.

Table 1694. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Statement
Application	stmt	Statement
Dynamic SQL	dynsql	Statement

Usage You can use this element to help identify the need for an index, since indexes can reduce the need for sorting of data. Using the related elements in the previously shown table you can identify the SQL statement for which this element is providing sort information, and then analyze this statement to determine index candidates by looking at columns that are being sorted (for example, columns used in ORDER BY and GROUP BY clauses and join columns). See **explain** in the *Administration Guide* for information on checking whether your indexes are used to optimize sort performance.

This count includes sorts of temporary tables that were generated internally by the database manager to execute the statement. The number of sorts is associated with the first FETCH operation of the SQL statement. This information is returned to you when the operation for the statement is the first FETCH. You should note that for blocked cursors several fetches may be performed when the cursor is opened. In these cases it can be difficult to use the snapshot monitor to obtain the number of sorts, since a snapshot would need to be taken while DB2 was internally issuing the first FETCH.

A more reliable way to determine the number of sorts performed when using a blocked cursor would be with an event monitor declared for statements. The total_sorts counter, in the statement event for the CLOSE cursor, contains the total number of sorts that were performed while executing the statement for which the cursor was defined.

stmt_source_id - Statement source identifier

This element shows the internal identifier (ID) given to the source of the SQL statement that was run.

Table 1695. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_stmt_history	-
Deadlocks with Details History ¹	event_stmt_history	-
Activities	event_activitystmt	-

1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT

MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element, along with **appl_id** monitor element, to uniquely identify the origin of a request to run a particular SQL statement. You can also use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmt_start - Statement Operation Start Timestamp

The date and time when the stmt_operation started executing.

Element identifier
stmt_start

Element type
timestamp

Table 1696. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement, Timestamp
DCS Statement	dc_stmt	Statement, Timestamp

Usage You can use this element with stmt_stop to calculate the elapsed statement operation execution time.

stmt_stop - Statement Operation Stop Timestamp

The date and time when the stmt_operation stopped executing.

Element identifier
stmt_stop

Element type
Timestamp

Table 1697. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement, Timestamp
DCS Statement	dc_stmt	Statement, Timestamp

Usage You can use this element with stmt_start to calculate the elapsed statement operation execution time.

stmt_sys_cpu_time - System CPU Time used by Statement

The total *system* CPU time (in seconds and microseconds) used by the currently executing statement.

Element identifier
stmt_sys_cpu_time

Element type
time

Table 1698. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Statement, Timestamp
Application	stmt	Statement, Timestamp

Usage This element along with the other related CPU-time elements can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

This counter includes time spent on both SQL and non-SQL statements, as well as any unfenced user defined functions (UDF) or stored procedures executed by the application.

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

Note: If this information is not available for your operating system, this element will be set to 0.

stmt_text - SQL statement text monitor element

The text of the SQL statement.

Table 1699. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1700. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement
Dynamic SQL	dynsql	Basic
DCS Statement	dcs_stmt	Statement

Table 1701. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected
Deadlocks with Details History ¹	event_stmt_history	Always collected
Statements	event_stmt	Always collected
Activities	event_activitystmt	Always collected
Package cache	-	COLLECT BASE DATA

Table 1701. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Change history	ddlstmtexec	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

For application snapshots, this statement text helps you identify what the application was executing when the snapshot was taken, or most recently processed if no statement was being processed right at the time the snapshot was taken.

The information returned by this element is taken from the SQL statement cache and it might not be available if the cache has overflowed. The only guaranteed way to capture the SQL text of a statement is to use an event monitor for statements.

For dynamic SQL statements, this element identifies the SQL text associated with a package.

For statement event monitors, this element is returned only for dynamic statements. If a statement event monitor record cannot fit into the size of the buffer specified by the BUFFERSIZE option of a statement event monitor, the value of the **stmt_text** monitor may be truncated so that the record can fit.

For the EVENT_STMT_HISTORY event monitor, this element is returned only for dynamic statements. For remaining event monitors, **stmt_text** is returned for dynamic and static statements only if it is available in the SQL statement cache.

For information about how to query the system catalog tables to obtain static SQL statement text that is not provided due to performance considerations, see the **section_number** monitor element.

stmt_type - Statement type monitor element

The type of statement processed.

Table 1702. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	stmt	Statement

Table 1703. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected
Statements	event_stmt	Always collected
Activities	event_activitystmt	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element to determine the type of statement that is executing. It can be one of the following statements:

- A static SQL statement
- A dynamic SQL statement
- An operation other than an SQL statement; for example, a bind or pre-compile operation.

For the snapshot monitor, this element describes the statement that is currently being processed or was most recently processed.

Note: API users should refer to the `sqlmon.h` header file containing definitions of database system monitor constants.

stmt_type_id - Statement type identifier monitor element

Statement type identifier.

Table 1704. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1705. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Package cache	-	COLLECT BASE DATA

Usage

The `stmt_type_id` monitor element has the following possible values:

- Statement not prepared
- DDL, (not Set Constraints)
- DDL, Set Constraints
- DML, Select
- DML, Insert/Update/Delete
- Authorization
- DML, Select (blockable)
- DML, Lock Table
- DML, Commit/Rollback
- Set environment

- DDL, Savepoint
- DDL, (declared user temp)
- Passthru support
- CALL
- Free locator
- DML, Select with IUD
- DML, Select with IUD (blockable)
- Top-level SET, no SQL
- Top-level SET, reads SQL
- DDL, (issues internal commit)
- Top-level SET, modifies SQL
- Unknown

stmt_unicode - Statement unicode flag monitor element

The SQL statement unicode flag. Possible values: Yes or No.

Table 1706. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	lock_participant_activities	

stmt_usr_cpu_time - User CPU Time used by Statement

The total *user* CPU time (in seconds and microseconds) used by the currently executing statement.

Element identifier

stmt_usr_cpu_time

Element type

time

Table 1707. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Statement, Timestamp
Application	stmt	Statement, Timestamp

Usage This element along with the other related CPU-time elements can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

This counter includes time spent on both SQL and non-SQL statements, as well as any unfenced user-defined functions (UDFs) or stored procedures executed by the application.

System CPU represents the time spent in system calls. User CPU represents time spent executing database manager code.

Note: If this information is not available for your operating system, this element will be set to 0.

stmt_value_data - Value data

This element contains a string representation of a data value to an SQL statement. LOB, LONG, and structured type parameters appear as empty strings. Date, time, and timestamp fields are recorded in ISO format.

Table 1708. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1709. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	stmt_value_data	-
Activities	event_activityvals	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmt_value_index - Value index

This element represents the position of the input parameter marker or host variable used in the SQL statement.

Table 1710. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1711. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	stmt_value_data	-
Activities	event_activityvals	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmt_value_isnull - Value has null value monitor element

This element shows whether a data value that is associated with an SQL statement is the NULL value; whether an extended indicator has been used to specify the default value; or that this statement value is unassigned.

Possible values are:

- 0 or "no" if the value is not NULL
- 1 or "yes" if the value is NULL
- 2 or "default" if the extended indicator value of default (-5) was specified for this statement value
- 3 or "unassigned" if the extended indicator value of unassigned (-7) was specified for this statement value

Table 1712. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1713. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	stmt_value_isnull	-
Activities	event_activityvals	-

- 1** This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmt_value_isreopt - Variable used for statement reoptimization monitor element

This element shows whether the provided value was a value used during statement reoptimization.

It returns a value of "True" if the statement was reoptimized (for example, due to the setting of the REOPT bind option) and if the value was used as input to the SQL compiler during this reoptimization.

Table 1714. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1715. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	event_data_value	-
Activities	event_activityvals	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with the provided compilation environment to allow for full analysis of the SQL compiler's treatment of the SQL statement.

stmt_value_type - Value type monitor element

This element contains a string representation of the type of a data value associated with an SQL statement.

Table 1716. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1717. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks with Details History Values ¹	stmt_value_type	-
Activities	event_activityvals	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

You can use this element in conjunction with other statement history entries to understand the cause of the deadlock.

stmtno - Statement number monitor element

Statement number within a package for a static SQL statement.

This element is set to '1' for dynamic SQL statements. The element is set to '-1' if the statement number is unavailable, for example the statement number for DDL statements is not available.

Table 1718. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	Always collected
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	Always collected
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - return a list of activities	Always collected

Table 1719. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Activities	event_activitystmt	Always collected
Package CacheActivities	event_pkgcache	Always collected

Usage

For static SQL statements, this value is the same as the value used for the SYSCAT.STATEMENTS catalog view.

sto_path_free_size - Automatic storage path free space monitor element

This element shows the amount of free space (in bytes) available on a file system pointed to by a storage path. If multiple storage paths point to the same file system, the free size is not divided among them.

Table 1720. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE

Table 1721. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	db_sto_path_info	Buffer Pool

Usage

You can use this element together with the following elements to gather per-node data on space utilization for the database:

- **db_storage_path**
- **fs_used_size**
- **fs_total_size**
- **fs_id**

stop_time - Event Stop Time

The date and time when the statement stopped executing.

Table 1722. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_stmt	Timestamp

Usage You can use this element with *start_time* to calculate the elapsed statement execution time.

For a FETCH statement event, this is the time of the last successful fetch.

Note: When the Timestamp switch is OFF, this element reports "0".

storage_group_id - Storage group identifier

An integer that uniquely represents a storage group used by the current database.

Table 1723. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - get storage path information for storage groups	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - get table space metrics	ACTIVITY METRICS BASE

Usage notes

- If using the ADMIN_GET_STORAGE_PATHS table function, the storage group identifier indicates the storage group to which a storage path is defined.
- If using the MON_GET_TABLESPACES table function, the storage group identifier indicates which storage group the table space is defined in.

storage_group_name - Storage group name

Name of a storage group.

Table 1724. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_STORAGE_PATHS table function - get storage path information for storage groups	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - get table space metrics	ACTIVITY METRICS BASE

Usage notes

- If using the ADMIN_GET_STORAGE_PATHS table function, this monitor element indicates the storage group to which a storage path is defined.
- If using the MON_GET_TABLESPACES table function, this monitor element indicates which storage group the table space is defined in.

stored_proc_time - Stored Procedure Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to stored procedure statements from all applications or a single application running on this federated server instance from the start of the federated server instance or the last reset of the database monitor counters.

Table 1725. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

The response time is measured as the difference between the time the federated server submits a stored procedure to the data source, and the time it takes the data source to respond, indicating that the stored procedure has been processed.

Usage Use this element to determine how much actual time is spent at this data source processing stored procedures.

stored_procs - Stored Procedures

This element contains a count of the total number of stored procedures from the start of the federated server instance, or the last reset of the database monitor counters, that the federated server has called at this data source on behalf of any application.

Table 1726. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine how many stored procedure calls were made locally at the federated database or by an application against the federated database.

subroutine_id - Subroutine identifier monitor element

A unique subroutine identifier.

This element returns NULL when the object is not a subroutine.

Table 1727. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SECTION_ROUTINE table function - get list of routines for input section	Always collected

Usage

Declared procedures have the same external ROUTINE_ID value as their parent, use this element to differentiate between them.

swap_pages_in - Pages swapped in from disk monitor element

The number of pages swapped in from disk since system startup. Reported for AIX and Linux systems only.

Table 1728. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

swap_pages_out - Pages swapped out to disk monitor element

The number of pages swapped out to disk since since system startup. Reported for AIX and Linux systems only.

Table 1729. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

swap_page_size - Swap page size monitor element

The page size used for swap space, in bytes. Reported for AIX and Linux systems only.

Table 1730. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

sync_runstats - Total number of synchronous RUNSTATS activities monitor element

The total number of synchronous RUNSTATS activities triggered by real-time statistics gathering for all the applications in the database. This value includes both successful and unsuccessful synchronous RUNSTATS commands. Values reported by all the database partitions are aggregated together.

Table 1731. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 1732. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement

For snapshot monitoring, this counter can be reset.

Table 1733. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage

Use this monitor element to determine how many synchronous RUNSTATS activities have been triggered by real-time statistics gathering in the database. This value changes frequently. In order to get a better view of the system usage, take a snapshot at specific intervals over an extended period of time. When used in conjunction with **sync_runstats_time**, this element can help you evaluate the performance impact of synchronous RUNSTATS activities triggered by real-time statistics gathering.

sync_runstats_time - Total time spent on synchronous RUNSTATS activities monitor element

The sync_runstats_time monitor element stores the total time spent on synchronous RUNSTATS activities triggered by real-time statistics gathering, in milliseconds.

The synchronous RUNSTATS activities occur during query compilation. At the database level, this monitor element represents the total time spent on synchronous RUNSTATS activities for all the applications running on the database, triggered by real-time statistics gathering. At the statement level, it represents the time spent on the latest synchronous RUNSTATS activities for a particular statement, triggered by real-time statistics gathering. Values reported by all the database partitions are aggregated together.

Table 1734. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
SNAP_GET_DB_V97 table function - Retrieve snapshot information from the dbase logical group	
SNAPDB administrative view and SNAP_GET_DB table function - Retrieve snapshot information from the dbase logical group	

Table 1735. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Statement
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this element can be reset.

Table 1736. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Statement	event_stmt	Always collected

Usage

Use this element along with **sync_runstats** to evaluate the performance impact of synchronous RUNSTATS activities triggered by real-time statistics gathering, at the database level,

For dynamic SQL snapshot monitor, use this element along with **total_exec_time** and **num_executions** to evaluate the impact of synchronous RUNSTATS on query performance.

For the statement event monitor, use this element along with **stmt_start** and **stmt_stop** for further evaluation of the impact of real-time statistics gathering.

system_auth_id - System authorization identifier monitor element

The system authorization id for the connection.

Table 1737. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 1738. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Threshold violations	event_thresholdviolations	Always collected
Change history	changesummary	Always collected

system_cpu_time - System CPU time monitor element

The total *system* CPU time (in seconds and microseconds) used by the database manager agent process, the unit of work, or the statement. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

When either the statement monitor switch or the timestamp switch is not turned on, this element is not collected. In that case, the monitor element displays -1 instead.

Table 1739. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected
Transactions	event_xact	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Always collected

Usage

This element, along with the other related CPU-time elements, can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

Note: If this information is not available for your operating system, this element will be set to 0.

Note: Due to the differences in granularity with which the DB2 system collects statistics, the value of the **total_exec_time** monitor element might not equal the sum of values of **system_cpu_time** and **user_cpu_time** monitor elements. In this

case, the sum of **system_cpu_time** and **user_cpu_time** monitor elements more accurately reflects the actual total execution time.

tab_file_id - Table file ID monitor element

A file ID (FID) for the table.

Table 1740. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLE_METRICS table function - Get table metrics	ACTIVITY METRICS BASE

Usage

tab_type - Table type monitor element

This interface returns a text identifier based on defines in sqlmon.h, and is one of USER_TABLE, TEMP_TABLE, or CATALOG_TABLE.

Table 1741. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE_METRICS table function - Get table metrics	ACTIVITY METRICS BASE

Usage

table_file_id - Table file ID monitor element

The file ID (FID) for the table.

Table 1742. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Table 1743. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Lock
Table	table	Basic
Lock	appl_lock_list	Lock
Lock	lock	Lock

Table 1744. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Deadlocks	lock	Always collected

Usage

For snapshot monitoring, this element is provided for information purposes only. It is returned for compatibility with previous versions of the database system monitor, and it may not uniquely identify the table. Use **table_name** and **table_schema** monitor elements to identify the table.

In MON_GET_LOCKS and MON_GET_APPL_LOCKWAIT table functions, this element represents the file ID (FID) for the table that the lock references.

table_name - Table name monitor element

The name of the table.

Table 1745. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
ADMINTEMPCOLUMNS administrative view and ADMIN_GET_TEMP_COLUMNS table function - Retrieve column information for temporary tables	ACTIVITY METRICS BASE
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Table 1745. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

Table 1746. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Lock
Lock	lock_wait	Lock

Table 1747. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Tables	event_table	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- ¹ This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Along with **table_schema**, this element can help you determine the source of contention for resources.

At the application-level, application-lock level, and deadlock-monitoring-level, this is the table that the application is waiting to lock, because it is currently locked by another application. For snapshot monitoring, this item is only valid when the “lock” monitor group information is set to ON, and when **lock_object_type** indicates that the application is waiting to obtain a table lock.

For snapshot monitoring at the object-lock level, this item is returned for table-level and row-level locks. The table reported at this level is the table against which this application holds these locks.

For snapshot and event monitoring at the table level, this is the table for which information has been collected. For temporary tables, the format for **table_name** is “TEMP (*n*, *m*)”, where:

- *n* is the table space ID
- *m* is the **table_file_id** element

table_scans - Table scans monitor element

The number of scans on this table.

Table 1748. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

table_schema - Table schema name monitor element

The schema of the table.

Table 1749. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
ADMINTEMPCOLUMNS administrative view and ADMIN_GET_TEMP_COLUMNS table function - Retrieve column information for temporary tables	ACTIVITY METRICS BASE
ADMINTEMPtables administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

Table 1750. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Lock
Lock	lock_wait	Lock

Table 1751. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Tables	event_table	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Along with **table_name**, this element can help you determine the source of contention for resources.

For application-level, application-lock-level, deadlock-monitoring-level, this is the schema of the table that the application is waiting to lock, because it is currently locked by another application. This element is only set if **lock_object_type** indicates that the application is waiting to obtain a table lock. For snapshot monitoring at the application-level and application-lock levels, this item is only valid when the “lock” monitor group information is set to ON.

For snapshot monitoring at the object-lock level, this item is returned for table and row level locks. The table reported at this level is the table against which this application holds these locks.

For snapshot and event monitoring at the table level, this element identifies the schema of the table for which information has been collected. For temporary tables, the format for **table_schema** is “<agent_id><auth_id>”, where:

- *agent_id* is the Application Handle of the application creating the temporary table
- *auth_id* is the authorization ID used by the application to connect to the database

table_type - Table type monitor element

The type of table for which information is returned.

Table 1752. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Table 1753. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 1754. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage

Use this element to help identify the table for which information is returned. If the table is a user table or a system catalog table, you can use **table_name** and **table_schema** to identify the table.

The type of table may be one of the following values. The possible values are text strings based on defines in the `sqlmon.h` file.

USER_TABLE

User table.

TEMP_TABLE

Temporary table. Information regarding temporary tables is returned, even though the tables are not kept in the database after being used. You may still find information about this type of table useful.

CATALOG_TABLE

System catalog table.

tablespace_auto_resize_enabled - Table space automatic resizing enabled monitor element

This element describes whether automatic resizing is enabled for the table space. A value of 1 means "Yes"; a value of 0 means "No".

Table 1755. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1756. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage

This element is only applicable to DMS table spaces and non-temporary automatic storage table spaces. If this element is set to 1, then automatic resizing is enabled. See the following monitor elements for information about the rate of increase and the maximum size for the table space.

- **tablespace_max_size**
- **tablespace_increase_size**
- **tablespace_increase_size_percent**

tablespace_content_type - Table space content type monitor element

The type of content in a table space.

Table 1757. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1758. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage

The type of content in the table space (defined in sqlmon.h) can be one of the following values:

- All types of permanent data.
 - Regular table space: `SQLM_TABLESPACE_CONTENT_ANY`
 - Large table space: `SQLM_TABLESPACE_CONTENT_LARGE`
- System temporary data: `SQLM_TABLESPACE_CONTENT_SYSTEMP`
- User temporary data: `SQLM_TABLESPACE_CONTENT_USRTEMP`

tablespace_cur_pool_id - Buffer pool currently being used monitor element

The buffer pool identifier for a buffer pool that a table space is currently using.

Table 1759. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1760. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage Each buffer pool is identified by a unique integer. The value of this element matches a value from column BUFFERPOOLID of view SYSCAT.BUFFERPOOLS.

tablespace_current_size - Current table space size

This element shows the current size of the table space in bytes.

Table 1761. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage For DMS and automatic storage table spaces, this element represents the total size of all table space containers in bytes. This value is equal to the total pages for the table space (tablespace_total_pages) multiplied by the table space's page size (tablespace_page_size). This element is not applicable for SMS table spaces, or for temporary automatic storage table spaces.

On table space creation for an automatic storage table space, the current size might not match the initial size. The value of current size will be within page size multiplied by extent size multiplied by the number of storage paths of the initial size on creation (usually greater, but sometimes smaller). It will always be less than or equal to tablespace_max_size (if set). This is because containers can only grow by full extents, and must be grown as a set.

tablespace_extent_size - Table space extent size monitor element

The extent size used by a table space.

Table 1762. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1763. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

tablespace_free_pages - Free pages in table space monitor element

The total number of pages that are currently free in a table space.

Table 1764. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1765. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

This is applicable only to a DMS table space.

tablespace_id - Table space identification monitor element

An integer that uniquely represents a table space used by the current database.

Table 1766. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_GET_APPL_LOCKWAIT table function - get information about locks for which an application is waiting	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1767. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic
Table	table	Basic

Table 1768. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage

The value of this element matches a value from column TBSPACEID of view SYSCAT.TABLESPACES.

tablespace_increase_size - Increase size in bytes

This element shows the size that an auto-resize table space will increase by in bytes when the table space becomes full and more space is required.

Table 1769. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This represents the amount of space that will be added to a table space that can be automatically resized when it becomes full, more space is being requested, and the maximum table space size has not been reached. If the value of this element is -1 (or "AUTOMATIC" in the snapshot output), then DB2 automatically determines the value when space needs to be added. This element is only applicable to table spaces that are enabled to be automatically resized.

tablespace_increase_size_percent - Increase size by percent monitor element

This element shows the amount by which an auto-resize table space will increase when the table space becomes full and more space is required. The actual number of bytes is determined at the time the table space is resized based on the size of the table space at that time.

Table 1770. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This represents the amount of space that will be added to a table space that can be automatically resized when it becomes full, more space is being requested, and the maximum table space size has not been reached. The growth rate is based on a percentage of the current table space size (tablespace_current_size) at the time the table space is resized. This element is only applicable to table spaces that are enabled to be automatically resized.

tablespace_initial_size - Initial table space size

The initial size of the automatic storage table space in bytes.

Table 1771. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage For non-temporary automatic storage table spaces, this monitor element represents the initial size in bytes for the table space when it was created.

tablespace_last_resize_failed - Last resize attempt failed

This element describes whether or not the last attempt to automatically increase the size of the table space failed. A value of 1 means yes, 0 means no.

Table 1772. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage For an automatic storage table space, this element may show that there is no space left on any of the database's storage paths. For a non-automatic storage table space, a failure means that one of the containers could not be extended because its filesystem was full. Another reason for failure is that the maximum size of the table space has been reached. This element is only applicable to table spaces that are enabled to be automatically resized.

tablespace_last_resize_time - Time of last successful resize

This element shows a timestamp representing the last time that the size of the table space was successfully increased.

Table 1773. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage For table spaces that can be automatically resized, this element represents the last time that space was automatically added to the table space when it became full, more space was being requested, and the maximum table space size had not been reached. This element is only applicable to table spaces that are enabled to be automatically resized.

tablespace_max_size - Maximum table space size

This element shows the maximum size in bytes to which the table space can automatically resize or increase.

Table 1774. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1775. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This represents the maximum size in bytes to which a table space that can be automatically resized can automatically increase. If this value is equal to the tablespace_current_size element, then there is no room for the table space to grow. If the value of this element is -1, then the maximum size is considered to be "unlimited" and the table space can automatically resize until the file systems are full or the architectural size limit of the table

space is reached. (This limit is described in the SQL Limits appendix of the *SQL Reference*). This element is only applicable to table spaces that are enabled for automatic resizing.

tablespace_min_recovery_time - Minimum recovery time for rollforward monitor element

A timestamp showing the earliest point in time to which a table space can be rolled forward. The timestamp reflects local time.

Table 1776. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1777. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

Displayed only if non zero.

tablespace_name - Table space name monitor element

The name of a table space.

Table 1778. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS - Get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1779. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic
Lock	appl_lock_list	Basic
Lock	lock	Lock
Lock	lock_wait	Lock

Table 1780. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	-
Deadlocks ¹	lock	-
Deadlocks ¹	event_dlconn	-
Deadlocks with Details ¹	event_detailed_dlconn	-
Table Space	tablespace_list	-

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

This element can help you determine the source of contention for resources.

It is equivalent to the TBSpace column in the database catalog table SYSCAT.TABLESPACES. At the application level, application-lock level, and deadlock monitoring level, this is the name of the table space that the application is waiting to lock. Another application currently holds a lock on this table space.

At the lock level, this is the name of the table space against which the application currently holds a lock.

At the table space level (when the buffer pool monitor group is ON), this is the name of the table space for which information is returned.

This element will not be returned for a table lock held on a partitioned table.

tablespace_next_pool_id - Buffer pool that will be used at next startup monitor element

The buffer pool identifier for a buffer pool that a table space will use at the next database startup.

Table 1781. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1782. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage Each buffer pool is identified by a unique integer. The value of this element matches a value from column BUFFERPOOLID of view SYSCAT.BUFFERPOOLS

tablespace_num_containers - Number of Containers in Table Space

Total number of containers in the table space.

Table 1783. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

tablespace_num_quiescers - Number of Quiescers

The number of users quiescing the table space (can be in the range of 0 to 5).

Table 1784. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This value represents the number of agents that have quiesced the table space (either in "SHARE", "UPDATE", or "EXCLUSIVE" mode). For each quiescer, the following information is returned in a tablespace_quiescer logical data group:

- User authorization ID of the quiescer
- Agent ID of the quiescer
- Table space ID of the object that was quiesced that resulted in this table space being quiesced
- Object ID of the object that was quiesced that resulted in this table space being quiesced
- Quiesce state

tablespace_num_ranges - Number of Ranges in the Table Space Map

The number of ranges (entries) in the table space map. This can be in the range of 1 to 100's (but is usually less than a dozen). The table space map only exists for DMS table spaces.

Table 1785. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

tablespace_page_size - Table space page size monitor element

Page size used by a table space in bytes.

Table 1786. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1787. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

tablespace_page_top - Table space high watermark monitor element

The page in a table space that is holding the high watermark.

Table 1788. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1789. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

For DMS, this element represents the page number of the first free extent following the last allocated extent of a table space. Note that this is not really a "high watermark", but rather a "current watermark", since the value can decrease. For SMS, this is not applicable.

tablespace_paths_dropped - Table space using dropped path monitor element

Indicates that the table space is using a storage path that has been dropped.

Table 1790. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1791. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

For table spaces using automatic storage, use this monitor element to determine whether any of the table space containers reside on a storage path that has been dropped. Before storage paths are physically dropped from the database, all table spaces must stop using them. To stop using a dropped storage path, either drop the table space or rebalance the table space using the REBALANCE clause of the ALTER TABLESPACE statement.

tablespace_pending_free_pages - Pending free pages in table space monitor element

The number of pages in a table space which would become free if all pending transactions are committed or rolled back and new space is requested for an object.

Table 1792. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1793. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

This is applicable only to a DMS table space.

tablespace_prefetch_size - Table space prefetch size monitor element

The maximum number of pages the prefetcher gets from the disk at a time.

Table 1794. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1795. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic
Table Space	tablespace_nodeinfo	Basic

Usage

- For table function monitoring, this element always reports the actual value for the table space prefetch size.
- For snapshot monitoring, if automatic prefetch size is enabled, this element reports the value "-1" in the *tablespace* Logical Data Grouping, and the actual value is reported in the *tablespace_nodeinfo* Logical Data Grouping.
- For snapshot monitoring, if automatic prefetch size is not enabled, this element reports the actual value in the *tablespace* Logical Data Grouping, and the element does not appear in the *tablespace_nodeinfo* Logical Data Grouping.

tablespace_rebalancer_extents_processed - Number of extents the rebalancer has processed

The number of extents that the rebalancer has already moved since the rebalancer has been started or restarted (whichever is most recent).

Table 1796. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1797. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This can be used as an indicator of the completion level of the rebalancer. You can monitor the progress of rebalancing by keeping track of the change in this element over time. You can use `tablespace_state` and `rebalance_mode` to check if the rebalancing is completed. This is only applicable to a DMS table space.

tablespace_rebalancer_extents_remaining - Total number of extents to be processed by the rebalancer

The number of extents to be moved. This value is calculated at either the rebalancer start time or restart time (whichever is most recent).

Table 1798. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1799. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This element can be used as an indicator of the completion level of the rebalancer. You can monitor the progress of rebalancing by keeping track of the change in this element over time. You can use `tablespace_state` to check if rebalancing has completed. This is only applicable to a DMS table space.

tablespace_rebalancer_last_extent_moved - Last extent moved by the rebalancer

The last extent moved by the rebalancer.

Table 1800. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1801. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This can be used as an indicator of the completion level of the rebalancer. You can monitor the progress of rebalancing by keeping track of the change in this element over time. You can use `tablespace_state` and `rebalance_mode` to check if the rebalancing is completed. This is only applicable to a DMS table space.

tablespace_rebalancer_mode - Rebalancer mode monitor element

Indicates whether the current rebalance process is removing space from a table space or adding space to a table space.

Table 1802. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1803. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

A *forward rebalance* occurs when new containers are added or existing containers have their size increased. In a forward rebalancing operation, data movement starts with the first extent in the table space and ends with the high watermark extent.

A *reverse rebalance* occurs when containers are removed or reduced in size and data needs to move out of the space being freed. In a reverse rebalancing operation, data movement starts at the high watermark extent and moves in reverse order through the table space, ending with the first extent in the table space.

A *two-pass rebalance* is a forward rebalance followed by a reverse rebalance. A two-pass rebalance might occur when containers are being both added and dropped as part of the rebalance operation.

For DMS non-automatic storage table spaces, this monitor element indicates the type of rebalance that is occurring for the table space. Only a single forward rebalance or a single reverse rebalance can occur for DMS non-automatic table space.

For automatic storage table spaces, this monitor element indicates what the current rebalance process is doing to the table space. In general, only a single forward rebalance or a single reverse rebalance is necessary when a rebalance is initiated. However, there are cases when a two-pass rebalance is necessary for automatic storage table spaces.

The possible **tablespace_rebalancer_mode** values are defined in the `sqlmon.h` file. The following values are returned in snapshot monitoring:

SQLM_TABLESPACE_NO_REBAL

No rebalancing is taking place.

SQLM_TABLESPACE_FWD_REBAL

Forward rebalance is taking place.

SQLM_TABLESPACE_REV_REBAL

Reverse rebalance is taking place.

SQLM_TABLESPACE_FWD_REBAL_OF_2PASS

The forward rebalance phase of two pass rebalance is taking place.

SQLM_TABLESPACE_REV_REBAL_OF_2PASS

The reverse rebalance phase of two pass rebalance is taking place.

If using either the `MON_GET_TABLESPACE` or the `MON_GET_REBALANCE_STATUS` table function, the following `rebalancer_mode` values are returned:

- NO_REBAL
- FWD_REBAL
- REV_REBAL
- FWD_REBAL_OF_2PASS
- REV_REBAL_OF_2PASS

tablespace_rebalancer_priority - Current rebalancer priority

The priority at which the rebalancer is running in the database.

Table 1804. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1805. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This is only applicable to a DMS table space.

tablespace_rebalancer_restart_time - Rebalancer restart time

A timestamp representing when a rebalancer was restarted after being paused or suspended.

Table 1806. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1807. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This can be used as an indicator of the completion level of the rebalancer. It will note when the rebalancer was restarted, and will allow for the derivation of the speed of the rebalancer and the estimated time until completion. This is only applicable to a DMS table space.

tablespace_rebalancer_source_storage_group_id - Rebalancer source storage group identifier

The source storage group identifier if the rebalancer is moving a table space from one storage group to another. Otherwise, it is -1.

Table 1808. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE

tablespace_rebalancer_source_storage_group_name - Rebalancer source storage group name

The source storage group name if the rebalancer is moving a table space from one storage group to another. Otherwise, it is NULL.

Table 1809. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE

tablespace_rebalancer_start_time - Rebalancer start time

A timestamp representing when a rebalancer was initially started.

Table 1810. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Table 1811. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This will be used to note the time at which a rebalancer was initially started. This can be used to derive metrics as to the speed at which the rebalancer is operating, and the estimated time of completion of the rebalance. This is only applicable to a DMS table space.

tablespace_rebalancer_status - Rebalancer status monitor element

Indicates the current status of the rebalance operation.

Table 1812. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE

Usage note

Current status of the rebalance operation is one of:

- ACTIVE - Rebalance operation is active.
- SUSPENDED - Rebalance operation has been explicitly suspended by a user using the ALTER TABLESPACE statement.
- PAUSED - Rebalance operation has been implicitly paused due to an online backup. The rebalance will proceed when the backup is complete.

If the rebalance operation has been explicitly suspended and implicitly paused, the status is reported as SUSPENDED.

tablespace_rebalancer_target_storage_group_id - Rebalancer target storage group identifier

The target storage group identifier if the rebalancer is moving a table space from one storage group to another. Otherwise, it is -1.

Table 1813. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE

This monitor element is connected to the `target_storage_group_name` monitor element, as well as `source_storage_group_id` monitor element and `source_storage_group_name` monitor element. You use these elements together to understand if a rebalance operation is moving a tablespace from one storage group to another, and to understand which storage group the tablespace is moving from (the source) and where it is moving to (the target).

tablespace_rebalancer_target_storage_group_name - Rebalancer target storage group name

The target storage group name if the rebalancer is moving a table space from one storage group to another. Otherwise, it is NULL.

Table 1814. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE

tablespace_state - Table space state monitor element

This element describes the current state of a table space.

Table 1815. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1816. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

In administrative views and table functions, this monitor element returns a text identifier based on defines in `sqlutil.h`, and is combination of the following values separated by a '+' sign:

- BACKUP_IN_PROGRESS
- BACKUP_PENDING
- DELETE_PENDING
- DISABLE_PENDING
- DROP_PENDING
- LOAD_IN_PROGRESS
- LOAD_PENDING
- MOVE_IN_PROGRESS
- NORMAL
- OFFLINE
- PSTAT_CREATION

- PSTAT_DELETION
- QUIESCED_EXCLUSIVE
- QUIESCED_SHARE
- QUIESCED_UPDATE
- REBAL_IN_PROGRESS
- REDIST_IN_PROGRESS
- REORG_IN_PROGRESS
- RESTORE_IN_PROGRESS
- RESTORE_PENDING
- ROLLFORWARD_IN_PROGRESS
- ROLLFORWARD_PENDING
- STORDEF_ALLOWED
- STORDEF_CHANGED
- STORDEF_FINAL_VERSION
- STORDEF_PENDING
- SUSPEND_WRITE

This element contains a hexadecimal value indicating the current table space state. The externally visible state of a table space is composed of the hexadecimal sum of certain state values. For example, if the state is "quiesced: EXCLUSIVE" and "Load pending", the value is 0x0004 + 0x0008, which is 0x000c. Use the **db2tbst** command to obtain the table space state associated with a given hexadecimal value.

Table 1817. Bit definitions listed in sqlutil.h

Hexadecimal Value	Decimal Value	State
0x0	0	Normal (see the definition SQLB_NORMAL in sqlutil.h)
0x1	1	Quiesced: SHARE
0x2	2	Quiesced: UPDATE
0x4	4	Quiesced: EXCLUSIVE
0x8	8	Load pending
0x10	16	Delete pending
0x20	32	Backup pending
0x40	64	Roll forward in progress
0x80	128	Roll forward pending
0x100	256	Restore pending
0x100	256	Recovery pending (not used)
0x200	512	Disable pending
0x400	1024	Reorg in progress
0x800	2048	Backup in progress
0x1000	4096	Storage must be defined
0x2000	8192	Restore in progress
0x4000	16384	Offline and not accessible
0x8000	32768	Drop pending
0x10000	65536	No write is allowed

Table 1817. Bit definitions listed in sqlutil.h (continued)

Hexadecimal Value	Decimal Value	State
0x20000	131072	Load in progress
0x40000	262144	Redistribute in progress
0x80000	524288	Move in progress
0x2000000	33554432	Storage may be defined
0x4000000	67108864	Storage Definition is in 'final' state
0x8000000	134217728	Storage Definition was changed before rollforward
0x10000000	268435456	DMS rebalancer is active
0x20000000	536870912	TBS deletion in progress
0x40000000	1073741824	TBS creation in progress

Note: DB2 LOAD does not set the table space state to Load pending or Delete pending.

tablespace_state_change_object_id - State Change Object Identification

The object that caused the table space state to be set to "Load pending" or "Delete pending".

Element identifier

tablespace_state_change_object_id

Element type

information

Table 1818. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This element is meaningful only if the table space state is "Load pending" or "Delete pending". If nonzero, the value of this element matches a value from column TABLEID of view SYSCAT.TABLES.

Note: DB2 LOAD does not set the table space state to Load pending or Delete pending.

tablespace_state_change_ts_id - State Change Table Space Identification

If the table space state is "Load pending" or "Delete pending", this shows the table space ID of the object that caused the table space state to be set.

Element identifier

tablespace_state_change_ts_id

Element type

information

Table 1819. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage This element is meaningful only if the table space state is "Load pending" or "Delete pending". If nonzero, the value of this element matches a value from column TABLESPACEID of view SYSCAT.TABLES.

Note: DB2 LOAD does not set the table space state to Load pending or Delete pending.

tablespace_total_pages - Total pages in table space monitor element

Total number of pages in a table space.

Table 1820. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1821. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic (DMS table spaces) Buffer Pool (SMS table spaces)

Usage

Total operating system space occupied by a table space. For DMS, this is the sum of the container sizes. For SMS, this is the sum of all file space used for the tables stored in this table space (and is only collected if the buffer pool switch is on).

tablespace_type - Table space type monitor element

The type of a table space.

Table 1822. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1823. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage

This element shows whether this table space is a database managed table space (DMS), or system managed table space (SMS).

The values for `tablespace_type` (defined in `sqlmon.h`) are as follows:

- For DMS: `SQLM_TABLESPACE_TYP_DMS`
- For SMS: `SQLM_TABLESPACE_TYP_SMS`

tablespace_usable_pages - Usable pages in table space monitor element

The total number of pages in a table space minus overhead pages.

Table 1824. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1825. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic (DMS table spaces) Buffer Pool (SMS table spaces)

Usage

This element is applicable to DMS table spaces only. For SMS table spaces, this element will have the same value as the **tablespace_total_pages** monitor element.

During a table space rebalance, the number of usable pages will include pages for the newly added container, but these new pages may not be reflected in the number of free pages until the rebalance is complete. When a table space rebalance is not taking place, the number of used pages plus the number of free pages, plus the number of pending free pages will equal the number of usable pages.

tablespace_used_pages - Used pages in table space monitor element

The total number of pages that are currently used (not free) in a table space.

Table 1826. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1827. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic (DMS table spaces) Buffer Pool (SMS table spaces)

Usage

This is the total number of pages in use for a DMS table space. For an SMS table space it is equal to the value of **tablespace_total_pages** monitor element.

tablespace_using_auto_storage - Table space enabled for automatic storage monitor element

This element describes whether the table space was created as an automatic storage table space. A value of 1 means "Yes"; a value of 0 means "No".

Table 1828. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 1829. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace	Basic

Usage

You can use this element to determine whether the given table space was created using automatic storage (that is, created with the **MANAGED BY AUTOMATIC STORAGE** clause), rather than with containers that are explicitly provided. The table space can have containers that exist on some or all of the storage paths associated with the database.

target_cf_gbp_size - Target cluster caching facility group buffer pool size monitor element

During a dynamic resize, this monitor element shows the group buffer pool memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 1830. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

target_cf_lock_size - Target cluster caching facility lock size monitor element

During a dynamic resize, this monitor element shows the global lock memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 1831. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

target_cf_sca_size - Target cluster caching facility shared communications area size monitor element

During a dynamic resize, this monitor element shows the shared communications area memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 1832. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

tbsp_datatag - Table space data tag

This element identifies the effective data tag value for a table space. The effective data tag is the data tag value that was specified explicitly for the table space or inherited from the table space storage group.

Valid user-specified range is 1 through 0; 0 indicates no data tag specified.

Table 1833. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - get table space metrics	ACTIVITY METRICS BASE

Usage note

A data tag is used to identify and group data that can be referenced within WLM configurations. The WLM configurations determine the effect of the tagging which may affect the processing priority of user work.

tbsp_last_consec_page - Last consecutive object table page monitor element

Object relative page number of the last contiguous meta-data page for the table space. This value is only valid for DMS table spaces. It is 0 otherwise.

Table 1834. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

tbsp_max_page_top - Maximum table space page high watermark monitor element

The highest allocated page number for a DMS table space since the database was activated.

Table 1835. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Usage

This value changes whenever the value of the **tablespace_page_top** monitor element increases.

tbsp_names - Table space names

This element lists the table space names that the utility acts on.

Table 1836. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTART	Always collected

Usage

For the change history event monitor, if the **object_type** element is DATABASE or TABLESPACE, this is a comma delimited list of table space names that the utility acts on.

tbsp_trackmod_state - Table space trackmod state monitor element

The modification state that a table space is in with respect to the last or next backup.

Table 1837. Table function monitoring information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	Always

Usage

You can use this monitor element to determine the modification status of a table space. The status of a table space can be in one of the following states:

CLEAN

No modifications occurred in the table space since the previous backup. If an incremental or delta backup is executed at this time, no data pages from this table space would be backed up.

DIRTY

Table space contains data that needs to be picked up by the next backup.

ININCREMENTAL

Table space contains modifications that were copied into an incremental backup. This state is in a DIRTY state relative to a full backup such that a future incremental backup needs to include some pages from this pool. This state is also in a CLEAN state such that a future delta backup does not need to include any pages from this pool.

READFULL

The latest table space modification state change was caused by a dirty table space that is being read by a full backup that might not have completed successfully, or is currently in progress.

READINCREMENTAL

The latest table space modification state change was caused by a dirty table space that is being read by an incremental backup that might not have completed successfully, or is currently in progress.

UNAVAILABLE

The **trackmod** configuration parameter is set to No. Therefore, no table space modification status information is available.

tcpip_recv_volume - TCP/IP received volume monitor element

The amount of data received by the data server from clients over TCP/IP. This value is reported in bytes.

Table 1838. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1838. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1839. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

tcPIP_recv_wait_time - TCP/IP received wait time monitor element

The time spent waiting for an incoming client request over TCP/IP excluding idle time. The value is given in milliseconds.

Table 1840. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1840. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1841. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

tcpip_recvs_total - TCP/IP receives total monitor element

The number of times data was received by the database server from the client application over TCP/IP.

Table 1842. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1842. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1843. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

tcPIP_send_volume - TCP/IP send volume monitor element

The amount of data sent by data server to client. This value is reported in bytes.

Table 1844. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1845. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

tcpip_send_wait_time - TCP/IP send wait time monitor element

Time spent blocking on a TCP/IP send to the client. The value is given in milliseconds.

Table 1846. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1847. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	-

tcPIP_sends_total - TCP/IP sends total monitor element

The number of times data was sent from the database server to the client application over TCP/IP.

Table 1848. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1849. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1849. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	Always collected

temp_tablespace_top - Temporary table space top monitor element

The temp_tablespace_top monitor element is a high watermark, in KB, for the temporary table space usage of DML activities at all nesting levels in a service class or work class.

For service classes, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class is set to NONE. For work classes, this monitor elements returns -1 if no COLLECT AGGREGATE ACTIVITY DATA work action is specified for the work class. For workloads, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE.

For service classes, when you remap activities between service subclasses with a REMAP ACTIVITY action, only the temp_tablespace_top high watermark of the service subclass where an activity completes is changed. High watermarks of service subclasses an activity is mapped to but does not complete in are unaffected.

Table 1850. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats	-
Statistics	event_wcstats	-
Statistics	event_wlstats	-

Usage

Use this element to determine the highest DML activity system temporary table space usage reached on a member for a service class, workload, or work class in the time interval collected.

This element is only updated by activities that have a temporary table space threshold applied to them. If no temporary table space threshold is applied to an activity, a value of 0 is returned.

territory_code - Database Territory Code

The territory code of the database for which the monitor data is collected. This monitor element was formerly known as country_code.

Table 1851. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
Application	appl	Basic

Table 1852. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	Always collected
Connections	event_connheader	Always collected

Usage Territory code information is recorded in the database configuration file.
For DRDA AS connections, this element will be set to 0.

thresh_violations - Number of threshold violations monitor element

Number of times a threshold was violated.

This monitor element is an alias of the “num_threshold_violations - Number of threshold violations monitor element” on page 1070 monitor element, which is returned by snapshot monitoring routines and the Database event monitor.

Table 1853. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, “Monitor element collection levels,” on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1853. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1854. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this element to quickly determine if there have been any WLM thresholds that have been violated. If thresholds have been violated you can then use the threshold violations event monitor (if created and active) to obtain details about the threshold violations.

For example, to obtain details which threshold was violated.

threshold_action - Threshold action monitor element

The action of the threshold to which this threshold violation record applies. Possible values include Stop, Continue and Remap.

Table 1855. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element to determine whether the activity that violated the threshold was stopped when the violation occurred, was allowed to continue executing, or was

remapped to another service subclass. If the activity was stopped, the application that submitted the activity will have received an SQL4712N error. If the activity was remapped to another service subclass, agents working for the activity on the member will be moving to the target service subclass of the threshold.

threshold_domain - Threshold domain monitor element

The domain of the threshold responsible for this queue.

Possible values are

- Database
- Work Action Set
- Service Superclass
- Service Subclass
- Workload

Table 1856. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1857. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-

Usage

This element can be used for distinguishing the queue statistics of thresholds that have the same predicate but different domains.

threshold_maxvalue - Threshold maximum value monitor element

For non-queuing thresholds, this monitor element represents the value that was exceeded to cause this threshold violation. For queuing thresholds, this monitor element represents the level of concurrency that caused the queuing.

The level of concurrency that caused the violation of the queuing threshold is the sum of **threshold_maxvalue** and **threshold_queuesize** monitor elements.

Table 1858. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	Always collected

Usage

For activity thresholds, this element provides a historical record of what the threshold's maximum value was at the time the threshold was violated. This is useful when the threshold's maximum value has changed since the time of the violation and the old value is no longer available from the SYSCAT.THRESHOLDS view. For the DATATAGINSC IN and DATATAGINSC NOT IN thresholds, this element contains the value of the data tag that violated the threshold.

threshold_name - Threshold name monitor element

The unique name of the threshold responsible for this queue.

Table 1859. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1860. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-

Usage

Use this element to uniquely identify the queuing threshold whose statistics this record represents.

threshold_predicate - Threshold predicate monitor element

Identifies the type of threshold that was violated or for which statistics were collected.

Table 1861. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1862. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	Always collected
Statistics	event_qstats	Always collected

Usage

Use this monitor element in conjunction with other statistics or threshold violation monitor elements for analysis of a threshold violation.

The valid values for this monitor element when reported in the event_thresholdviolations logical group are:

- AggSQLTempSpace
- SQLTempSpace
- SQLRowsReturned
- ActivityTotalTime
- EstimatedSQLCost
- TotalMemberConnections
- ConnectionIdleTime

ConcurrentWorkloadOccurrences
 ConcurrentWorkloadActivities
 ConcurrentDBCoordActivities
 TotalSCMemberConnections
 SQLRowsRead
 SQLRowsReadInSC
 CPUTime
 CPUTimeInSC
 UowTotalTime
 DataTagInSC
 DataTagNotInSC

The valid values for this monitor element when reported in the event_qstats logical group are:

TotalMemberConnections
 ConcurrentDBCoordActivities
 TotalSCMemberConnections

threshold_queuesize - Threshold queue size monitor element

The size of the queue for a queuing threshold. An attempt to exceed this size causes a threshold violation. For a non-queuing threshold, this value is 0.

Table 1863. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element to determine the number of activities or connections in the queue for this threshold at the time the threshold was violated.

thresholdid - Threshold ID monitor element

Identifies the threshold to which a threshold violation record applies or for which queue statistics were collected.

Table 1864. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE

Table 1865. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-
Statistics	event_qstats	-

Usage

Use this monitor element in conjunction with other activity history monitor elements for analysis of a threshold queue or for analysis of the activity that violated a threshold.

time_completed - Time completed monitor element

The time at which the activity described by this activity record finished executing. This element is a local timestamp.

Table 1866. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity.

This field has a value of "0000-00-00-00.00.00.000000" when a full activity record could not be written to a table event monitor due to memory limitations. If the activity was captured while it was in progress, then this field represents the time that activity was collected.

time_created - Time created monitor element

The time at which a user submitted the activity described by this activity record. This element is a local timestamp.

Table 1867. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity.

time_of_violation - Time of violation monitor element

The time at which the threshold violation described in this threshold violation record occurred. This element is a local timestamp.

Table 1868. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Threshold violations	event_thresholdviolations	-

Usage

Use this element in conjunction with other threshold violations monitor elements for analysis of a threshold violation.

time_stamp - Snapshot Time

The date and time when the database system monitor information was collected.

Table 1869. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Usage You can use this element to help relate data chronologically if you are saving the results in a file or database for ongoing analysis.

time_started - Time started monitor element

The time at which the activity described by this activity record began executing. This element is a local timestamp.

Table 1870. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity.

If the activity got rejected, then the value of **act_exec_time** monitor element is 0. In this case, the value of **time_started** monitor element equals the value of **time_completed** monitor element.

time_zone_disp - Time Zone Displacement

Number of seconds that the local time zone is displaced from Greenwich Mean Time (GMT).

Table 1871. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	collected	Basic

Usage All time reported by reported by the database system monitor is GMT, this displacement calculates the local time.

top - Histogram bin top monitor element

The inclusive top end of the range of a histogram bin. The value of this monitor element is also the bottom exclusive end of the range of the next histogram bin.

Table 1872. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	-

Usage

Use this element with the corresponding **bottom** element to determine the range of a bin within a histogram.

tot_log_used_top - Maximum Total Log Space Used

The maximum amount of total log space used (in bytes).

Table 1873. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1874. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Table 1875. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You can use this element to help evaluate the amount of primary log space that you have allocated. Comparing the value of this element with the amount of primary log space you have allocated can help you to evaluate your configuration parameter settings. Your primary log space allocation can be calculated using the following formula:

$$\text{logprimary} \times \text{logfilsiz} \times 4096 \text{ (see note below)}$$

You can use this element in conjunction with *sec_log_used_top* and *sec_logs_allocated* to show your current dependency on secondary logs.

This value includes space used in both primary and secondary log files.

You may need to adjust the following configuration parameters:

- logfilsiz
- logprimary
- logsecond

Note: While the database system monitor information is given in bytes, the configuration parameters are set in pages, which are each 4K bytes.

total_act_time - Total activity time monitor element

The total amount of time spent executing activities. This value is given in milliseconds.

Table 1876. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1876. Table Function Monitoring Information (continued)

Table Function	Monitor Element	Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS	BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS	BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS	BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS	BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected	
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected	
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS	BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS	BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS	BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS	BASE

Table 1877. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this monitor element along with the **total_act_wait_time** monitor element to determine the percentage of time the data server spent working on the activity.

$$\frac{(\text{total_act_time} - \text{total_act_wait_time})}{(\text{total_act_time})} =$$

% of time data server is actively working on activity

total_act_wait_time - Total activity wait time monitor element

Total time spent waiting within the DB2 database server, while processing an activity. The value is given in milliseconds.

Table 1878. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1878. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1879. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this monitor element along with the **total_act_time** monitor element to determine the percentage of time the data server spent working on the activity.

$$\frac{(\text{total_act_time} - \text{total_act_wait_time})}{(\text{total_act_time})} = \text{\% of time data server is actively working on activity}$$

total_app_commits - Total application commits monitor elements

Total number of commit statements issued by the client application.

Table 1880. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 1880. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1881. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_app_rollbacks - Total application rollbacks monitor element

Total number of rollback statements issued by the client application.

Table 1882. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1882. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1883. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_app_rqst_time - Total application request time monitor element

The total elapsed time spent on application requests; this is the total time spent by coordinator agents on the server executing application requests. This value is reported in milliseconds.

Table 1884. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1884. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Usage

Use this monitor element to determine the time that the application request spent in the DB2 data server. This value can be used to help determine if the data server is the source of an observed performance problem.

For example, if a user reports that there is a problem with an application and it has taken 20 minutes to return, and if you determine that total application request time is 1 minute and there are currently no application requests in progress for the connection, then the performance problem might lie outside of the DB2 data server.

total_app_section_executions - Total application section executions monitor element

Number of section executions performed by an application.

Table 1885. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1886. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_buffers_rcvd - Total FCM Buffers Received

For snapshot monitor, this monitor element reports the total number of FCM buffers received by the node issuing the GET SNAPSHOT command from the node identified by the **node_number** monitor element. For table function monitor, this monitor element reports the total number of FCM buffers received from a remote database member.

Table 1887. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

Table 1888. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm_node	Basic

Usage

Use this element to measure the level of traffic between the current member and the remote member. If the total number of FCM buffers received from this member is high, consider redistributing the database or moving tables to reduce the traffic between members.

total_buffers_sent - Total FCM Buffers Sent

For snapshot monitor, this monitor element reports the total number of FCM buffers that have been sent from the node issuing the GET SNAPSHOT command to the node identified by the **node_number** monitor element. For table function monitor, this monitor element reports the total number of FCM buffers sent from the current database member to a remote database member.

Table 1889. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE

Table 1890. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	fcm_node	Basic

Usage

Use this element to measure the level of traffic between the current member and the remote member. If the total number of FCM buffers sent to this member is high, consider redistributing the database or moving tables to reduce the traffic between members.

total_bytes_received - Bytes received monitor element

Total number of bytes received since the network adapter started.

Table 1891. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

total_bytes_sent - Bytes sent monitor element

Total number of bytes sent s since the network adapter started.

Table 1892. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE

total_commit_proc_time - Total commits processing time monitor element

The total amount of processing (non-wait) time spent performing commit processing on the database server. The value is given in milliseconds.

Table 1893. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1893. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1894. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_commit_time - Total commit time monitor element

The total amount of time spent performing commit processing on the database server. The value is given in milliseconds.

Table 1895. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1896. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1896. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_compilations - Total compilations monitor element

The total number of explicit compiles on the database server. Explicit compiles are compilations directly initiated by a user request such as a bind, rebind, prepare or execute immediate.

Table 1897. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1898. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_compile_proc_time - Total compile processing time monitor element

The total amount of processing (non-wait) time spent performing explicit compiles on the database server. Explicit compiles are compilations directly initiated by a user request such as a bind, rebind, prepare or execute immediate. The value is given in milliseconds.

Table 1899. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1899. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1900. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_compile_time - Total compile time monitor element

The total amount of time spent performing explicit compiles on the database server. Explicit compiles are compilations directly initiated by a user request such as a bind, rebind, prepare or execute immediate. The value is given in milliseconds.

Table 1901. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 1901. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1902. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_cons - Connects Since Database Activation

Indicates the number of connections to the database since the first connect, activate, or last reset (coordinator agents).

Table 1903. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic

For snapshot monitoring, this counter can be reset.

Table 1904. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected

Usage You can use this element in conjunction with the db_conn_time and the db2start_time monitor elements to calculate the frequency at which applications have connected to the database.

If the frequency of connects is low, you may want to explicitly activate the database using the `ACTIVATE DATABASE` command before connecting any other application, because of the extra processing time that is associated with the first connect to a database (for example, initial buffer pool allocation). This will result in subsequent connects being processed at a higher rate.

Note: When you reset this element, its value is set to the number of applications that are currently connected, not to zero.

total_connect_authentication_proc_time - Total connection authentication processing time monitor element

The amount of processing (non-wait) time spent performing connection or switch user authentication, in milliseconds.

Table 1905. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1906. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_sclist (reported in the details_xml) document)	REQUEST METRICS BASE

Table 1906. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_connect_authentications - Connections or switch user authentications performed monitor element

The number of connection or switch user authentications performed.

Table 1907. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1908. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

total_connect_authentication_time - Total connection or switch user authentication request time monitor element

The amount of time spent performing connection or switch user authentication, in milliseconds.

Table 1909. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1910. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

total_connect_request_proc_time - Total connection or switch user request processing time monitor element

The amount of processing (non-wait) time spent processing a connection or switch user request, in milliseconds.

Table 1911. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1912. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

total_connect_requests - Connection or switch user requests monitor element

The total number of connection or switch user requests.

Table 1913. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1914. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

total_connect_request_time - Total connection or switch user request time monitor element

The amount of time spent performing a connection or switch user request, in milliseconds.

Table 1915. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1916. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of Work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE

total_cpu_time - Total CPU time monitor element

The total amount of CPU time used while within DB2. Represents total of both user and system CPU time. This value is given in microseconds.

When returned by the WLM_GET_SERVICE_SUBCLASS_STATS or the WLM_GET_WORKLOAD_STATS table function, it represents the total CPU time since the last reset of statistics. When returned by the MON_SAMPLE_SERVICE_CLASS_METRICS or the MON_SAMPLE_WORKLOAD_METRICS table function, it represents the total CPU time since the function was executed.

When returned by the MON_GET_ROUTINE or MON_GET_ROUTINE_DETAILS table function, this element represents the total CPU time spent in agents and subagents of the current member for this routine. CPU time spent in fenced processes is not included.

Table 1917. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1917. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 1918. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Together with the **total_disp_run_queue_time** monitor element, **total_cpu_time** can be used to compute a measure of the amount of contention for the CPU resource, measured on a scale from 0 to 1, with lower numbers meaning greater contention for the CPU resource. This measure, called CPU velocity, is computed by measuring the amount of time that work in the service class has access to the CPU divided by the total time spent accessing the CPU or waiting to access the CPU. CPU velocity gives a measure of how efficiently the work executing in the service class is being executed relative to how efficiently it could be executed if such work never had to wait for the CPU. The formula is as follows:

$$\text{CPU velocity} = \text{total_cpu_time} / (\text{total_cpu_time} + \text{total_disp_run_queue_time})$$

total_disp_run_queue_time - Total dispatcher run queue time monitor element

The total time that requests, that were run in this service class, spent waiting to access the CPU. This value is given in microseconds.

Table 1919. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE

Table 1919. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 1920. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document	REQUEST METRICS BASE

Usage

Together with the **total_cpu_time**, the **total_disp_run_queue_time** monitor element can be used to compute a measure of the amount of contention for the CPU resource, measured on a scale from 0 to 1, with lower numbers meaning greater contention for the CPU resource. This measure, called CPU velocity, is computed by measuring the amount of time that work in a service class has access to the CPU divided by the total time spent accessing the CPU or waiting to access the CPU. It gives a measure of how efficiently the work is being executed relative to how efficiently it could be executed if such work never had to wait for the CPU. The formula is as follows:

$$\text{CPU velocity} = \text{total_cpu_time} / (\text{total_cpu_time} + \text{total_disp_run_queue_time})$$

When returned by the WLM_GET_SERVICE_SUBCLASS_STATS or the WLM_GET_WORKLOAD_STATS function, this monitor element represents the total dispatcher run queue wait time since the last reset of statistics.

When returned by the MON_SAMPLE_SERVICE_CLASS_METRICS or the MON_SAMPLE_WORKLOAD_METRICS function, this monitor element represents the total dispatcher run queue wait time since the function was executed.

total_exec_time - Elapsed statement execution time monitor element

The total time in seconds and microseconds that was spent executing a particular statement in the SQL cache.

Table 1921. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Usage

Use this element with **num_executions** monitor element determine the average elapsed time for the statement and identify the SQL statements that would most benefit from a tuning of their SQL. The **num_compilation** monitor element must be considered when evaluating the contents of this element.

Note: Due to the differences in granularity with which the DB2 system collects statistics, the value of the **total_exec_time** monitor element might not equal the sum of values of **system_cpu_time** and **user_cpu_time** monitor elements. In this case, the sum of **system_cpu_time** and **user_cpu_time** monitor elements more accurately reflects the actual total execution time.

total_extended_latch_wait_time - Total extended latch wait time monitor element

The amount of time, in milliseconds, spent in extended latch waits.

Table 1922. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML documented provided as input.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML documented provided as input.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML documented provided as input.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_EXTENDED_LATCH_WAITS	REQUEST METRICS BASE

Table 1922. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1923. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Package cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE

Usage

- Use the following formula to determine extended latch wait time as a percentage of total wait time. This formula can be used to determine if the time spent waiting on extended latches is high relative to the total wait time.

$$(TOTAL_EXTENDED_LATCH_WAIT_TIME / TOTAL_WAIT_TIME) * 100$$

- Use the following formula to determine the average length of time in milliseconds of an extended latch wait.

$$TOTAL_EXTENDED_LATCH_WAIT_TIME / TOTAL_EXTENDED_LATCH_WAITS$$

total_extended_latch_waits - Total extended latch waits monitor element

The number of extended latch waits.

Table 1924. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1924. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_EXTENDED_LATCH_WAITS	REQUEST METRICS BASE

Table 1925. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	uow (reported in the metrics.xml document) uow_metrics	REQUEST METRICS BASE
Package cache	pkgcache (reported in the metrics.xml document) pkgcache_metrics	ACTIVITY METRICS BASE

Usage

Use the following formula to determine the average length of time in milliseconds of an extended latch wait.

$$\text{TOTAL_EXTENDED_LATCH_WAIT_TIME} / \text{TOTAL_EXTENDED_LATCH_WAITS}$$

total_move_time - Total extent move time monitor element

In milliseconds, the total move time for all extents moved during the table space rebalance process.

Table 1926. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

total_nested_invocations - Total nested invocations monitor element

Number of times a routine is invoked at a nesting level > 1.

An example is when a routine or trigger is invoked under the context of another routine or trigger.

Table 1927. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected

total_routine_coord_time - Total routine coordinator time monitor element

Total amount of time the coordinator agent spent executing the routine.

For procedures, compiled SQL functions, compiled triggers, and dynamically prepared compound SQL statements, this element represents the total elapsed time spent in the routine. If request metrics are disabled, this value is zero.

Table 1928. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	REQUEST METRICS BASE
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	REQUEST METRICS BASE

total_times_routine_invoked - Total routine invoked occurrences monitor element

Number of times the routine executed on a member.

Table 1929. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected

total_hash_joins - Total Hash Joins

The total number of hash joins executed.

Element identifier

total_hash_joins

Element type
counter

Table 1930. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1931. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage At the database or application level, use this value in conjunction with `hash_join_overflows` and `hash_join_small_overflows` to determine if a significant percentage of hash joins would benefit from modest increases in the sort heap size.

total_hash_loops - Total Hash Loops

The total number of times that a single partition of a hash join was larger than the available sort heap space.

Table 1932. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1933. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage Values for this element indicate inefficient execution of hash joins. This might indicate that the sort heap size is too small or the sort heap threshold is too small. Use this value in conjunction with the other hash join variables to tune the sort heap size (*sortheap*) and sort heap threshold (*sheapthres*) configuration parameters.

total_implicit_compilations - Total implicit complications monitor element

The `total_implicit_compilations` monitor element stores the total number of implicit compiles on the database server. Implicit compiles are compilations that are not directly requested by the user.

That is, they are not a result of a bind, rebind, prepare or execute immediate request. For example, an implicit compilation may occur when executing a statement that was bound using the VALIDATE RUN option if the statement needs to be compiled at execution time.

Table 1934. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1935. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_implicit_compile_proc_time - Total implicit compile processing time monitor element

The total_implicit_compile_proc_time monitor element stores the total amount of processing (non-wait) time spent performing implicit compiles on the database server. Implicit compiles are compilations that are not directly requested by the user.

That is, they are not a result of a bind, rebind, prepare or execute immediate request. For example, an implicit compilation may occur when executing a statement that was bound using the VALIDATE RUN option if the statement needs to be compiled at execution time. The value is given in milliseconds.

Table 1936. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1937. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_implicit_compile_time - Total implicit compile time monitor element

The total_implicit_compile_time monitor element stores the total amount of time spent performing implicit compiles on the database server. Implicit compiles are compilations that are not directly requested by the user.

That is, they are not a result of a bind, rebind, prepare or execute immediate request. For example, an implicit compilation may occur when executing a statement that was bound using the VALIDATE RUN option if the statement needs to be compiled at execution time. The value is given in milliseconds.

Table 1938. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1938. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1939. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_load_proc_time - Total load processing time monitor element

Total amount of processing (non-wait) time spent performing load processing on the database server. The value is given in milliseconds.

Table 1940. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 1940. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1941. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_load_time - Total load time monitor element

The total amount of time spent performing loads on the database server. The value is given in milliseconds.

Table 1942. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1942. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1943. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_loads - Total loads monitor element

The total number of loads performed on the database server.

Table 1944. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1944. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1945. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the details_xml document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_log_available - Total Log Available

The amount of active log space in the database that is not being used by uncommitted transactions (in bytes).

Table 1946. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1947. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage

Use this element in conjunction with `total_log_used` to determine whether you may need to adjust the following configuration parameters to avoid running out of log space:

- `logfilsiz`
- `logprimary`
- `logsecond`

If `total_log_available` goes down to 0, SQL0964N will be returned. You may need to increase the previously listed configuration parameters, or end the oldest transaction by `COMMIT`, `ROLLBACK` or `FORCE APPLICATION`.

If `logsecond` is set to -1 this element will contain `SQLM_LOGSPACE_INFINITE`.

Note: While the database system monitor information is given in bytes, the configuration parameters are set in pages, which are each 4K bytes.

total_log_used - Total Log Space Used

The total amount of active log space currently used (in bytes) in the database.

Table 1948. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE

Table 1949. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage Use this element in conjunction with `total_log_available` to determine whether you may need to adjust the following configuration parameters to avoid running out of log space:

- `logfilsiz`
- `logprimary`
- `logsecond`

Note: While the database system monitor information is given in bytes, the configuration parameters are set in pages, which are each 4K bytes.

total_move_time - Total extent move time monitor element

In milliseconds, the total move time for all extents moved during the table space rebalance process.

Table 1950. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE

total_olap_funcs - Total OLAP Functions monitor element

The total number of OLAP functions executed.

Table 1951. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 1952. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage

At the database or application level, use this value in conjunction with `olap_func_overflows` to determine if a significant percentage of OLAP functions would benefit from modest increases in the sort heap size.

total_peas - Total partial early aggregations monitor element

The total number of times that partial early aggregation operations have been executed.

Table 1953. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE

Table 1953. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 1954. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 1954. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1955. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At the database or application level, use this value in conjunction with **post_threshold_peas** to determine if a significant number of partial early aggregation operations would benefit from an increase in either sort heap size or sort heap threshold. If the ratio of **post_threshold_peas** to **total_peas** is high,

increasing the sort heap size or the sort heap threshold, or both, may improve database or application performance.

total_peds - Total partial early distincts monitor element

The total number of times that partial early distinct operations have been executed.

Table 1956. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 1957. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 1957. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1958. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At the database or application level, use this value in conjunction with the **disabled_peds** monitor element and the **post_threshold_peds** monitor element to determine if a significant number of partial early distinct operations would benefit from an increase in either sort heap size or sort heap threshold. If the ratio of the **disabled_peds** monitor element and the **post_threshold_peds** monitor element to the **total_peds** monitor element is high, increasing the sort heap size or the sort heap threshold, or both, may improve database or application performance.

total_reorg_proc_time - Total reorganization processing time monitor element

The total amount of processing (non-wait) time spent performing reorg operations on the database server. The value is given in milliseconds.

Table 1959. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1960. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1960. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_reorg_time - Total reorganization time monitor element

The total amount of time spent performing reorg operations on the database server. The value is given in milliseconds.

Table 1961. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1962. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_reorgs - Total reorganizations monitor element

The number of reorg operations issued against the database server.

Table 1963. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1964. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_rollback_proc_time - Total rollback processing time monitor element

The total amount of processing (non-wait) time spent performing rollback operations on the database server. The value is given in milliseconds.

Table 1965. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1965. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1966. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_rollback_time - Total rollback time monitor element

The total amount of time spent performing rollback operations on the database server. The value is given in milliseconds.

Table 1967. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1967. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1968. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_routine_invocations - Total routine invocations monitor elements

The total number of times a routine was invoked.

Table 1969. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 1969. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1970. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_routine_non_sect_proc_time - Non-section processing time monitor element

The total amount of processing time this statement spent performing non-section execution within routines. This value includes both the time spent executing user-code within routines and time spent performing non-section operations like commit or rollback. Processing time does not include wait time. The value is given in milliseconds.

Table 1971. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1972. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

total_routine_non_sect_time - Non-section routine execution time monitor elements

The total amount of time this statement spent performing non-section execution within routines. This value includes both the time spent executing user-code within routines and the time spent performing non-section operations like commit or rollback. The value is given in milliseconds.

Table 1973. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 1973. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Table 1974. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

total_routine_time - Total routine time monitor element

The total time spent executing routines. The value is given in milliseconds.

Table 1975. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 1975. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1976. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

If the collection level is set to BASE, then the value of **total_routine_time** monitor element does not include any time spent executing functions that were defined using the NO SQL clause.

If the collection level is set to EXTENDED, then the value of **total_routine_time** monitor element includes the time spent in all routines.

total_routine_user_code_proc_time - Total routine user code processing time monitor element

The total amount of processing time spent executing in routines outside of known DB2 times (typically user code in routines). The value is given in milliseconds.

Table 1977. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1978. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

If the collection level is set to BASE, then this monitor element does not include any processing time spent executing functions that were defined using the NO SQL clause. Instead, this time is included in the value of the **total_section_proc_time** monitor element.

If the collection level is set to EXTENDED, then the value of this monitor element includes the processing time spent executing all routines.

total_routine_user_code_time - Total routine user code time monitor element

The total amount of time spent executing in routines outside of known DB2 times (typically user code in routines). The value is given in milliseconds.

Table 1979. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1979. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1980. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

If the collection level is set to BASE, then the value of this monitor element does not include the time spent executing functions that were defined using the NO SQL clause. Instead, this time is included in the value of the **total_section_time** monitor element.

If the collection level is set to EXTENDED, then the value of this monitor element includes the time spent executing all routines.

total_rqst_mapped_in - Total request mapped-in monitor element

The total number of requests that were mapped into this service subclass via a remap threshold or a work action set.

Table 1981. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1982. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the details_xml document)	REQUEST METRICS BASE

total_rqst_mapped_out - Total request mapped-out monitor element

The total number of requests that were mapped out of this service subclass via a remap threshold or a work action set.

Table 1983. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1984. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

total_rqst_time - Total request time monitor element

The total amount of time spent working on requests. This value is reported in milliseconds.

Table 1985. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT_TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1986. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1986. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_runstats - Total runtime statistics monitor element

The total number of runstats operations performed on the database server.

Table 1987. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1988. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

Table 1988. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_runstats_proc_time - Total runtime statistics processing time monitor element

The total amount of processing (non-wait) time spent performing runstats operations on the database server. The value is given in milliseconds. Any time the runstats utility spends throttled does not count to the runstats processing time.

Table 1989. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 1989. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1990. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_runstats_time - Total runtime statistics time monitor element

The total amount of time spent performing runstats operations on the database server. The value is given in milliseconds.

Table 1991. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1991. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1992. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_sec_cons - Secondary Connections

The number of connections made by a subagent to the database at the node.

Element identifier

total_sec_cons

Element type

counter

Table 1993. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic

Usage You can use this element in conjunction with the total_cons, db_conn_time, and the db2start_time monitor elements to calculate the frequency at which applications have connected to the database.

total_section_proc_time - Total section processing time monitor element

The total amount of processing time agents spent performing section execution. Processing time does not include wait time. The value is given in milliseconds.

Table 1994. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1995. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

If the collection level is set to BASE, then the value of the **total_section_proc_time** monitor element includes processing time spent executing functions that were defined using the NO SQL clause.

If the collection level is set to EXTENDED, then the processing time spent executing these functions is not included in the value of the **total_section_proc_time** monitor element. It is included in the value of the **total_routine_user_code_proc_time** monitor element.

total_section_sort_proc_time - Total section sort processing time monitor element

Total amount of processing (non-wait) time spent performing sorts while executing a section, which is the execution of the compiled query plan generated by the SQL statement that was issued by the client application. The value is given in milliseconds.

Table 1996. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 1996. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1997. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

At the system level, use this element with the **total_section_sorts** monitor element to calculate the average sort processing time (does not include waits) during section execution, which can indicate whether or not sorting is an issue as far as performance is concerned.

At the activity level, use this element to identify statements that spend a large amount of time sorting. These statements may benefit from additional tuning to reduce the sort time.

total_section_sort_time - Total section sort time monitor element

Total amount of time spent performing sorts while executing a section, which is the execution of the compiled query plan generated by the SQL statement that was issued by the client application. The value is given in milliseconds.

Table 1998. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1998. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 1999. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the details_xml) document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

At the system level, use this element with the **total_section_sorts** monitor element to calculate the average sort time during section execution, which can indicate whether or not sorting is an issue as far as statement performance is concerned.

The **total_section_sort_time** element includes both wait and processing time. If the value of $(total_section_sort_time - total_section_sort_proc_time)$ is high, sorts are spending a lot of time waiting. For example, if sorts are frequently spilling to disk, the value of the **total_section_sort_time** monitor element will increase due to I/O waits. This time will not be included in the **total_section_sort_proc_time** monitor element value, which only counts the time actively processing a sort. In this case, you may consider tuning sort memory to improve performance.

At the activity level, use this element to identify statements that spend a large amount of time sorting. These statements may benefit from additional tuning to reduce the sort time.

total_section_sorts - Total section sorts monitor element

Total number of sorts performed during section execution, which is the execution of the compiled query plan generated by the SQL statement that was issued by the client application.

Table 2000. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2001. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

Use this element with the **total_section_sort_time** monitor element to calculate the average amount of time spent performing sorts during section execution.

At the activity and package cache levels, use this element to identify statements which are performing large numbers of sorts. These statements may benefit from additional tuning to reduce the number of sorts. You can also use the EXPLAIN statement to identify the number of sorts a statement performs.

total_section_time - Total section time monitor element

The total time agents spent performing section execution. The value is given in milliseconds.

Table 2002. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 2002. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2003. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

If the collection level is set to BASE, then the value of **total_section_time** monitor element includes time spent executing functions that were defined using the NO SQL clause.

If the collection level is set to EXTENDED, then the time spent executing these functions is not included in the value of the **total_section_time** monitor element. It is included in the value of the **total_routine_user_code_time** monitor element instead.

total_sort_time - Total sort time monitor element

The total elapsed time for all sorts that have been executed. This value is reported in milliseconds.

Table 2004. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Sort
Application	appl	Sort
Application	stmt	Sort
Dynamic SQL	dynsql	Sort

For snapshot monitoring, this counter can be reset.

Table 2005. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Statement, Sort

Usage

At a database or application level, use this element with **total_sorts** to calculate the average sort time, which can indicate whether or not sorting is an issue as far as performance is concerned.

At a statement level, use this element to identify statements that spend a lot of time sorting. These statements may benefit from additional tuning to reduce the sort time.

This count also includes sort time of temporary tables created during related operations. It provides information for one statement, one application, or all applications accessing one database.

When using monitor elements providing elapsed times, you should consider:

1. Elapsed times are affected by system load, so the more processes you have running, the higher this elapsed time value.
2. To calculate this monitor element at a database level, the database system monitor sums the application-level times. This can result in double counting elapsed times at a database level, since more than one application process can be running at the same time.

To provide meaningful data from the database level, you should normalize the data to a lower level. For example:

```
total_sort_time / total_sorts
```

provides information about the average elapsed time for each sort.

total_sorts - Total sorts monitor element

The total number of sorts that have been executed.

Table 2006. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2007. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2008. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Statement, Sort
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At a database or application level, use this value with **sort_overflows** to calculate the percentage of sorts that need more heap space. You can also use it with **total_sort_time** to calculate the average sort time.

If the number of sort overflows is small with respect to the total sorts, then increasing the sort heap size may have little impact on performance, unless this buffer size is increased substantially.

At a statement level, use this element to identify statements which are performing large numbers of sorts. These statements may benefit from additional tuning to reduce the number of sorts. You can also use the SQL EXPLAIN statement to identify the number of sorts a statement performs.

total_stats_fabrication_proc_time - Total statistics fabrication processing time monitor element

The total non-wait time spent on statistics fabrications by real-time statistics gathering, in millisecond. Statistics fabrication is the statistics collection activity needed to generate statistics during query compilation.

Table 2009. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2010. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE

Table 2010. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_stats_fabrication_time - Total statistics fabrication time monitor element

The total time spent on statistics fabrications by real-time statistics gathering, in milliseconds. Statistics fabrication is the statistics collection activity needed to generate statistics during query compilation.

Table 2011. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2011. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2012. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	uow_metrics	REQUEST METRICS BASE
Package cache	pkgcache	Always collected

total_stats_fabrications - Total statistics fabrications monitor elements

The total number of statistics fabrications performed by real-time statistics gathering. Statistics fabrication is the statistics collection activity needed to generate statistics during query compilation.

Table 2013. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 2013. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2014. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	Always collected

total_sync_runstats_time - Total synchronous RUNSTATS time monitor elements

The total time spent on synchronous RUNSTATS activities triggered by real-time statistics gathering, in milliseconds. The synchronous RUNSTATS activities occur during query compilation.

Table 2015. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_COMPONENT _TIMES_BY_ROW - Get formatted row-based component times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2016. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	Always collected

total_sync_runstats_proc_time - Total synchronous RUNSTATS processing time monitor element

The non-wait time spent on synchronous RUNSTATS activities triggered by real-time statistics gathering, in milliseconds. The synchronous RUNSTATS activities occur during query compilation.

Table 2017. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 2017. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2018. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

total_sync_runstats - Total synchronous RUNSTATS activities monitor element

The total number of synchronous RUNSTATS activities triggered by real-time statistics gathering. The synchronous RUNSTATS activities occur during query compilation.

Table 2019. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 2019. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2020. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	Always collected

total_sys_cpu_time - Total system CPU time for a statement monitor element

The total system CPU time for an SQL statement.

Table 2021. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Usage

Use this element with Elapsed Statement Execution Time and Total User CPU for a Statement to evaluate which statements are the most expensive.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

total_sorts - Total sorts monitor element

The total number of sorts that have been executed.

Table 2022. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected

Table 2022. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2023. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2024. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Statement, Sort

Table 2024. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

At a database or application level, use this value with **sort_overflows** to calculate the percentage of sorts that need more heap space. You can also use it with **total_sort_time** to calculate the average sort time.

If the number of sort overflows is small with respect to the total sorts, then increasing the sort heap size may have little impact on performance, unless this buffer size is increased substantially.

At a statement level, use this element to identify statements which are performing large numbers of sorts. These statements may benefit from additional tuning to reduce the number of sorts. You can also use the SQL EXPLAIN statement to identify the number of sorts a statement performs.

total_usr_cpu_time - Total user CPU time for a statement monitor element

The total user CPU time for an SQL statement.

Table 2025. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Dynamic SQL	dynsql	Statement

For snapshot monitoring, this counter can be reset.

Usage

Use this element with Elapsed Statement Execution Time and to evaluate the longest running statements.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

total_wait_time - Total wait time monitor element

The total time spent waiting within the DB2 database server. The value is given in milliseconds.

Table 2026. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2027. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

Table 2027. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

Usage

To understand the percentage of time the database server spends actively working on requests, use the following ratio:

$$(total_rqst_time - total_wait_time) / total_rqst_time$$

The value of the **client_idle_wait_time** monitor element is not included in the value of the **total_wait_time** monitor element. The **total_wait_time** element represents only time spent waiting while the database server is processing requests.

tpmon_acc_str - TP monitor client accounting string monitor element

The data passed to the target database for logging and diagnostic purposes, if the sqleseti API was issued in this connection. The current value of the CLIENT_ACCTNG special register for this connection, unit of work, or activity.

This monitor element is synonymous to the **client_acctng** monitor element. The **client_acctng** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_acc_str** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 2028. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl	Basic

Table 2029. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-
Deadlock	event_dlconn	-
Transaction	event_xact	-

Usage

Use this element for problem determination and accounting purposes.

tpmon_client_app - TP monitor client application name monitor element

Identifies the server transaction program performing the transaction, if the sqleset API was issued in this connection. The current value of the CLIENT_APPLNAME special register for this connection, unit of work, or activity.

This monitor element is synonymous to the **client_applname** monitor element. The **client_applname** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_client_app** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 2030. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl	Basic

Table 2031. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-
Deadlock	event_dlconn	-
Transaction	event_xact	-

Usage

Use this element for problem determination and accounting purposes.

tpmon_client_userid - TP monitor client user ID monitor element

The client user ID generated by a transaction manager and provided to the server, if the sqleset API is used. The current value of the CLIENT_USERID special register for this connection, unit of work, or activity.

This monitor element is synonymous to the **client_userid** monitor element. The **client_userid** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_client_userid** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 2032. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl	Basic

Table 2033. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-
Deadlock	event_dlconn	-

Table 2033. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Transaction	event_xact	-

Usage

Use this element in application server or Transaction Processing monitor environments to identify the end-user for whom the transaction is being executed.

tpmon_client_wkstn - TP monitor client workstation name monitor element

Identifies the client's system or workstation (for example CICS EITERMID), if the sqleseti API was issued in this connection. The current value of the CLIENT_WRKSTNNAME special register for this connection, unit of work, or activity.

This monitor element is synonymous to the **client_wrkstnname** monitor element. The **client_wrkstnname** monitor element is used for monitoring table functions and event monitors that write to unformatted tables, which were introduced in DB2 Version 9.7. The **tpmon_client_wkstn** monitor element is used for snapshot monitors and event monitors that write to tables, files, and pipes.

Table 2034. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic
DCS Application	dcs_appl	Basic

Table 2035. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	-
Deadlock	event_dlconn	-
Transaction	event_xact	-

Usage

Use this element to identify the user's machine by node ID, terminal ID, or similar identifiers.

tq_cur_send_spills - Current number of table queue buffers overflowed monitor element

The current number of table queue buffers residing in a temporary table.

Table 2036. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Usage An agent writing to a table queue may be sending rows to several readers.

The writing agent will overflow buffers to a temporary table when the agent that it is currently sending rows to is not accepting rows and another agent requires rows in order to proceed. Overflowing to temporary table allows both the writer and the other readers to continue processing.

Rows that have been overflowed will be sent to the reading agent when it is ready to accept more rows.

If this number is high, and queries fail with sqlcode -968, and there are messages in db2diag.log indicating that you ran out of temporary space in the TEMP table space, then table queue overflows may be the cause. This could indicate a problem on another node (such as locking). You would investigate by taking snapshots on all the partitions for this query.

There are also cases, perhaps because of the way data is partitioned, where many buffers need to be overflowed for the query. In these cases you will need to add more disk to the temporary table space.

tq_id_waiting_on - Waited on node on a table queue monitor element

The identifier of the table queue that is waiting to send or receive data.

Table 2037. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Usage

This can be used for troubleshooting.

tq_max_send_spills - Maximum number of table queue buffers overflows

Maximum number of table queue buffers overflowed to a temporary table.

Element identifier

tq_max_send_spills

Element type

watermark

Table 2038. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 2039. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Always collected

Usage Indicates the maximum number of table queue buffers that have been written to a temporary table.

tq_node_waited_for - Waited for node on a table queue

If the subsection status `ss_status` is *waiting to receive* or *waiting to send* and `tq_wait_for_any` is `FALSE`, then this is the number of the node that this agent is waiting for.

Element identifier

`tq_node_waited_for`

Element type

information

Table 2040. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Usage This can be used for troubleshooting. You may want to take an application snapshot on the node that the subsection is waiting for. For example, the application could be in a lock wait on that node.

tq_rows_read - Number of Rows Read from table queues

Total number of rows read from table queues.

Element identifier

`tq_rows_read`

Element type

counter

Table 2041. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 2042. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Always collected

Usage If monitoring does not indicate that this number is increasing, then processing progress is not taking place.

If there is significant differences in this number between nodes, then some nodes may be over utilized while others are being under utilized.

If this number is large, then there is a lot of data being shipped between nodes, suggest that optimization might improve the access plan.

tq_rows_written - Number of rows written to table queues

Total number of rows written to table queues.

Element identifier

`tq_rows_written`

Element type

counter

Table 2043. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 2044. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_subsection	Always collected

Usage If monitoring does not indicate that this number is increasing, then processing progress is not taking place.

If there is significant differences in this number between nodes, then some nodes may be over utilized while others are being under utilized.

If this number is large, then there is a lot of data being shipped between nodes, suggest that optimization might improve the access plan.

tq_sort_heap_rejections - Table queue sort heap rejections monitor element

The number of times that table queues requested for sort heap memory and was rejected due to sort heap threshold being exceeded.

Table 2045. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS - Get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 2045. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	REQUEST METRICS BASE

Table 2046. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2046. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2047. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with the **tq_sort_heap_requests** monitor element to determine if table queues are getting sufficient sort heap memory most of the time. If the ratio of the **tq_sort_heap_rejections** monitor element to the **tq_sort_heap_requests** monitor element is high, database performance may be sub-optimal. Consider increasing the sort heap size.

tq_sort_heap_requests - Table queue sort heap requests monitor element

The number of times that table queues requested for sort heap memory to store data.

Table 2048. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2048. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2049. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Connection	event_conn	-

Table 2049. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statements	event_stmt	-
Transactions	event_xact	-
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Use this element in conjunction with the **tq_sort_heap_rejections** monitor element to determine if table queues are getting sufficient sort heap memory most of the time. If the ratio of the **tq_sort_heap_rejections** monitor element to the **tq_sort_heap_requests** monitor element is high, database performance may be sub-optimal. Consider increasing the sort heap size.

tq_tot_send_spills - Total number of table queue buffers overflowed monitor element

Total number of table queue buffers overflowed to a temporary table.

Table 2050. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 2050. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2051. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Table 2052. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Statements	event_subsection	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

Indicates the total number of table queue buffers that have been written to a temporary table. See the **tq_cur_send_spills** monitor element for more information.

tq_wait_for_any - Waiting for any node to send on a table queue

This flag is used to indicate that the subsection is blocked because it is waiting to receive rows from any node.

Element identifier
tq_wait_for_any

Element type
information

Table 2053. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	subsection	Statement

Usage If `ss_status` indicates *waiting to receive data on a table queue* and this flag is TRUE, then the subsection is waiting to receive rows from any node. This generally indicates that the SQL statement has not processed to the point it can pass data to the waiting agent. For example, the writing agent may be performing a sort and will not write rows until the sort has completed. From the `db2expln` output, determine the subsection number associated with the `tablequeue` that the agent is waiting to receive rows from. You can then examine the status of that subsection by taking a snapshot on each node where it is executing.

ts_name - Table space being rolled forward monitor element

The name of the table space currently rolled forward.

Element identifier
ts_name

Element type
information

Table 2054. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	rollforward	Basic

Usage If a rollforward is in progress, this element identifies the table spaces involved.

txn_completion_status - Transaction completion status

This element indicates the status of the transaction.

Table 2055. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	TXNCOMPLETION	Always collected

Usage

For the change history event monitor, the status of the transaction is one of:

- C Commit
- R Rollback
- S Rollback to savepoint

uid_sql_stmts - Update/Insert/Delete SQL Statements Executed

The number of SQL UPDATE, INSERT, and DELETE statements that were executed.

Table 2056. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2057. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to determine the level of database activity at the application or database level.

You can also use the following formula to determine the ratio of UPDATE, INSERT and DELETE statements to the total number of statements:

$$\frac{\text{uid_sql_stmts}}{(\text{static_sql_stmts} + \text{dynamic_sql_stmts})}$$

This information can be useful for analyzing application activity and throughput.

unread_prefetch_pages - Unread prefetch pages monitor element

Indicates the number of pages that the prefetcher read in that were never used.

Table 2058. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 2059. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Buffer Pool
Table Space	tablespace	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Application	appl	Buffer Pool

For snapshot monitoring, this counter can be reset.

Table 2060. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Tablespaces	event_tablespace	Always collected
Connection	event_conn	Always collected

Usage

If this number is high, prefetchers are causing unnecessary I/O by reading pages into the buffer pool that will not be used.

uow_comp_status - Unit of Work Completion Status

The status of the unit of work and how it stopped.

Element identifier

uow_comp_status

Element type

information

Table 2061. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work
DCS Application	dcs_appl	Basic

Table 2062. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected

Usage You may use this element to determine if the unit of work ended due to a deadlock or abnormal termination. It may have been:

- Committed due to a commit statement
- Rolled back due to a rollback statement
- Rolled back due to a deadlock
- Rolled back due to an abnormal termination
- Committed at normal application termination.
- Unknown as a result of a FLUSH EVENT MONITOR command for which units of work were in progress.

Note: API users should refer to the header file (*sqlmon.h*) containing definitions of database system monitor constants.

uow_completed_total - Total completed units of work monitor element

The total number of units of work that completed, either by being committed or rolled back.

Table 2063. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 2064. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	Always collected
Statistics	event_wlstats (reported in the metrics document)	Always collected

Usage

When returned by the WLM_GET_SERVICE_SUBCLASS_STATS or the WLM_GET_WORKLOAD_STATS function, this monitor element represents the total completed units of work since the last reset of the statistics.

When returned by the MON_SAMPLE_SERVICE_CLASS_METRICS or the MON_SAMPLE_WORKLOAD_METRICS function, this monitor element represents the total completed units of work since the function was executed.

uow_elapsed_time - Most Recent Unit of Work Elapsed Time

The elapsed execution time of the most recently completed unit of work.

Element identifier

uow_elapsed_time

Element type

time

Table 2065. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work, Timestamp
DCS Application	dcs_appl	Unit of Work, Timestamp

Usage

Use this element as an indicator of the time it takes for units of work to complete.

This element is composed of two subelements that report time spent as seconds and microseconds (one millionth of a second). The names of the subelements can be derived by adding "_s" and "_ms" to the name of this monitor element. To retrieve the total time spent for this monitor element, the values of the two subelements must be added together. For example, if the "_s" subelement value is 3 and the "_ms" subelement value is 20, then the total time spent for the monitor element is 3.00002 seconds.

uow_id - Unit of work ID monitor element

The unit of work identifier. The unit of work ID is unique within an application handle.

Table 2066. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 2067. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Unit of work	-	Always collected
Activities	event_activity	Always collected
Activities	event_activitystmt	Always collected
Activities	event_activityvals	Always collected
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Threshold violations	event_thresholdviolations	Always collected
Change history	ddlstmtexec txncompletion	Always collected

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity.

You can also use this element with the **activity_id** and **appl_id** monitor elements to uniquely identify an activity.

uow_lifetime_avg - Unit of work lifetime average monitor element

The average lifetime of a unit of work. Measured in milliseconds.

Table 2068. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 2069. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	Always collected
Statistics	event_wlstats (reported in the metrics document)	Always collected

Usage

When returned by the WLM_GET_SERVICE_SUBCLASS_STATS or the WLM_GET_WORKLOAD_STATS function, this monitor element represents the average unit of work lifetime since the last reset of the statistics.

When returned by the MON_SAMPLE_SERVICE_CLASS_METRICS or the MON_SAMPLE_WORKLOAD_METRICS function, this monitor element represents the average unit of work lifetime since the function was executed.

uow_lock_wait_time - Total time unit of work waited on locks monitor element

The total amount of elapsed time this unit of work has spent waiting for locks. The value is given in milliseconds.

Element identifier

uow_lock_wait_time

Element type
counter

Table 2070. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work

Usage This element can help you determine the severity of the resource contention problem.

uow_log_space_used - Unit of work log space used monitor element

The amount of log space (in bytes) used in the current unit of work of the monitored application.

Table 2071. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2072. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work

Table 2073. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected
Unit of work	-	Always collected

Usage

You may use this element to understand the logging requirements at the unit of work level.

uow_start_time - Unit of work start timestamp monitor element

The date and time that the unit of work first required database resources.

Table 2074. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2075. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work, Timestamp
DCS Application	dcx_appl	Unit of Work, Timestamp

Table 2076. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	-
Transaction	event_xact	-

Usage

This resource requirement occurs at the first SQL statement execution of that unit of work:

- For the first unit of work, it is the time of the first database request (SQL statement execution) after **conn_complete_time**.
- For subsequent units of work, it is the time of the first database request (SQL statement execution) after the previous COMMIT or ROLLBACK.

Note: The *SQL Reference* defines the boundaries of a unit of work as the COMMIT or ROLLBACK points.

The database system monitor excludes the time spent between the COMMIT/ROLLBACK and the next SQL statement from its definition of a unit of work. This measurement method reflects the time spent by the database manager in processing database requests, separate from time spent in application logic before the first SQL statement of that unit of work. The unit of work elapsed time does include the time spent running application logic between SQL statements within the unit of work.

You may use this element with the **uow_stop_time** monitor element to calculate the total elapsed time of the unit of work and with the **prev_uow_stop_time** monitor element to calculate the time spent in the application between units of work.

You can use the **uow_stop_time** and the **prev_uow_stop_time** monitor elements to calculate the elapsed time for the *SQL Reference* definition of a unit of work.

uow_status - Unit of Work Status

The status of the unit of work.

Element identifier
uow_status

Element type
information

Table 2077. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected

Usage You may use this element to determine the status of a unit of work. API users should refer to the `sqlmon.h` header file containing definitions of database system monitor constants.

uow_stop_time - Unit of work stop timestamp monitor element

The date and time that the most recent unit of work completed, which occurs when database changes are committed or rolled back.

Table 2078. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl	Unit of Work, Timestamp
DCS Application	dcs_appl	Unit of Work, Timestamp

Table 2079. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	-

Usage

Use this element with the **prev_uow_stop_time** monitor element to calculate the total elapsed time between COMMIT/ROLLBACK points, and with the **uow_start_time** monitor element to calculate the elapsed time of the latest unit of work.

The timestamp contents will be set as follows:

- When the application has completed a unit of work and has not yet started a new one (as defined in the **uow_start_time** monitor element), this element reports a valid, non-zero timestamp.
- When the application is currently executing a unit of work, this element reports zeros.
- When the application first connects to the database, this element is set to the value of the **conn_complete_time** monitor element

As a new unit of work is started, the contents of this element are moved to the **prev_uow_stop_time** monitor element.

uow_throughput - Unit of work throughput monitor element

The completion rate of units of work measured in units of work per second.

Table 2080. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	REQUEST METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	REQUEST METRICS BASE

Table 2080. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 2081. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	Always collected
Statistics	event_wlstats (reported in the metrics document)	Always collected

Usage

When returned by the WLM_GET_SERVICE_SUBCLASS_STATS or the WLM_GET_WORKLOAD_STATS function, this monitor element represents the unit of work throughput since the last reset of the statistics.

When returned by the MON_SAMPLE_SERVICE_CLASS_METRICS or the MON_SAMPLE_WORKLOAD_METRICS function, this monitor element represents the unit of work throughput since the function was executed.

uow_total_time_top - UOW total time top monitor element

High watermark for unit of work lifetime, in milliseconds.

Table 2082. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	REQUEST METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	REQUEST METRICS BASE

Table 2083. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	Always collected
Statistics	event_scstats	Always collected

Usage

This element can be used to help determine whether or not the UOWTOTALTIME threshold is effective and can also help to determine how to configure such a threshold.

For service classes, this monitor element returns -1 when COLLECT AGGREGATE ACTIVITY DATA for the service class is set to NONE.

For workloads, this monitor element returns -1 if COLLECT AGGREGATE ACTIVITY DATA for the workload is set to NONE.

For a service class, measurements taken for this high watermark are computed for the service class assigned by the workload. Any mapping by a work action set to change the service class of an activity does not affect this high watermark.

update_sql_stmts - Updates

This element contains a count of the total number of times the federated server has issued an UPDATE statement to this data source on behalf of any application from the start of the federated server instance, or the last reset of the database monitor counters.

Table 2084. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Basic
Application	appl_remote	Basic

For snapshot monitoring, this counter can be reset.

Usage Use this element to determine the level of database activity directed against this data source by the federated server or an application.

You can also use this element to determine the percentage of write activity against this data source by the federated server or an application, with the following formula:

$$\text{write_activity} = \frac{(\text{INSERT statements} + \text{UPDATE statements} + \text{DELETE statements})}{(\text{SELECT statements} + \text{INSERT statements} + \text{UPDATE statements} + \text{DELETE statements})}$$

update_time - Update Response Time

This element contains the aggregate amount of time, in milliseconds, that it has taken this data source to respond to UPDATES from all applications or a single application running on this federated server instance from the start of the federated server instance, or the last reset of the database monitor counters.

Table 2085. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase_remote	Timestamp
Application	appl_remote	Timestamp

For snapshot monitoring, this counter can be reset.

The response time is measured as the difference in time between the time the federated server submits an UPDATE statement to the data source, and the time the data source responds to the federated server, indicating the UPDATE has been processed.

Usage Use this element to determine how much actual time transpires while

waiting for UPDATES to this data source to be processed. This information can be useful for capacity planning and tuning.

usage_list_last_state_change - Last state change monitor element

A timestamp that indicates when the value of the **usage_list_state** monitor element last changed.

Table 2086. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_last_updated - Usage list last updated monitor element

A timestamp indicating the last time that a particular section was updated. The section is represented by the values of the **executable_id** and **mon_interval_id** monitor elements.

Table 2087. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

usage_list_mem_size - Usage list memory size monitor element

The total amount of memory that is allocated for a particular usage list, in kilobytes.

Table 2088. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_name - Usage list name monitor element

A usage list name.

Table 2089. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_num_references - Number of references monitor element

The total number of times that a specific section referenced a specific object since the section was added to the usage list.

Table 2090. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

usage_list_num_ref_with_metrics - Number of references with metrics monitor element

The total number of times that a specific section referenced a specific object since the section was added to the usage list and had statistics collected.

Table 2091. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

usage_list_schema - Usage list schema monitor element

The name of the schema of a usage list.

Table 2092. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_size - Usage list size monitor element

The maximum number of entries that a particular usage list can hold.

Table 2093. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_state - Usage list state monitor element

The state of a particular usage list.

Possible values are as follows:

- A** Active.
- F** Failed to activate.
- I** Inactive.
- P** Activation pending.

Table 2094. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_used_entries - Usage list used entries monitor element

The number of entries currently in a usage list. If the usage list is in an Inactive state, this monitor element represents the number of entries that were in this usage list when it was last active for monitoring.

Table 2095. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

usage_list_wrapped - Usage list wrap indicator monitor element

An indicator of whether a particular usage list has wrapped. When a usage list becomes full, the default behavior is for entries to wrap, which means the oldest entries get replaced by the newest entries.

Possible values are Y and N.

Table 2096. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_USAGE_LIST_STATUS table function - Returns the status of a usage list	ACTIVITY METRICS BASE

user_cpu_time - User CPU time monitor element

The total *user* CPU time (in seconds and microseconds) used by the database manager agent process, the unit of work, or the statement. For event monitors that write to tables, the value of this element is given in microseconds by using the BIGINT data type.

When either the statement monitor switch or the timestamp switch is not turned on, this element is not collected and -1 is written instead.

Table 2097. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Connection	event_conn	Always collected
Transactions	event_xact	Always collected
Statements	event_stmt	Always collected
Activities	event_activity	Always collected

Usage

This element along with the other related CPU-time elements can help you understand the level of activity within an application, and can help you identify applications that could benefit from additional tuning.

Note: If this information is not available for your operating system, this element will be set to 0.

Note: Due to the differences in granularity with which the DB2 system collects statistics, the value of the **total_exec_time** monitor element might not equal the sum of values of **system_cpu_time** and **user_cpu_time** monitor elements. In this case, the sum of **system_cpu_time** and **user_cpu_time** monitor elements more accurately reflects the actual total execution time.

utility_dbname - Database Operated on by Utility

The database operated on by the utility.

Table 2098. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

utility_description - Utility Description

A brief description of the work a utility is performing. For example, a rebalance invocation may contain "Tablespace ID: 2" representing that this rebalancer is working on table space with ID 2.

The format of this field is dependent on the class of utility and is subject to change between releases.

Table 2099. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

utility_detail - Utility detail

This element contains a brief description of the work a utility is performing.

Table 2100. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTART	Always collected

Usage

A brief description of the work a utility is performing, including some options specified for the utility. For example, a record for the invocation of REORG includes a partially reconstructed command string including some of the different options used by the utility such as access mode . The format of this field is dependent on the type of utility and might change between releases.

utility_id - Utility ID

The unique identifier corresponding to the utility invocation.

Table 2101. Table Function Monitoring Information

Table Function	Monitor Element Collection Command and Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE _ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE

Table 2102. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

utility_invocation_id - Utility invocation ID

A unique identifier corresponding to the utility invocation.

Table 2103. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Element Collection Level
Change History	changesummary utillocation utilphase utilstart utilstop	Always collected

Usage

The **utility_invocation_id** is a binary token that uniquely identifies a given invocation of a utility. The **utility_invocation_id** is the same on each member where the utility is executing. The **utility_invocation_id** will retain its uniqueness across database deactivation, reactivation, and member shutdown, allowing quick identification of all event monitor records corresponding to a given invocation of a utility.

utility_invoker_type - Utility Invoker Type

This element describes how a utility was invoked.

Table 2104. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

Table 2105. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilstart	Always collected

Usage

Use this element to determine how a utility was invoked. For example, you can use it to determine whether a utility was invoked automatically by DB2 or by a user. The values for this element, listed as follows, are defined in sqlmon.h.

API Constant	Utility
SQLM_UTILITY_INVOKER_USER	Utility was invoked by user
SQLM_UTILITY_INVOKER_AUTO	Utility was invoked automatically by DB2

For the change event history monitor, this element indicates how a utility was invoked:

USER Utility was invoked by a user

AUTO
Utility was invoked automatically by DB2

utility_operation_type - Utility operation type

Indicates the type of utility operation.

Table 2106. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTART	Always collected

Usage

For the change history event monitor, this element contains details about utility events (UTILITY_TYPE) that were started .

If UTILITY_TYPE is BACKUP, one of:

- D Delta
- I Incremental
- F Full

If UTILITY_TYPE is LOAD, one of:

- I Insert
- R Replace
- S Restart
- T Terminate

If UTILITY_TYPE is MOVETABLE, one of:

- A Cancel
- C Copy
- I Init
- L Cleanup
- M Move
- R Replay
- S Swap
- V Verify

If UTILITY_TYPE is REDISTRIBUTE, one of:

- A Abort
- C Continue
- D Default
- T Target Map

If UTILITY_TYPE is REORG, one of:

- A Reorganize all table indexes
- I Index reorganization
- N Inplace table reorganization
- R Reorganize table reclaim extents
- T Classic table reorganization

If UTILITY_TYPE is RESTORE, one of:

- A Incremental automatic
- B Incremental abort
- F Full
- M Incremental manual

If UTILITY_TYPE is ROLLFORWARD, one of:

- E End of logs
- P Point in time

If UTILITY_TYPE is RUNSTATS, one of:

- A All indexes on a table
- I Index
- T Table

utility_phase_detail - Utility phase detail

This element reserved for future use.

Table 2107. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILPHASE	Always collected

utility_phase_type - Utility phase type

Identifies the utility phase type.

Table 2108. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILPHASE	Always collected

Usage

For the change history event monitor, if the utility_type element is BACKUP, the phase type is:

BACKUPTS

Backup table space

utility_priority - Utility Priority

Utility priority specifies the amount of relative importance of a throttled utility with respect to its throttled peers. A priority of 0 implies that a utility is executing unthrottled. Non-zero priorities must fall in the range of 1-100, with 100 representing the highest priority and 1 representing the lowest.

Table 2109. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

Table 2110. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilstart	Always collected

utility_start_time - Utility Start Time

The date and time when the current utility was originally invoked.

Table 2111. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

utility_start_type - Utility start type

This element indicates how a utility was started.

Table 2112. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTART	Always collected

Usage

For the change history event monitor, utility start information is one of:

- RESUME
- START

utility_state - Utility State

This element describes the state of a utility.

Element identifier

utility_state

Element type

information

Table 2113. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

Usage Use this element to determine the state of an active utility. The values for this field, listed as follows, are defined in sqlmon.h.

API Constant	Description
SQLM_UTILITY_STATE_EXECUTE	Utility is executing
SQLM_UTILITY_STATE_WAIT	Utility is waiting for an event to occur before resuming progress
SQLM_UTILITY_STATE_ERROR	Utility has encountered an error

utility_stop_type - Utility stop type

This element indicates how a utility was stopped.

Table 2114. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change History	UTILSTOP	Always collected

Usage

For the change history event monitor, a utility was stopped in one of the following ways:

- PAUSE
- STOP

valid - Section validity indicator monitor element

Indicates whether the dynamic SQL statement section is valid. For static SQL statements, the value of this monitor element is always Y.

Table 2115. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Usage

Valid values for this monitor element are Y and N. An invalid section will be implicitly prepared by the system when next used.

utility_type - Utility Type

The class of utility.

Table 2116. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database Manager	utility_info	Basic

Table 2117. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor element collection level
Change history	changesummary utillocation utilphase utilstart utilstop	Always collected

Usage

The values for this element can be any of the constants defined in `sqlmon.h` with names beginning "SQLM_UTILITY_".

For the change history event monitor, the utility type is one of:

- BACKUP
- LOAD
- MOVETABLE
- REDISTRIBUTE
- REORG
- RESTORE
- ROLLFORWARD
- RUNSTATS

valid - Section validity indicator monitor element

Indicates whether the dynamic SQL statement section is valid. For static SQL statements, the value of this monitor element is always Y.

Table 2118. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE

Usage

Valid values for this monitor element are Y and N. An invalid section will be implicitly prepared by the system when next used.

vectored_ios - Number of vectored I/O requests monitor element

The number of vectored I/O requests. More specifically, the number of times DB2 performs prefetching of pages into the page area of the buffer pool.

Table 2119. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Table 2120. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Buffer Pool	bufferpool	Buffer Pool

Usage

Use this element to determine how often vectored I/O is being done. The number of vectored I/O requests is monitored only during prefetching.

version - Version of Monitor Data

The version of the database manager that produced the event monitor data stream.

Table 2121. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Event Log Header	event_log_header	-

Usage

The data structures used by the event monitor may change between releases of the database manager. As a result, your monitor applications should check the version of the data stream to determine if they can process the data they will be receiving.

For this release, this element is set to the API constant `SQLM_DBMON_VERSION9_5`.

virtual_mem_free - Free virtual memory monitor element

The amount of virtual memory available on this host that is not allocated to any process, in MB.

Table 2122. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

virtual_mem_reserved - Reserved virtual memory monitor element

The amount of virtual memory reserved by running processes, in MB.

Table 2123. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

virtual_mem_total - Total virtual memory monitor element

The total amount of virtual memory available on this host, in MB.

Table 2124. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

wl_work_action_set_id - Workload work action set identifier monitor element

If this activity has been categorized into a work class of workload scope, this monitor element shows the ID of the work action set associated with the work class set to which the work class belongs. Otherwise, this monitor element shows the value of 0.

Table 2125. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2126. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this monitor element, together with the **wl_work_class_id** monitor element, to uniquely identify the workload work class of the activity, if one exists.

wl_work_class_id - Workload work class identifier monitor element

If this activity has been categorized into a work class of workload scope, then this monitor element displays the identifier of the work class. Otherwise, this monitor element displays the value of 0.

Table 2127. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2128. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity	Always collected

Usage

Use this monitor element, together with the `wl_work_action_set_id` monitor element, to uniquely identify the workload work class of the activity, if one exists.

wlm_queue_assignments_total - Workload manager total queue assignments monitor element

The number of times that activities or connections have been queued by a WLM threshold.

Table 2129. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2129. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2130. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

wlm_queue_time_total - Workload manager total queue time monitor element

The time spent waiting on a WLM queuing threshold. This value is given in milliseconds.

Table 2131. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 2131. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2132. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE

wlo_completed_total - Workload occurrences completed total monitor element

The number of workload occurrences to complete since last reset.

Table 2133. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 2134. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	-

Usage

Use this element to determine how many occurrences of a given workload are driving work into the system.

work_action_set_id - Work action set ID monitor element

The ID of the work action set to which this statistics record applies.

Table 2135. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_histogrambin	Always collected
Statistics	event_wcstats	Always collected

Usage

Use this element in conjunction with other activity history elements for analysis of the behavior of an activity or with other statistics elements for analysis of a work class.

The value of this element is 0 when the following conditions are met:

- The element is reported in an event_histogrambin logical data group.
- The histogram data is collected for an object that is not a work class.

work_action_set_name - Work action set name monitor element

The name of the work action set to which the statistics shown as part of this event are associated.

Table 2136. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE

Table 2137. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-
Statistics	event_wcstats	-

Usage

Use this element along with the **work_class_name** element to uniquely identify the work class whose statistics are being shown in this record or to uniquely identify the work class which is the domain of the threshold queue whose statistics are shown in this record.

work_class_id - Work class ID monitor element

The identifier of the work class to which this statistics record applies.

Table 2138. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wcstats	Always collected
Statistics	event_histogrambin	Always collected

Usage

Use this element in conjunction with other statistics elements for analysis of a work class.

The value of this element is 0 when the following conditions are met:

- The element is reported in an event_histogrambin logical data group.
- The histogram data is collected for an object that is not a work class.

work_class_name - Work class name monitor element

The name of the work class to which the statistics shown as part of this event are associated.

Table 2139. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE

Table 2140. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_qstats	-
Statistics	event_wcstats	-

Usage

Use this element along with the `work_action_set_name` element to uniquely identify the work class whose statistics are being shown in this record or to uniquely identify the work class which is the domain of the threshold queue whose statistics are shown in this record.

workload_id - Workload ID monitor element

An integer that uniquely identifies a workload.

Table 2141. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample	ACTIVITY METRICS BASE

Table 2142. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Application	appl_info	Basic

Table 2143. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Unit of work	-	Always collected
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	Always collected
Statistics	event_wlstats	Always collected
Statistics	event_histogrambin	Always collected
Activities	event_activity	Always collected
Threshold violations	event_thresholdviolations	Always collected

Usage

Use this ID to uniquely identify the workload to which this activity, application, histogram bin, or workload statistics record belongs.

The value of this element is 0 when the following conditions are met:

- The element is reported in an event_histogram in logical data group.
- The histogram data is collected for an object that is not a workload.

workload_name - Workload name monitor element

Name of the workload.

Table 2144. Table Function Monitoring Information

Table Function	Monitor Element Collection Level (For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 2145. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Unit of work	-	Always collected
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	Always collected
Statistics	event_wlstats	Always collected

Usage

In the statistics event monitor and workload table functions, the workload name identifies the workload for which statistics or metrics are being collected and reported. In the unit of work event monitor and unit of work table functions, the workload name identifies the workload that the unit of work was associated with.

Use the workload name to identify units of work or sets of information that apply to a particular workload of interest.

workload_occurrence_id - Workload occurrence identifier monitor element

The ID of the workload occurrence to which this activity belongs.

Table 2146. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD _OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Table 2147. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Unit of work	-	Always collected
Activities	event_activity	Always collected

Usage

Use this to identify the workload occurrence that submitted the activity.

workload_occurrence_state - Workload occurrence state monitor element

The state of the workload occurrence.

Table 2148. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2148. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_SERVICE_CLASS_WORKLOAD _OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE

Usage

Possible values include:

DECOUPLED

Workload occurrence does not have a coordinator agent assigned (concentrator case).

DISCONNECTPEND

Workload occurrence is disconnecting from the database.

FORCED

Workload occurrence has been forced.

INTERRUPTED

Workload occurrence has been interrupted.

QUEUED

Workload occurrence coordinator agent is queued by a workload management queuing threshold. In a partitioned database environment, this state may indicate that the coordinator agent has made an RPC another member to obtain threshold tickets and has not yet received a response.

TRANSIENT

Workload occurrence has not yet been mapped to a service superclass.

UOWEXEC

Workload occurrence is processing a request.

UOWWAIT

Workload occurrence is waiting for a request from the client.

x_lock_escals - Exclusive lock escalations monitor element

The number of times that locks have been escalated from several row locks to one exclusive table lock, or the number of times an exclusive lock on a row caused the table lock to become an exclusive lock.

Table 2149. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2150. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Table 2150. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Transactions	event_xact	Always collected

Usage

Other applications cannot access data held by an exclusive lock; therefore it is important to track exclusive locks since they can impact the concurrency of your data.

A lock is escalated when the total number of locks held by an application reaches the maximum amount of lock list space available to the application. The amount of lock list space available is determined by the **locklist** and **maxlocks** configuration parameters.

When an application reaches the maximum number of locks allowed and there are no more locks to escalate, it will then use space in the lock list allocated for other applications. When the entire lock list is full, an error occurs.

See the **lock_escals** monitor element for possible causes and resolutions to excessive exclusive lock escalations.

An application may be using exclusive locks when share locks are sufficient. Although share locks may not reduce the total number of lock escalations share lock escalations may be preferable to exclusive lock escalations.

xda_object_pages - XDA Object Pages

The number of disk pages consumed by XML storage object (XDA) data.

Element identifier

xda_object_pages

Element type

information

Table 2151. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic

Table 2152. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Tables	event_table	Always collected

Usage This element provides a mechanism for viewing the actual amount of space consumed by XML storage object (XDA) data in a particular table. This element can be used in conjunction with a table event monitor to track the rate of XML storage object data growth over time.

xda_object_l_pages - XML storage object (XDA) data logical pages monitor element

The number of logical pages used on disk by XML storage object (XDA) data.

Table 2153. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE

Usage

- This value might be less than the amount of space physically allocated for the object. This can happen when you use the REUSE STORAGE option of the TRUNCATE statement. This option causes storage allocated for the table to continue to be allocated, although the storage will be considered empty. In addition, the value for this monitor element might be less than the amount of space logically allocated for the object, because the total space logically allocated includes a small amount of additional meta data.

To retrieve an accurate measure of the logical or physical size of an object, use the ADMIN_GET_TAB_INFO_V97 function. This function provides more accurate information about the size of objects than you can obtain by multiplying the number of pages reported for this monitor element by the page size.

xid - Transaction ID

A unique transaction identifier (across all databases) generated by a transaction manager in a two-phase commit transaction.

Table 2154. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
DCS Application	dcs_appl	Unit of Work

Usage This identifier can be used to correlate the transaction generated by the transaction manager with the transactions executed against multiple databases. It can be used to help diagnose transaction manager problems by tying database transactions involving a two-phase commit protocol with the transactions originated by the transaction manager.

xmlid - XML ID monitor element

A unique document ID. The ID is derived as follows:

<event_header>_<event_id>_<event_type>_<event_timestamp>_<partition>.

Table 2155. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
EVMON_FORMAT_UE_TO_TABLES procedure - move an XML document to relational tables	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
EVMON_FORMAT_UE_TO_XML table function - convert unformatted events to XML	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 2156. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking		
Package Cache		

xquery_stmts - XQuery Statements Attempted

The number of XQuery statements executed for an application or database.

Element identifier

xquery_stmts

Element type

counter

Table 2157. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2158. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_db	Always collected
Connection	event_conn	Always collected

Usage You can use this element to gauge the activity of native XQuery language requests. This does not include embedded XQuery language requests such as xmlquery, xmltable, or xmlexist.

Part 3. Monitoring in a DB2 pureScale environment

The IBM DB2 pureScale Feature provides a robust, highly available database processing environment. Problems that might arise with the operation of one or more host systems in the DB2 pureScale instance can typically be addressed without interrupting access to data.

Ironically, this characteristic of high-availability in a DB2 pureScale environment can mask issues that might lead to less than optimal performance. Monitoring certain aspects of your DB2 pureScale environment can help you recognize and address such issues.

For example, you might have a hardware problem that causes a member or cluster caching facility (also known as a CF) to fail over repeatedly to another host. However, because recovery is in most cases automatic, you might never be aware of the problem. If the problem goes undetected and uncorrected, you will not be realizing the full performance potential of your DB2 pureScale environment .

For this reason, doing some level of ongoing, operational monitoring of your DB2 pureScale instance is recommended. It can help you answer such questions as:

- Are all components of my DB2 pureScale instance running?
- If a member or CF has failed, was it able to restart successfully?
- Is my CF running on its preferred primary host? Or has it failed over to another host?
- Is another CF in a state where it is ready to take over if the primary CF fails?

A good place to start when you want to see the overall status of your DB2 pureScale environment is to examine the operational status of the hosts, members and CFs in your instance. By examining state and alert information reported for each of these entities, you can form an overall picture of how well your DB2 pureScale instance is functioning.

Beyond looking at the overall state of your DB2 pureScale instance, you can also use the DB2 monitoring infrastructure to examine monitor elements that provide information about specific aspects of the DB2 pureScale instance. This information can help you to better understand where configuration and application design issues might detract from overall system performance.

Chapter 12. Status monitoring of a DB2 pureScale instance

Viewing the overall status of the components in a DB2 pureScale instance can give you a picture of how effectively it is functioning. You can view this information using table functions and administrative views.

There are also DB2 command-line processor (CLP) commands and system commands that you can use to display operational status for your instance.

The information returned from these table functions, views, and commands provides you with a high-level view of the state of your DB2 pureScale instance. For example, you can use these interfaces to find answer to questions like the ones that follow: :

- Are the hosts that comprise a DB2 pureScale instance active or not?
- Which hosts are functioning as cluster caching facilities or member servers?
- Are there hosts that are functioning as both a member and a cluster caching facility?
- Are there hosts that are running more than one member?
- Is a member running on its preferred home host?
- For configurations with more than one cluster caching facility, which one is functioning as the primary server? What is the current state of the other, non-primary cluster caching facilities, PEER, or CATCHUP?
- What is the current *state* of the members that comprise an instance? For example, has any member been stopped using the **db2stop** command? Or is any member currently waiting to fail back to its home host?
- Do any cluster caching facility or member servers indicate an active *alert* that requires investigation?

Included in the information returned by many of these interfaces is *state* and *alert* information. The state of a host, a member or a cluster caching facility reflects the current operational capacity of the object in question. For example, a member can be STARTED, STOPPED, RESTARTING, WAITING_FOR_FAILBACK, ERROR or UNKNOWN.

Alerts are used to indicate that there is something that requires further investigation. If an alert is raised for one or more cluster caching facilities or members in an instance, problems might exist that require investigation.

Interfaces for retrieving status information for DB2 pureScale instances

To see the overall status of various components in your DB2 pureScale instance, you can choose from a number of administrative views, table functions, and CLP commands.

In addition, there are commands that you can use from the system command prompt or shell, which are useful when any of the server components are not running.

You can view state and alert information about your DB2 pureScale instance in the following ways:

- “Table functions and administrative views”
- “CLP commands” on page 1553
- “System prompt (shell) commands” on page 1553.

Table functions and administrative views

Table functions provide a flexible interface for retrieving information about your system. Most table functions accept parameters to narrow the scope of the information returned. For example, you might be interested in viewing information about a specific host.

Administrative views provide quick and easy access to system information. Unlike table functions, you cannot pass parameters to an administrative view to narrow the scope of a query. Generally, information for all objects relevant to the view (for example, hosts, cluster caching facilities (also known as CFs) or members) in the system are returned. You can always filter the output of administrative views using SQL, however.

The following table functions and their corresponding administrative views return information about the overall status of a DB2 pureScale instance:

Table 2159. Table functions and administrative views that display status information for components in a DB2 pureScale instance

Interface	Description
DB2_GET_CLUSTER_HOST_STATE table function DB2_CLUSTER_HOST_STATE administrative view	These interfaces provide basic information about the hosts that comprise a DB2 pureScale instance. They return a list of hosts and associated state information.
DB2_GET_INSTANCE_INFO table function DB2_MEMBER administrative view DB2_CF administrative view	These interfaces provide more detailed information about a DB2 pureScale instance. They return information about the role in the instance each host plays (cluster caching facility or member), whether each cluster caching facility or member is running on its home host, and connection information for each host.
DB2_INSTANCE_ALERTS administrative view	This interface provides information about alerts in a DB2 pureScale instance.

Note: Each of the preceding interfaces can be used in both DB2 pureScale instances and other DB2 instances. The results they return for each might be different. For example, the DB2_MEMBER administrative view can be used for both types of instances; however, in an instance outside of a DB2 pureScale environment, no state or alert information is included in the information returned. You must remember to interpret the results returned from the functions and views in the context of the type of instance that is being queried. Consult the reference topics for each of the specific table functions or administrative views for details.

CLP commands

The following commands can be used from the DB2 command-line processor (CLP):

Table 2160. CLP commands that display status information for components in a DB2 pureScale instance

CLP command	Description
LIST INSTANCE	This command returns information about the state of members, hosts, and cluster caching facilities.
LIST INSTANCE SHOW DETAIL	This command is an extension of the LIST INSTANCE command that returns added information, including partition number and connection information for members, hosts, and cluster caching facilities.

System prompt (shell) commands

The following commands can be used from the system or shell prompt:

Table 2161. System prompt (shell) commands that display information for components in a DB2 pureScale instance

Command	Description
db2instance -list	This command returns status information about members, hosts, and cluster caching facilities in a DB2 pureScale instance. It can be used even if there is no current database connection, or if the instance is stopped. In the latter case, the db2instance -list command works with the cluster manager to report the information about the hosts in the DB2 pureScale instance. There are several options available that restrict the output to members only, or cluster caching facilities only.
db2cluster -list options	This command can be used to view information about DB2 pureScale instances. There are several additional options to choose from for this command; when you specify the -list option, you must also specify additional options to specify what to include in the command output.

Values for member and cluster caching facility states and alerts

Many of the table functions, administrative views, and commands that you can use to query the status of components in a DB2 pureScale environment return *state* and *alert* information.

The *state* of a host, member or cluster caching facility (also known as a CF) reflects its operational status. An *alert* for a host, member or CF is an indication that a problem exists that might require investigation or intervention.

States for hosts, members and cluster caching facilities

State information is returned by many of the table functions, administrative views, and commands that you can use to query the status of the components of a DB2 pureScale environment. The possible values for the state of each component are shown in Table 2162 on page 1554:

Table 2162. Possible states for hosts, members and cluster caching facilities

Component	Possible states	Description
Host	ACTIVE	Host is available for use. This means that the host system is running and can respond to operating system or networking commands, such as the TCP/IP ping command.
	INACTIVE	Host is not available for use. This means that the host system is not running, not available or not responding to system commands. The reasons for being in this state can range from a power loss at the host to connection or networking issues.
cluster caching facility (CF)	STOPPED	CF has been manually stopped using the db2stop command as part of a normal shutdown by the administrator.
	RESTARTING	CF is in the process of starting, either from the db2start command, or after a CF failure.
	BECOMING_PRIMARY	Once a CF has started, it attempts to take on the role of the primary CF in the instance if no other CF already has this role.
	PRIMARY	The CF is operating normally as the primary CF.
	CATCHUP (<i>n%</i>)	When a backup CF is initially started, it does not contain any information from the primary CF. During CATCHUP state, the backup CF is in the process of obtaining a copy of all relevant information from the primary CF. This information that enables it to assume the role of primary CF if the primary CF fails. <i>n%</i> indicates how far along the backup CF is in the process of copying information from the primary CF. When this copying process is complete, the backup CF moves into PEER state. Note: When you view the status of the non-primary CF using the command db2instance -list , it will be in CATCHUP state until a connection is made to the database. Once the first connection is made, the process of copying data from the primary CF begins.
	PEER	The backup CF is ready to take over the responsibilities of the primary CF in the event of a primary CF failure. Duplexing continues while the backup CF is in PEER state.
	ERROR	DB2 cluster services could not automatically restart the CF. When the CF reflects an ERROR state, the ALERT field is always set to YES, indicating intervention and investigation is required by the administrator. DB2 cluster services no longer attempts to restart the CF once it is in the ERROR state unless the alert has been cleared. The ERROR state can also occur if a connection to a CF cannot be established to query its state. In this case, the ALERT field is not set to YES because the problem might be temporary.

Table 2162. Possible states for hosts, members and cluster caching facilities (continued)

Component	Possible states	Description
Member	STARTED	Member is started in the instance and operating normally. All databases are consistent and member is ready to accept or is already accepting connections to databases. If a member failed and started again, it is possible that the process model has started, but that crash recovery of the database is not yet complete. Use the LIST UTILITIES SHOW DETAIL command from any member to monitor the recovery progress.
	STOPPED	Member has been manually stopped using the db2stop command as part of a normal shutdown by the administrator.
	RESTARTING	Member is in the process of starting or restarting. If the current host is the same as the home host, then a local member restart is taking place. If current host is different from the home host, then a member has failed over to the current host, and is restarting in light mode.
	WAITING_FOR_FAILBACK	The process model for this member has successfully restarted on the current host in light mode. The member is waiting for its home host to become available, and which point, it will fail back on the home host. Use the LIST UTILITIES command with the SHOW DETAIL option from any active member to monitor recovery progress, and to see if crash recovery is complete for all databases. The member does not accept any new connections, nor does it process any transactions. In-doubt transactions might still exist.
	ERROR	DB2 cluster services could not automatically restart the member, either on its home host or on any other host in the DB2 pureScale instance. When the member reflects an ERROR state, the ALERT field is always set to YES, indicating intervention and investigation is required from the administrator. DB2 cluster services no longer attempts to restart the member once it is in the ERROR state unless the alert has been cleared.

Alerts for hosts, members and cluster caching facilities

In addition to returning state information, the commands that query the status of the components in a DB2 pureScale environment also return alert information. The possible values for alerts for all components is either YES or NO. Generally speaking, an alert value of NO is an indication that things are running normally. An alert value of YES indicates that there is a problem that might require manual intervention. In some cases, the alert conditions are temporary, and the alert field might clear itself, such as when a host is rebooted. In other cases, the alert field remains set until the administrator resolves the problem and manually resets the alert field using the **db2cluster** command with the **-clear -alert** options.

Interpretation of status information

When you query hosts, members or cluster caching facilities for status information, the system presents state and alert information that tells you about the status of the various components in your DB2 pureScale environment. When problems arise, you generally need to examine both states and alerts to understand what is happening in the system.

The *state* of a host, member or cluster caching facility (also known as a CF) reflects its operational status. When everything is operating normally, the values reported for the state of hosts, members and cluster caching facilities (also known as CFs) can give you a general idea of the status of your system. For example, a status of RESTARTING, or WAITING_FOR_FAILBACK on a member does not itself indicate that there is a problem. There might be several valid reasons why a member is

failing over to a new host, or restarting on its home host, such as when hosts are taken offline for maintenance. If a member is failing over on a frequent, repeated basis, there might be a problem that warrants further investigation.

An *alert* for a host, member or CF is an indication that a problem exists that might require investigation or intervention. Looking at alerts in the context of the state of a given system component can reveal additional information about the source of the problem. The sections that follow outline the various combinations of state and alert information that you might encounter for hosts, members or cluster caching facilities, and how to interpret different combinations of states and alerts.

Remember: The completeness of state and alert information returned by the interfaces that report on this information depends on the following factors:

- The type of instance in which the table function, administrative view, or command is being run (for example, DB2 pureScale instances or other DB2 instances)
- Whether a supported cluster manager is employed in that instance. All DB2 pureScale Feature deployments use a cluster manager.

See “Differences in reporting for data-sharing and environments other than DB2 pureScale environments” on page 1559 for details.

Host status

You can view information about the hosts in a DB2 pureScale environment using a number of different interfaces. One such interface is the `DB2_CLUSTER_HOST_STATE` administrative view. For example, consider this SQL query:

```
SELECT varchar(HOSTNAME,10) AS HOST,  
       varchar(STATE,8) AS STATE,  
       varchar(INSTANCE_STOPPED,7) AS STOPPED,  
       ALERT  
FROM SYSIBMADM.DB2_CLUSTER_HOST_STATE
```

The output of running the preceding SQL statement would look like this:

HOST	STATE	STOPPED	ALERT
HOSTD	ACTIVE	NO	NO
HOSTB	ACTIVE	NO	NO
HOSTA	ACTIVE	YES	NO
HOSTC	ACTIVE	NO	NO

4 record(s) selected.

(In the preceding example, the `STOPPED` column corresponds to the `INSTANCE_STOPPED` column returned by the administrative view.)

The values for the `state`, `instance_stopped` and `alert` columns can take on different values, depending on the conditions at any given time. The possible values are summarized in Table 2163 on page 1557.

Table 2163. Combinations of state, instance_stopped, and alerts possible on a host system in a DB2 pureScale instance

STATE	INSTANCE_STOPPED	ALERT	Description
ACTIVE	NO	NO	The host is active and operating normally.
		YES	The host is active (that is, it responds to system commands), however there might be a problem preventing it from participating in the DB2 pureScale instance. For example, there might be a file system problem or a network communication issue, or the idle processes that the DB2 pureScale Feature requires for performing failovers might not be running.
	YES	NO	The host is active. The instance has been stopped explicitly on this host by the administrator using the db2stop instance on hostname command
		YES	The host is active, however, an alert exists for the host that has not been cleared. The administrator has explicitly stopped the instance.
INACTIVE	NO	NO	Not applicable. A host cannot be INACTIVE when both INSTANCE_STOPPED and ALERT are set to NO.
		YES	The host is not responding to system commands. The instance was not stopped explicitly by the administrator, however there is an alert. This combination of status information indicates the abnormal shutdown of a host. Such a shutdown might arise, for example, from a power failure on a host.
	YES	NO	Normal state when the instance has been stopped by the administrator. Such a combination of status information might arise when the host is being taken offline for the installation of software updates.
		YES	The host is not responding to system commands. An alert exists for the host that has not been cleared, but the instance was stopped explicitly by the administrator (that is, the system did not shut down abnormally).

Tip: You can see details about alerts using the DB2_INSTANCE_ALERTS administrative view.

Member status

You can view member states and alerts using several different interfaces. One such interface is the DB2_MEMBER administrative view. The DB2_MEMBER administrative view shows status information for members in a DB2 pureScale instance. What follows is an example of how to use this administrative view to retrieve member status:

```
SELECT ID,
       varchar(STATE,21) AS STATE,
       varchar(HOME_HOST,10) AS HOME_HOST,
       varchar(CURRENT_HOST,10) AS CUR_HOST,
       ALERT
FROM SYSIBMADM.DB2_MEMBER
```

The values for the state, and alert columns can take on different values, depending on the conditions at any given time. The possible values are summarized in Table 2164 on page 1558.

Table 2164. Combinations of state, and alerts possible for members in a DB2 pureScale instance

STATE	ALERT	Description
STARTED	NO	The member is started in the instance and is operating normally.
	YES	The member is started in the instance. However, at some point, there was an unsuccessful attempt to fail over to another host. Since that unsuccessful attempt to fail over, the member was able to fail over successfully to another host, or it has failed back to its home host. If the member is running on its home host, it is running normally; if it is running on a guest host, it is running in light mode. Either way, investigate the alert to determine what happened.
STOPPED	NO	The member has been stopped by the administrator using the db2stop command.
	YES	The member has been stopped by the administrator using the db2stop command, however, the alert field has not yet been cleared.
RESTARTING	NO	The member is starting.
	YES	The member is starting. However, at some point, there was an unsuccessful attempt to start the member on the home host or to fail over to another host. The alert field has not yet been cleared.
WAITING_FOR_FAILBACK	NO	The member is running in light mode on a guest host, and is waiting to fail back to the home host. You might want to examine the status of the home host to see if anything is preventing the member from failing back to the home host (for example, a failed network adapter).
	YES	An attempt to restart the member on the home host might have failed, automatic failback is disabled, or crash recovery might have failed. You need to resolve the problem and clear the alert manually before the member can automatically fail back to its home host. If automatic failback is disabled, manually clear the alert and enable automatic failback using the db2cluster command.
ERROR	YES	DB2 cluster services was not able to start the member on any host. You need to resolve the problem and clear the alert manually before attempting to restart the instance.

Tip: You can see details about alerts using the DB2_INSTANCE_ALERTS administrative view.

cluster caching facility status

The DB2_GET_INSTANCE_INFO table function lets you retrieve status information for members in a DB2 pureScale instance. One of the benefits of the table function is that you can pass parameters to it to narrow the scope of the results returned. For example, to retrieve information about CFs in a DB2 pureScale instance, you can construct a query such as:

```
SELECT ID,
       varchar(STATE,17) AS STATE,
       varchar(HOME_HOST,10) AS HOME_HOST,
       varchar(CURRENT_HOST,10) AS CUR_HOST,
       ALERT
FROM TABLE(DB2_GET_INSTANCE_INFO(NULL, '', '', 'CF', NULL))
```

The values for the state, and alert columns can take on different values, depending on the conditions at any given time. The possible values are summarized in Table 2165 on page 1559.

Table 2165. Combinations of state, and alerts possible for cluster caching facilities in a DB2 pureScale instance

STATE	ALERT	Description
STOPPED	NO	The cluster caching facility (also known as a CF) has been manually stopped using the db2stop command.
	YES	There has been an unsuccessful attempt by the CF to become the primary CF. The cluster caching facility has been manually stopped in the instance by the administrator using the db2stop command.
RESTARTING	NO	The CF is restarting, either as a result of the db2start command, or after a primary CF failure.
	YES	The CF is restarting, however, there is a pending alert from a previous failed attempt by the CF to take on the primary role that must be cleared manually.
BECOMING_PRIMARY	NO	The CF will take on the role of primary CF if there is no other primary CF already running in the instance.
	YES	Not applicable. The CF cannot attempt to take on the primary role with an alert condition set.
PRIMARY	NO	The CF has taken on the role of primary CF and is operating normally.
	YES	Not applicable. The CF cannot be acting as the primary CF with an alert condition set.
CATCHUP(<i>n</i> %)	NO	This non-primary CF is in the process of copying information from the primary CF required for it to operate in PEER mode. Note: When you view the status of the non-primary CF using the command db2instance -list , it will be in CATCHUP state until a connection is made to the database. Once the first connection is made, the process of copying data from the primary CF begins.
	YES	This non-primary CF is in the process of copying information from the primary CF required for it to operate in PEER mode. There is a pending alert from a previous failed attempt by this CF to take on the primary role that must be cleared manually.
PEER	NO	This non-primary CF is ready to assume the role of primary CF if the current primary CF fails.
	YES	This non-primary CF is ready to assume the role of primary CF if the current primary CF fails. There is a pending alert from a previous failed attempt by this CF to take on the primary role that must be cleared manually.
ERROR	YES	The CF could not be started on any host in the instance. You need to resolve the problem and clear the alert manually before attempting to restart the instance.

Tip: You can see details about alerts using the DB2_INSTANCE_ALERTS administrative view.

Differences in reporting for data-sharing and environments other than DB2 pureScale environments

All the various table functions, administrative views and commands that report status data for hosts, members and cluster caching facilities can be used outside of a DB2 pureScale instance. However, the results returned by these interfaces might be different from what you see in a DB2 pureScale instance.

In a configuration that uses a clustered file system with a supported cluster manager (CM) (a configuration sometimes known as "integrated High Availability" or "integrated HA") the results returned for most of these status-reporting interfaces will resemble what you see in a DB2 pureScale instance. One exception is when retrieving information about hosts in your instance using the DB2_GET_CLUSTER_HOST_STATE table function or the DB2_CLUSTER_HOST_STATE administrative view. Outside of a DB2 pureScale instance with integrated HA, neither of these interfaces will return the INSTANCE_STOPPED column. The results of a query that uses the DB2_CLUSTER_HOST_STATE administrative view, for example, resemble those shown in Figure 20

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
HOSTA	ACTIVE	-	NO
HOSTB	ACTIVE	-	NO
HOSTC	ACTIVE	-	NO
HOSTD	ACTIVE	-	NO

Figure 20. Results returned by the DB2_CLUSTER_HOST_STATE administrative view outside of a DB2 pureScale instance with a cluster manager.

Another exception is any interface that specifically reports on status for cluster caching facilities. Outside of a DB2 pureScale environment, there are no cluster caching facilities, so there is no status to report. For example, the DB2_CF administrative view returns results similar to the following in an environment other than a DB2 pureScale environment:

ID	CURRENT_HOST	STATE	ALERT
0 record(s) selected.			

Figure 21. Results returned by the DB2_CF administrative view outside of a DB2 pureScale instance.

When the status-reporting interfaces are used in an instance without a CM, no status or alert information is returned at all. For example, the results of a query that uses the DB2_CLUSTER_HOST_STATE administrative view resemble those in Figure 22

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
HOSTA	-	-	-
HOSTB	-	-	-
HOSTC	-	-	-
HOSTD	-	-	-

4 record(s) selected.

Figure 22. Results returned by the DB2_CLUSTER_HOST_STATE administrative view outside of a DB2 pureScale instance without a cluster manager.

Examples: Viewing the status of hosts, members and cluster caching facilities

The topics that follow include examples of using the various interfaces to view the status of the components of your DB2 pureScale instance.

Viewing status information for hosts in a DB2 pureScale instance

You can retrieve basic information that shows the overall status of hosts in a DB2 pureScale instance. This information tells you whether the host is active or not, if the instance is running on the host, and whether there are any alerts that require investigation.

About this task

Viewing the status of the hosts in a DB2 pureScale instance is one of the first places to start to get an overall view of the status of the instance.

One way to retrieve this status is using the `DB2_CLUSTER_HOST_STATE` administrative view. This view returns status information for all hosts in the instance. You can also use the following interfaces to retrieve information about host status:

- `DB2_GET_CLUSTER_HOST_STATE` table function. This approach is useful if you want to query the status of a particular host, as the table function accepts a host ID as a parameter.
- `LIST INSTANCE` command.
- `db2instance` command, with the `-list` parameter

Procedure

To view the status of the hosts in a DB2 pureScale instance:

1. Formulate an SQL statement using either the `DB2_CLUSTER_HOST_STATE` administrative view, or the `DB2_GET_CLUSTER_HOST_STATE` table function. This example uses the administrative view:

```
SELECT varchar(HOSTNAME,10) AS HOST,  
       varchar(STATE,8) AS STATE,  
       varchar(INSTANCE_STOPPED,7) AS STOPPED,  
       ALERT  
FROM SYSIBMADM.DB2_CLUSTER_HOST_STATE
```

2. Run the query.

Results

The output of running the preceding SQL statement would look like this:

HOST	STATE	STOPPED	ALERT
HOSTD	ACTIVE	NO	NO
HOSTB	ACTIVE	NO	NO
HOSTA	ACTIVE	YES	NO
HOSTC	ACTIVE	NO	NO

4 record(s) selected.

In this example, there are 4 hosts in this instance. Three are active, which just means that the systems are powered on, and are able to respond to operating system commands. One host is stopped, which means that the instance has been stopped on that host explicitly by the administrator. There are no alerts that require investigation.

Example

Retrieving host status using the `DB2_GET_CLUSTER_HOST_STATE` table function

The DB2_GET_CLUSTER_HOST_STATE table function also lets you retrieve status information about hosts in a DB2 pureScale instance. One of the benefits of the table function is that you can pass parameters to it to narrow the scope of the results returned. For example, to retrieve information about the host HOSTD in the DB2 pureScale instance, construct a query like the following:

```
SELECT varchar(HOSTNAME,10) as HOST,
       varchar(STATE,10) AS STATE,
       ALERT
FROM TABLE(DB2_GET_CLUSTER_HOST_STATE('HOSTD'))
```

Results:

HOST	STATE	ALERT
HOSTD	ACTIVE	NO

1 record(s) selected.

Viewing status information for members and cluster caching facilities in a DB2 pureScale instance

You can view details about the operational status of members and cluster caching facilities (also known as CFs) in a DB2 pureScale instance, such as the role played by CFs (for example, primary or peer), and whether or members have failed over to a different host.

About this task

The example presented in this task shows how to retrieve information about the status of members and cluster caching facilities in a DB2 pureScale instance using the **db2instance** system command. The benefit of using a system command is that a database connection is not required. However, the command must be run from a host that is a member (not a CF) in the instance.

Procedure

To retrieve status information about the members and CFs in a DB2 pureScale instance using the **db2instance** command, enter the command at the system prompt of one of the members in the instance, with the **-list** option:

```
db2instance -list
```

The db2instance command returns information like the following query (output has been slightly compressed for presentation purposes):

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT	PARTITION_NUMBER	LOGICAL_PORT	NETNAME
0	MEMBER	STARTED	HOSTA	HOSTA	NO	0	0	OSTA-ib0
1	MEMBER	STARTED	HOSTB	HOSTB	NO	0	0	HOSTB-ib0
2	MEMBER	STARTED	HOSTC	HOSTC	NO	0	0	HOSTC-ib0
128	CF	PRIMARY	HOSTD	HOSTD	NO	-	0	HOSTD-ib0
129	CF	PEER	HOSTE	HOSTE	NO	-	0	HOSTE-ib0

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
HOSTA	ACTIVE	NO	NO
HOSTC	ACTIVE	NO	NO
HOSTD	ACTIVE	NO	NO
HOSTE	ACTIVE	NO	NO
HOSTB	ACTIVE	NO	NO

Results

The results returned depend on the structure of your DB2 pureScale instance. In this example, the report shows that:

- Hosts HOSTA through HOSTC are configured as members
- Each member is started, and is running on its own home host
- There are 2 cluster caching facilities CFs running on hosts HOSTD and HOSTE
- The primary CF is running on HOSTD; another CF is running on HOSTE in peer mode, indicating that it is ready to take over the responsibilities of the primary CF in the event of a primary CF failure.

Example

You can also retrieve status information for members and cluster caching facilities using the following interfaces:

- DB2_MEMBER or DB2_CF administrative view
- DB2_GET_INSTANCE_INFO table function
- **LIST INSTANCE** command-line processor (CLP) command
- **db2cluster** system command.

The examples that follow illustrate the use of some of these interfaces.

Example 1: Retrieving status information using the DB2_MEMBER administrative view

The DB2_MEMBER administrative view shows status information for members in a DB2 pureScale instance. What follows is an example of how to use this administrative view to retrieve member status:

```
SELECT ID,  
       varchar(STATE,21) AS STATE,  
       varchar(HOME_HOST,10) AS HOME_HOST,  
       varchar(CURRENT_HOST,10) AS CUR_HOST,  
       ALERT  
FROM SYSIBMADM.DB2_MEMBER
```

Results:

ID	STATE	HOME_HOST	CUR_HOST	ALERT
0	WAITING_FOR_FAILBACK	HOSTA	HOSTB	NO
1	STARTED	HOSTB	HOSTB	NO
2	STARTED	HOSTC	HOSTC	NO

3 record(s) selected.

In this example, member 0 has failed on its home host and has failed over to HOSTB. Member 0 is waiting to fail back to its home host, HOSTA.

Example 2: Retrieving status information for CFs using the DB2_GET_INSTANCE_INFO table function

The DB2_GET_INSTANCE_INFO table function lets you retrieve status information for members in a DB2 pureScale instance. One of the benefits of the table function is that you can pass parameters to it to narrow the scope of the results returned. For example, to retrieve information about CFs in a DB2 pureScale instance, you can construct a query such as:

```
SELECT ID,  
       varchar(STATE,17) AS STATE,  
       varchar(HOME_HOST,10) AS HOME_HOST,
```

```

        varchar(CURRENT_HOST,10) AS CUR_HOST,
        ALERT
FROM TABLE(DB2_GET_INSTANCE_INFO(NULL, '', '', 'CF', NULL))

```

Results:

ID	STATE	HOME_HOST	CUR_HOST	ALERT
128	RESTARTING	HOSTD	HOSTD	NO
129	BECOMING_PRIMARY	HOSTE	HOSTE	NO

1 record(s) selected.

In this example, the CF with the host ID of 128 has failed. The CF with the host ID of 129 is in the process of taking over as the primary CF.

*Example 3: Investigating alerts reported with the **db2instance -list** command.*

In this example, the results of running the **db2instance -list** command are as follows:

```

$ db2instance -list
ID      TYPE      STATE      HOME_HOST      CURRENT_HOST      ALERT  PARTITION_NUMBER  LOGICAL_PORT  NETNAME
-----
0       MEMBER    STARTED    HostA           HostA             NO     0                  0              -
1       MEMBER    STARTED    HostB           HostB             NO     0                  1              -
2       MEMBER    STARTED    HostC           HostC             NO     0                  2              -
128    CF        ERROR      HostD           HostD             YES    -                  0              -
129    CF        ERROR      HostE           HostE             YES    -                  0              -

HOSTNAME      STATE      INSTANCE_STOPPED  ALERT
-----
HostA         ACTIVE    NO                NO
HostB         ACTIVE    NO                NO
HostC         ACTIVE    NO                NO
HostD         ACTIVE    NO                YES
HostE         ACTIVE    NO                YES

```

There is currently an alert for a member, CF, or host in the data-sharing instance. For more information on the alert, its impact, and how to clear it, run the following command: 'db2cluster -cm -list -alert'

In this example, there are alerts for both cluster caching facilities in the instance. Also, the state of the CFs appear as ERROR. As the message at the end of the report suggests, you can use the **db2cluster** command with the **-cm -list -alert** options to view more information about the alerts:

```
$db2cluster -cm -list -alert
```

Alert: CF '128' failed to start the PRIMARY role on host 'HostD'. Check the cadiag*.log for failures related to CF '128' for more information.

Action: This alert must be cleared manually with the command: 'db2cluster -cm -clear -alert'.

Impact: CF '128' on host 'HostD' will be unavailable to service requests from DB2 members until the alert is cleared.

Example 4: Member alert, a member failed to start in the DB2 pureScale instance

In this example, the results of running the **db2instance -list** command are as follows:

```

$ db2instance -list
ID      TYPE      STATE      HOME_HOST      CURRENT_HOST      ALERT  PARTITION_NUMBER  LOGICAL_PORT  NETNAME
-----
0       MEMBER    ERROR      HostA           HostA             YES    0                  0              -
1       MEMBER    STARTED    HostB           HostB             NO     0                  1              -
2       MEMBER    STARTED    HostC           HostC             NO     0                  2              -
128    CF        PRIMARY    HostD           HostD             NO     -                  0              -
129    CF        PEER      HostE           HostE             NO     -                  0              -

HOSTNAME      STATE      INSTANCE_STOPPED  ALERT
-----
HostA         ACTIVE    NO                NO
HostB         ACTIVE    NO                NO
HostC         ACTIVE    NO                NO
HostD         ACTIVE    NO                NO
HostE         ACTIVE    NO                NO

```

There is currently an alert for a member, CF, or host in the data-sharing instance. For more information on the alert, its impact, and how to clear it, run the following command: 'db2cluster -cm -list -alert'

In this example, a member failed to start in the DB2 pureScale instance. Running the **db2cluster** command with the **-cm -list -alert** options recommends an action to take and outlines the impact of this failure in the

DB2 pureScale instance.

```
$db2cluster -cm -list -alert
```

Alert: DB2 member '0' failed to start on its home host 'HostA'. The cluster manager will attempt to restart the DB2 member in restart light mode on another host. Check the db2diag.log for messages concerning failures on host 'HostA' for member '0'."

Action: This alert must be cleared manually with the command: 'db2cluster -cm -clear -alert'.

Impact: DB2 member '%0' will not be able to service requests until this alert has been cleared and the DB2 member returns to its home host.

Example 5: CF error, the secondary CF failed CATCHUP phase

In this example, the results of running the **db2instance -list** command are as follows:

```
$ db2instance -list
ID      TYPE      STATE      HOME_HOST      CURRENT_HOST      ALERT  PARTITION_NUMBER  LOGICAL_PORT  NETNAME
-----
0       MEMBER    STARTED    HostA           HostA             NO     0                  0             -
1       MEMBER    STARTED    HostB           HostB             NO     0                  1             -
2       MEMBER    STARTED    HostC           HostC             NO     0                  2             -
128    CF        PRIMARY    HostD           HostD             NO     -                  0             -
129    CF        ERROR      HostE           HostE             YES    -                  0             -

HOSTNAME      STATE      INSTANCE_STOPPED  ALERT
-----
HostA         ACTIVE    NO                NO
HostB         ACTIVE    NO                NO
HostC         ACTIVE    NO                NO
HostD         ACTIVE    NO                NO
HostE         ACTIVE    NO                NO
```

There is currently an alert for a member, CF, or host in the data-sharing instance. For more information on the alert, its impact, and how to clear it, run the following command: 'db2cluster -cm -list -alert'

In this example, the secondary CF failed CATCHUP phase. Running the **db2cluster** command with the **-cm -list -alert** options recommends an action to take and outlines the impact of this failure in the DB2 pureScale instance.

```
$db2cluster -cm -list -alert
```

Alert: CF '129' failed to complete CATCHUP on host 'HostE'. Check the db2diag.log for failure messages pertaining to CATCHUP on CF '129'.

Action: Contact IBM support to determine the reason for the failure. To re-attempt CATCHUP, restart the failed CF with the commands: 'db2stop 129; db2start 129'. This alert will clear itself when the CF is restarted.

Impact: CF '129' on host 'HostE' will not be available until it can undergo CATCHUP successfully.

Example 6: Host alert, the host "HostA" lost a network connection.

In this example, the results of running the **db2instance -list** command are as follows:

```
$ db2instance -list
ID      TYPE      STATE      HOME_HOST      CURRENT_HOST      ALERT  PARTITION_NUMBER  LOGICAL_PORT  NETNAME
-----
0       MEMBER    WAITING_FOR_FAILBACK  HostA           HostA             NO     0                  0             -
1       MEMBER    STARTED    HostB           HostB             NO     0                  1             -
2       MEMBER    STARTED    HostC           HostC             NO     0                  2             -
128    CF        PRIMARY    HostD           HostD             NO     -                  0             -
129    CF        PEER       HostE           HostE             NO     -                  0             -

HOSTNAME      STATE      INSTANCE_STOPPED  ALERT
-----
HostA         INACTIVE    NO                YES
HostB         ACTIVE    NO                NO
HostC         ACTIVE    NO                NO
HostD         ACTIVE    NO                NO
HostE         ACTIVE    NO                NO
```

There is currently an alert for a member, CF, or host in the data-sharing instance. For more information on the alert, its impact, and how to clear it, run the following command: 'db2cluster -cm -list -alert'.

In this example, the host "HostA" lost a network connection. Running the **db2cluster** command with the **-cm -list -alert** options recommends an action to take and outlines the impact of this failure in the DB2 pureScale instance.

```
$db2cluster -cm -list -alert
```

Alert: Host 'HostA' is INACTIVE. Ensure the host is powered on and connected to the network.

Action: This alert will clear itself when the host is ACTIVE.

Impact: While the host is INACTIVE, the DB2 members on this host will be in restart light mode on other hosts and will be in the WAITING_FOR_FAILBACK state. Any CF defined on the host will not be able to start, and the host will not be available as a target for restart light.

Checking restart status for members

If you know a member has failed, perhaps because of a power loss or other hardware problem that you have since corrected, you might want to know whether it has restarted successfully.

About this task

You can use the DB2_MEMBER administrative view to examine the operational status of all members in a DB2 pureScale instance. You can also use the DB2_GET_INSTANCE_INFO table function, which provides options for querying specific hosts.

The process for checking member restart status is exactly as is shown in Example 1 of “Viewing status information for members and cluster caching facilities in a DB2 pureScale instance” on page 1562. Specifically, formulate an SQL query that uses the DB2_MEMBER administrative view (or the DB2_GET_INSTANCE_INFO table function) to retrieve values for the following columns:

- ID
- HOME_HOST
- CURRENT_HOST
- STATE
- ALERT

Procedure

1. Formulate the SQL query using whichever interface you prefer. This example uses the DB2_MEMBER administrative view:

```
SELECT ID,  
       varchar(STATE,21) AS STATE,  
       varchar(HOME_HOST,10) AS HOME_HOST,  
       varchar(CURRENT_HOST,10) AS CUR_HOST,  
       ALERT  
FROM SYSIBMADM.DB2_MEMBER
```

2. Run the query. The results returned will look like the following:

ID	STATE	HOME_HOST	CUR_HOST	ALERT
0	STARTED	HOSTA	HOSTA	NO
1	STARTED	HOSTB	HOSTB	NO
2	STARTED	HOSTC	HOSTC	NO

3 record(s) selected.

In the previous example, all members are running on their own hosts with no alerts.

Results

When looking at the restart status for the members, check that:

- The value for the STATE column is either RESTARTING or STARTED. The former is an indication that the member is in the process of being restarted; the

latter indicates that it has successfully restarted. If the state is `RESTARTING`, check the status again in a few minutes to see if the state has changed to `STARTED`.

- The value for `CUR_HOST` is the same as the value for `HOME_HOST`. This indicates that the member is running on its home host.
- There is no `YES` value in the alert column for the member you are interested in.

If `CUR_HOST` is different than `HOME_HOST`, or if the state has not moved beyond `RESTARTING`, or remains as `WAITING_FOR_FAILBACK`, or if there is a `YES` value in the alert column, then there might be a problem that requires further investigation.

Example

Example 1: Failed member in the process of restarting

In this example, member 0 is in the process of restarting on its home host, `HOSTA`.

ID	STATE	HOME_HOST	CUR_HOST	ALERT
0	RESTARTING	HOSTA	HOSTA	NO
1	STARTED	HOSTB	HOSTB	NO
2	STARTED	HOSTC	HOSTC	NO

3 record(s) selected.

To see if the restart is ultimately successful, run the query again in a few seconds.

Example 2: Failed member that is not able to restart

In this example, member 0 is waiting to fail back to its home host. Currently, it is running in light mode on `HOSTB`.

ID	STATE	HOME_HOST	CUR_HOST	ALERT
0	WAITING_FOR_FAILBACK	HOSTA	HOSTB	NO
1	STARTED	HOSTB	HOSTB	NO
2	STARTED	HOSTC	HOSTC	NO

3 record(s) selected.

In this case, you might want to check the host status for `HOSTA` to see if there is an issue. Using the `DB2_CLUSTER_HOST_STATE` administrative view might return the following results:

HOST	STATE	STOPPED	ALERT
HOSTD	ACTIVE	NO	NO
HOSTB	ACTIVE	NO	NO
HOSTA	INACTIVE	NO	YES
HOSTC	ACTIVE	NO	NO

4 record(s) selected.

This report shows that there is an alert on `HOSTA`, and that the host is inactive. However, the instance was not stopped using the `db2stop` command. Further investigation might an incident such as a loss of power to this host. Once the problem with the host is resolved, check the restart status again to see if the member is able to restart.

Viewing details for an alert

If one of the members or cluster caching facilities reports an alert, you can view more information about the alert using the `DB2_INSTANCE_ALERTS` administrative view. Alternatively, you can use the `db2cluster` command with the `-cm -list -alert` parameters.

About this task

This task assumes that you already determined an alert was raised on one of the hosts in your DB2 pureScale instance. For example, the `LIST INSTANCE` command might have shown an alert for one of your members:

ID	TYPE	STATE	HOME_HOST	CURRENT_HOST	ALERT
0	MEMBER	STARTED	hostA	hostA	YES
1	MEMBER	STARTED	hostB	hostB	NO
2	MEMBER	STARTED	hostC	hostC	NO
3	MEMBER	STARTED	hostD	hostD	NO
128	CF	PRIMARY	hostE	-	NO
129	CF	PEER	hostF	-	NO

HOSTNAME	STATE	INSTANCE_STOPPED	ALERT
hostA	ACTIVE	NO	NO
hostB	ACTIVE	NO	NO
hostC	ACTIVE	NO	NO
hostD	ACTIVE	NO	NO
hostE	ACTIVE	NO	NO
hostF	ACTIVE	NO	NO

In this case, member 0 is showing an alert.

Procedure

To find more information about the alerts in your instance:

1. Formulate an SQL statement that uses the `DB2_INSTANCE_ALERTS` administrative view:

```
SELECT * FROM SYSIBMADM.DB2_INSTANCE_ALERTS
```

2. Run the SQL statement.

Results

Depending on the nature of the problem on member 0, the information that the `DB2_INSTANCE_ALERTS` administrative view returns varies. You might, for example, receive a message like the one that follows:

```
MESSAGE
-----
Could not restart light DB2 member '0' on hosts 'hostA'. Check the db2diag.log for messages concerning a
restart light or database crash recovery failure on the indicated hosts for DB2 member '0'.

ALERT_ACTION
-----
This alert must be cleared manually with the command: 'db2cluster -clear -alert -member 0'

IMPACT
-----
DB2 member '0' will not be able to restart light on host 'hostC' until this alert has been cleared.
```

Example

Example 1: Using the `db2cluster` command to view alert information

In this example, the `db2instance -list` command returns the following information:

```

$ db2instance -list
ID      TYPE      STATE      HOME_HOST      CURRENT_HOST      ALERT  PARTITION_NUMBER  LOGICAL_PORT  NETNAME
-----
0      MEMBER    ERROR      HostA          HostA             YES    0                 0             -
1      MEMBER    STARTED    HostB          HostB             NO     0                 1             -
2      MEMBER    STARTED    HostC          HostC             NO     0                 2             -
128    CF        PRIMARY    HostD          HostD             NO     -                 0             -
129    CF        PEER       HostE          HostE             NO     -                 0             -

HOSTNAME      STATE      INSTANCE_STOPPED  ALERT
-----
HostA         ACTIVE    NO                YES
HostB         ACTIVE    NO                NO
HostC         ACTIVE    NO                NO
HostD         ACTIVE    NO                NO
HostE         ACTIVE    NO                NO

```

There is currently an alert for a member, CF, or host in the data-sharing instance. For more information on the alert, its impact, and how to clear it, run the following command: 'db2cluster -cm -list -alert'

From the information contained in Table 2164 on page 1558, you can see that the output of **db2instance -list** is showing that member 0 was not able to start on any host. (If it had started on guest host, then the status would be STARTED, and the current host would show the name of the host it was running on.)

Using the **db2cluster -cm -list -alert** command shows the following message:

```
$ db2cluster -cm -list -alert
```

```
Alert: DB2 member '0' failed to start on its home host 'Host A'. The cluster manager will
attempt to restart the DB2 member
in restart light mode on another host. Check the db2diag.log for messages concerning failures
on hosts 'HostA' for member '0'.
```

```
Action: This alert must be cleared manually with the command: 'db2cluster -cm -clear -alert'.
```

```
Impact: DB2 member '0' will not be able to service requests until this alert has been cleared
and the DB2 member returns to its home host.
```

What to do next

Perform the investigation or action specified in the information returned by the DB2_INSTANCE_ALERTS administrative view or the **db2cluster** command.

Chapter 13. Event and real-time database and system monitoring in a DB2 pureScale environment

In addition to viewing the overall status of the components of a DB2 pureScale instance, you can examine specific aspects of the operation of cluster caching facilities and members using the DB2 monitoring infrastructure.

You can use monitoring table functions and administrative views to display this information. You can also use selected event monitors to capture events as they occur.

DB2 V9.7 introduced a number of enhancements to the monitoring infrastructure for the DB2 product. One of these enhancements was a set of table functions that provide access to hundreds of *in-memory* monitor elements that you can use query the state of your database environment at a specific point in time. Other enhancements included improved event monitors for capturing information about such things as locking, units of work, and activities as they occur.

The DB2 pureScale Feature extends the monitoring capabilities built into the DB2 database with monitor elements that you can use to view data that describes specific aspects of the operation of cluster caching facilities (also known as CFs) and members in a DB2 pureScale instance. However, there are some differences between monitoring in DB2 pureScale instances and other DB2 instances to be aware of, including:

- “The ability to monitor CFs in addition to DB2 members”
- “How monitor elements in a DB2 pureScale instance are reported” on page 1572
- The effects of component failure on monitor element reporting.

The ability to monitor CFs in addition to DB2 members

CFs, with the different role they play as compared to members in a DB2 pureScale environment introduce additional monitoring needs. For example, in DB2 instances other than DB2 pureScale instances, you might be interested in monitoring for buffer pool hit ratios, which represents the number of pages that are found in memory, as compared to the number of pages that must be read from disk. Higher buffer pool hit ratios are, generally speaking, a reflection of better performance. The higher performance is because there is less I/O involved in bringing needed pages into memory. In a DB2 pureScale environment, all physical page reads from disk are performed by the members, but only after they first check with the CF to see if the group buffer pool has a record of any other member with a valid page that they can use. Thus, whereas you might be accustomed to tuning only local buffer pools in a DB2 environment other than a DB2 pureScale environment, monitoring buffer pool hit ratios in the group buffer pool of the CF is also important in a DB2 pureScale environment. The more times pages can be found in either a local or group buffer pool (GBP), the fewer times they must be read in from disk.

In addition to the GBP, the global lock manager (GLM) is another component of the CF that you can monitor. The GLM manages locking of objects across all the members in a DB2 pureScale instance. The DB2 pureScale Feature adds monitor elements that you can use to monitor locking between members.

How monitor elements in a DB2 pureScale instance are reported

In general, the mechanics of monitoring in a DB2 pureScale instance are similar to the mechanics of monitoring in other DB2 instances. For example, the `MON_GET_TABLESPACE` table function, which returns information about table spaces in a database, works similarly in both DB2 pureScale instance and other DB2 instances. In a DB2 pureScale instance, the scope of some monitor elements is limited to a specific member, while the scope of others is global, across all members. For example, the data from monitor elements such as **direct_reads**, or **pool_data_l_reads** are specific to read activity performed by a member. By comparison, monitor elements such as **tbasp_total_pages**, which represent physical attributes of a table space is the same across all members, because all members share the same table space. For example, consider the following query:

```
SELECT VARCHAR(TBSP_NAME, 30) AS TBSP_NAME,  
       MEMBER, POOL_DATA_L_READS,  
       TBSP_TOTAL_PAGES  
FROM TABLE(MON_GET_TABLESPACE('USERSPACE1',-2))
```

The results of this query look like the following example:

TBSP_NAME	MEMBER	POOL_DATA_L_READS	TBSP_TOTAL_PAGES
USERSPACE1	1	0	4096
USERSPACE1	2	0	4096
USERSPACE1	3	0	4096
USERSPACE1	0	36	4096

4 record(s) selected.

In this example, the number of logical reads from the local buffer pool for each member is different because each member performs its reads independently of other members; however the total pages for the table space is the same across all members, because all members are working from the same instance of `USERSPACE1`.

Effects of component failure on monitor element reporting

If a host, member or CF in a DB2 pureScale environment fails, unless the entire DB2 pureScale instance is taken down, you can still retrieve monitor elements from the instance. However, the components that fail do not generate statistics. This fact is apparent if you are running a query such as the first example shown in “How monitor elements in a DB2 pureScale instance are reported,” where data from each member is shown individually. If you use a query that aggregates information across members, though, you might not notice that data from a member is missing.

Another thing to keep in mind is that if a member fails while monitor element data collection is taking place, the data collection process pauses until the communications problem with the failed member has been detected, or the TCP/IP timeout period has passed. In this situation, the data is still reported, however, there is no information from the failed member.

Finally, keep in mind that if a member fails, all the statistics accumulated in the monitor elements are reset to 0.

Cluster caching facility memory and CPU usage monitoring overview

A basic indicator of the operational effectiveness of a cluster caching facility is the extent to which memory and the CPU are consistently used to their maximum configured capacity.

Memory usage

Cluster caching facilities (also known as CFs) use different memory heaps for the following purposes:

Group buffer pool memory

Group buffer pool memory is used for the group buffer pool for the DB2 pureScale instance. If this type of memory is consistently used to the maximum configured capacity, it might have a negative effect on performance. However, the fact that memory might be used to capacity is not itself an indicator that performance might be affected. Check the hit rates for the group buffer pool to confirm that performance has degraded. Low hit rates coupled with high group buffer pool memory usage might be an indication that this type of memory needs to be increased. This type of memory is configured by the **cf_gbp_sz** configuration parameter.

Lock memory

Lock memory is used for managing page locks across the DB2 pureScale instance. If there is insufficient memory available for locks on the CF, one or both of the following conditions might arise:

- Lock escalation might take place, which reduces concurrency for the objects involved
- Requests for locks might be denied, resulting in the SQL0912 message being returned.

This type of memory is configured by the **cf_lock_sz** configuration parameter.

Shared Communication Area (SCA) memory

SCA memory contains database-wide information for tables, indexes, table spaces, and catalogs. Each database has its own SCA memory in the CF. It is allocated during the first database activation on any DB2 member, and is not freed until the database is dropped, or the CF is stopped. If table partitioning is used then the information required to synchronize the table partitioning data between the CF and the members is also stored in SCA memory.

If this type of memory is used to capacity, tables may fail to load, and an error is returned. This type of memory is configured by the **cf_sca_sz** configuration parameter.

Overall CF memory

Overall CF memory is the total amount of physical memory available to the CF. It is set by the **cf_mem_size** configuration parameter. The memory for the group buffer pool, locks and shared communication area are all allocated out of this pool of memory. For this reason, the total amount of the memory allocated for these specific types of memory must not exceed the amount of memory configured using the **cf_mem_size** configuration parameter.

By default, configuration of each of these types of memory is performed automatically. The DB2 pureScale Feature provides monitor elements that you can use to examine the amount of each of these types of memory that is currently in

use by the system. There are also related elements that you can use to determine what the maximum size is for each type of memory, and whether a memory resize operation is in progress.

In addition to monitor elements that report on the usage of specific types of CF memory, you can use the ENV_CF_SYS_RESOURCES administrative view to examine the total amount of physical and virtual storage available to the CF.

CPU load

CPU load on the CF is an indication of how heavily taxed its processors are. If you find that the processors on the host where the CF is running are working at maximum capacity most of the time, it might be an indication that the host the CF is running on is not powerful enough. You might want to add processors, or upgrade to a more powerful system.

You can view the overall CPU load for the host serving as the CF in a DB2 pureScale instance using the ENV_CF_SYS_RESOURCES administrative view.

Note: The value reported for CPU load reflects the total usage of the CPU for actual processing performed by the CF, and for host processes other than processes from the CF.

Monitor elements for viewing cluster caching facility memory usage

The IBM DB2 pureScale Feature provides a number of monitor elements that report on cluster caching facility memory usage.

Monitor elements

The following monitor elements provide information about how various CF memory heaps are allocated and used:

- “configured_cf_gbp_size - Configured cluster caching facility group buffer pool size monitor element” on page 788
- “current_cf_gbp_size - Current cluster caching facility group buffer pool size monitor element” on page 829
- “target_cf_gbp_size - Target cluster caching facility group buffer pool size monitor element” on page 1398
- “configured_cf_lock_size - Configured cluster caching facility lock size monitor element” on page 788
- “current_cf_lock_size - Current cluster caching facility lock size monitor element” on page 829
- “target_cf_lock_size - Target cluster caching facility lock size monitor element” on page 1399
- “configured_cf_mem_size - Configured cluster caching facility memory size monitor element” on page 788
- “current_cf_mem_size - Current cluster caching facility memory size monitor element” on page 830
- “configured_cf_sca_size - Configured cluster caching facility shared communications area size monitor element” on page 788
- “current_cf_sca_size - Current cluster caching facility shared communications area size monitor element” on page 830

- “target_cf_sca_size - Target cluster caching facility shared communications area size monitor element” on page 1399

Tip: In all cases, the values reported for each of these monitor elements is expressed in terms of 4k pages. So, for example, if you queried the **current_gbp_size** monitor element, and it returned a value of 350, then the actual amount of memory currently used for the GBP would be 350×4096 bytes = 1,433,600 bytes.

For most of these types of memory, there are three monitor elements that you can query that represent different aspects of how the memory is configured.

Current

The current memory size (for example, `current_cf_gbp_size`, or `current_cf_mem_size`) represents the amount of that type of memory currently in use by the system.

Configured

The configured memory size (for example, `configured_cf_sca_size`, `configured_cf_mem_size`) represents the total amount of that type of memory that is currently configured by the database as the maximum. The value for current memory can never exceed that of configured memory.

Target

The target memory size (for example, `target_cf_sca_size`) represents a new configured maximum value for that type of memory. Usually, the target size is the same as the configured size. However, if the target and configured sizes differ, that means that that particular type of memory is undergoing an online change in its configured size. The process of allocating memory takes place over time. At any point during this resizing process, the configured memory represents the maximum amount of that type of memory that can be used at that specific point in time. Eventually, the configured memory becomes the same as target memory.

Refer to the reference topics for each monitor element to see what monitoring interfaces you can use to examine the data associated with that monitor element.

Retrieving information from cluster caching facility memory usage monitor elements

You can use the `MON_GET_CF` table function to retrieve the various monitor elements that report on memory usage on the cluster caching facility in a DB2 pureScale instance.

About this task

Understanding the extent to which memory in a cluster caching facility (also known as a CF) is used can help you to determine whether to adjust memory allocations. For example, if your cluster caching facility is using close to the maximum amount of allocated buffer pool memory, the hit rates for the group buffer pool might be lower than they could be. Or, if your lock memory is used to capacity, you might notice a higher-than-expected number of lock escalations.

Procedure

To retrieve information about memory usage in a cluster caching facility:

- Determine which monitor elements you want to retrieve. For example, if you want to view lock memory usage, you can choose from one or more of the following monitor elements:
 - current_cf_lock_size
 - configured_cf_lock_size
 - target_cf_lock_size
- Formulate a query using the MON_GET_CF table function. Using the example from step 1, the statement would look like the following example:

```
SELECT SUBSTR(HOST_NAME,1,10) AS HOST,
       ID as HOSTID,
       CURRENT_CF_LOCK_SIZE,
       CONFIGURED_CF_LOCK_SIZE,
       TARGET_CF_LOCK_SIZE
FROM TABLE( MON_GET_CF( NULL ) )
```

- Run the query. Continuing with this example, the output from the preceding query would resemble the following example:

```
HOST      HOSTID CURRENT_CF_LOCK_SIZE CONFIGURED_CF_LOCK_SIZE
-----
HOSTA     128      133852                564224
HOSTB     129      133852                564224

TARGET_CF_LOCK_SIZE
-----
                564224
                564224
```

2 record(s) selected.

Note: The lock memory on both cluster caching facilities is typically the same, as one of the cluster caching facilities is duplexing its information and configuration to the other. You can check to see which of the two cluster caching facilities is the primary one by using one of the interfaces described in “Viewing status information for members and cluster caching facilities in a DB2 pureScale instance” on page 1562. Examples of two such interfaces are the **LIST INSTANCE** and **db2cluster** commands.

Results

The preceding example shows that the current amount of lock memory used is 170,258 4k blocks, or 697,376,768 bytes. The maximum amount of lock memory available is 564,224 4k blocks, or 2,311,061,504 bytes.

Example

Example 1: Retrieving group buffer pool memory usage data.

The following query displays information about the group buffer pool memory size for all cluster caching facilities on the system:

```
SELECT SUBSTR(HOST_NAME,1,20) AS HOST,
       ID as HOSTID,
       CURRENT_CF_GBP_SIZE,
       CONFIGURED_CF_GBP_SIZE,
       TARGET_CF_GBP_SIZE
FROM TABLE( MON_GET_CF(NULL) )
```

The following output is an example of what the preceding query returns:

HOST	HOSTID	CURRENT_CF_GBP_SIZE	CONFIGURED_CF_GBP_SIZE	TARGET_CF_GBP_SIZE
HOSTA	128	367611	500224	500224
HOSTB	129	367611	500224	500224

2 record(s) selected.

In this example, the current GBP size is 367,611 4k pages, or 1,505,734,656 bytes. The memory allocated to the GBP is 500,224 4k pages, or 2,048,917,504 bytes.

Example 2: Retrieving shared communications area (SCA) memory usage data for a specific host.

The following query displays information about the SCA memory size for the cluster caching facility with the ID of 128:

```
SELECT SUBSTR(HOST_NAME,1,8)AS HOST,
       ID as HOSTID,
       CURRENT_CF_SCA_SIZE,
       CONFIGURED_CF_SCA_SIZE,
       TARGET_CF_SCA_SIZE
FROM TABLE(MON_GET_CF(128))
```

The following output is an example of what the preceding query returns:

HOST	HOSTID	CURRENT_CF_SCA_SIZE	CONFIGURED_CF_SCA_SIZE	TARGET_CF_SCA_SIZE
HOSTA	128	43	16128	23280

1 record(s) selected.

In this example, the SCA memory currently being used is 43 4k pages. At the point these monitor elements were retrieved, the maximum size of the SCA memory was 16,128 4k pages. However, the configured and the target sizes are the different, which means that the SCA memory is undergoing a size increase from the previous maximum configured size to 23,280 pages.

What to do next

In all the preceding examples, keep in mind that the values returned for memory usage provide only an overall view of memory usage. By themselves, they do not necessarily convey sufficient information to inform a decision about changing memory configuration. For example, the size of the group buffer pool (GBP), by itself, does not tell you whether it is large enough for the DB2 pureScale instance. In this case, consider using the monitor elements that report on buffer pool activity to calculate buffer pool hit rates. The hit rates can tell you whether you must adjust the size of your buffer pool. When it comes to lock memory, examining the number of lock escalations that take place gives you insight into whether enough lock memory has been allocated. A high rate of lock escalations can be an indicator that lock memory might need to be increased.

Viewing cluster caching facility processor load

You can view the overall CPU load on the primary cluster caching facilities in a DB2 pureScale instance using the ENV_CF_SYS_RESOURCES administrative view.

Before you begin

You must be connected to a database running in a DB2 pureScale instance.

About this task

The ENV_CF_SYS_RESOURCES administrative view returns information for all cluster caching facilities (also known as CFs) in a DB2 pureScale instance. In instances where you have more than one CF configured, one to act as the primary and the others to serve as backup CFs running in PEER mode, the ENV_CF_SYS_RESOURCES administrative view returns information for all CFs.

Note: The value reported for CPU load reflects the total usage of the CPU for actual processing performed by the CF, and for host processes other than processes from the CF.

Procedure

To determine the CPU load on the CFs in a DB2 pureScale instance:

1. Formulate an SQL statement that uses the ENV_CF_SYS_RESOURCES administrative view. For example:

```
SELECT  VARCHAR(NAME,20) AS HOST_ATTRIBUTE,  
        VARCHAR(VALUE,25) AS VALUE,  
        VARCHAR(UNIT,8) AS UNIT  
FROM SYSIBMADM.ENV_CF_SYS_RESOURCES
```

2. Run the statement. The preceding query would return the following output:

HOST_ATTRIBUTE	VALUE	UNIT
HOST_NAME	HOSTA	-
MEMORY_TOTAL	24108	MB
MEMORY_FREE	3504	MB
MEMORY_SWAP_TOTAL	4102	MB
MEMORY_SWAP_FREE	4063	MB
VIRTUAL_MEM_TOTAL	28211	MB
VIRTUAL_MEM_FREE	7568	MB
CPU_USAGE_TOTAL	96	PERCENT
HOST_NAME	HOSTB	-
MEMORY_TOTAL	24108	MB
MEMORY_FREE	3342	MB
MEMORY_SWAP_TOTAL	4102	MB
MEMORY_SWAP_FREE	4063	MB
VIRTUAL_MEM_TOTAL	28211	MB
VIRTUAL_MEM_FREE	7406	MB
CPU_USAGE_TOTAL	97	PERCENT

16 record(s) selected.

In this output, there are results for both HOSTA and HOSTB, which indicates there are two hosts that are configured to serve as CFs.

3. To determine which of the hosts is acting as the primary CF, you can use the DB2_CF administrative view:

```
SELECT  VARCHAR(CURRENT_HOST,12) AS HOST,  
        ID,  
        STATE  
FROM SYSIBMADM.DB2_CF
```

The preceding query returns the following output:

HOST	ID	STATE
HOSTA	128	PRIMARY
HOSTB	129	PEER

2 record(s) selected.

In this case, the primary host is HOSTA, and based on the output from the command used in step 2 on page 1578, you can surmise that the CPU load on the primary CF is 96%.

What to do next

If you find your CPU usage is running at maximum capacity, adding processors to, or upgrading your cluster caching facilities might improve system throughput.

Note: For hosts with more than one logical processor, usage numbers can exceed 100%. For example, an eight processor host might have processor usage approach 800%.

Buffer pool monitoring in a DB2 pureScale environment

Examining the number of times that pages of data requested by a member can be found in group or local buffer pools, as opposed to the number of times they need to be read in from disk can tell you where you might have performance problems related to I/O.

Generally speaking, larger buffer pools increase the likelihood that a required page of data can be found in memory.

Viewing and comparing monitor elements related to buffer pool activity can help you understand the extent to which the group buffer pool (GBP) in the cluster caching facility, and the local buffer pools (LBPs) for each member are reducing the amount of disk I/O in your system.

Monitor elements for viewing DB2 pureScale buffer pool activity

The IBM DB2 pureScale Feature uses a number of monitor elements to report on buffer pool activity across a DB2 pureScale instance.

Monitor elements for the group buffer pool

The following monitor elements provide information about the group buffer (GBP) pool in the primary CF:

- “pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element” on page 1134
- “pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element” on page 1136
- “pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element” on page 1133
- “pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element” on page 1168
- “pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements” on page 1169
- “pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element” on page 1166
- “pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element” on page 1228
- “pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element” on page 1230

- “pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element” on page 1226
- “pool_async_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found by asynchronous EDUs in a local buffer pool monitor element monitor element” on page 1114
- “pool_async_data_gbp_l_reads - Asynchronous group buffer pool data logical reads monitor element” on page 1115
- “pool_async_data_gbp_p_reads - Asynchronous group buffer pool data physical reads monitor element” on page 1115
- “pool_async_data_gbp_invalid_pages - Asynchronous group buffer pool invalid data pages monitor element” on page 1114
- “pool_async_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found by asynchronous EDUs in a local buffer pool monitor element monitor element” on page 1119
- “pool_async_index_gbp_l_reads - Asynchronous group buffer pool index logical reads monitor element” on page 1120
- “pool_async_index_gbp_p_reads - Asynchronous group buffer pool index physical reads monitor element” on page 1120
- “pool_async_index_gbp_invalid_pages - Asynchronous group buffer pool invalid index pages monitor element” on page 1119
- “pool_async_xda_gbp_indep_pages_found_in_lbp - Group buffer pool independent XML storage object(XDA) pages found by asynchronous EDUs in a local buffer pool monitor element monitor element” on page 1125
- “pool_async_xda_gbp_l_reads - Group buffer pool XDA data asynchronous logical read requests monitor element” on page 1126
- “pool_async_xda_gbp_p_reads - Group buffer pool XDA data asynchronous physical read requests monitor element” on page 1127
- “pool_async_xda_gbp_invalid_pages - Asynchronous group buffer pool invalid XDA data pages monitor element” on page 1126

Note: These monitor elements report data for the buffer pools for each member individually; no aggregation is performed. If you want to aggregate buffer pool usage information for local buffer pools, such as to calculate the average hit rates across all local buffer pools, use the SUM aggregate function.

Refer to the reference topics for each monitor element to see what monitoring interfaces you can use to examine the data associated with that monitor element.

Monitor elements for local buffer pools

The following monitor elements provide information about the buffer pools local to each member in the DB2 pureScale instance:

- “pool_data_gbp_indep_pages_found_in_lbp - Group buffer pool independent data pages found in local buffer pool monitor element” on page 1131
- “pool_data_lbp_pages_found - Local buffer pool found data pages monitor element” on page 1138
- “pool_index_gbp_indep_pages_found_in_lbp - Group buffer pool independent index pages found in local buffer pool monitor element” on page 1165
- “pool_index_lbp_pages_found - Local buffer pool index pages found monitor element” on page 1171

- “pool_xda_gbp_indep_pages_found_in_lbp - Group buffer pool XDA independent pages found in local buffer pool monitor element” on page 1225
- “pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element” on page 1234
- “pool_async_data_lbp_pages_found - Asynchronous local buffer pool data pages found monitor element” on page 1116
- “pool_async_index_lbp_pages_found - Asynchronous local buffer pool index pages found monitor element” on page 1121
- “pool_async_xda_lbp_pages_found - Asynchronous local buffer pool XDA data pages found monitor element” on page 1127

The values reported for these next three monitor elements represent all reads from disk into the local buffer pool for a given member:

- “pool_data_p_reads - Buffer pool data physical reads monitor element” on page 1142
- “pool_index_p_reads - Buffer pool index physical reads monitor element” on page 1175
- “pool_xda_p_reads - Buffer pool XDA data physical reads monitor element” on page 1236

These last three monitor elements are the same as the ones used in environments *other than* DB2 pureScale environments. The elements are the same, because local buffer pools for a member in a DB2 pureScale environment equivalent to the buffer pools for a database in environments other than DB2 pureScale environments.

Important:

- The values reported by these last three monitor elements reflect reads the local buffer pools make from disk of GBP-dependent pages (that is, pages that a member requests from the GBP) that were not found in the GBP. They also include reads from disk of GBP-independent pages (that is, pages that are local to members, and for which members have no dependency on the GBP), such as temporary pages.
- Because of the relationship between LBPs and GBPs in a DB2 pureScale environment, the formulas for calculating buffer pool hit ratios are different than those used outside of a DB2 pureScale environment. See “Formulas for calculating buffer pool hit ratios” on page 1583 for more information.

Refer to the reference topics for each monitor element to see what monitoring interfaces you can use to examine the data associated with that monitor element.

Buffer pool hit rates and hit ratios in a DB2 pureScale environment

One way of measuring the extent to which pages required by members are found in memory as opposed to on disk is by calculating the buffer pool *hit ratio*. The buffer pool hit ratio indicates the number of times that the database manager found a requested page in a buffer pool (also known as the *hit rate*) as compared to the number of times it had to read it from disk. In a DB2 pureScale environment, both the local buffer pool and group buffer pool hit rates and hit ratios are important factors in assessing overall performance.

Local buffer pool (LBP) hit ratios reflect the extent to which pages that a member needs can be found in a valid state in the local buffer pool. A page in the LBP of a

member is deemed to be in a valid state if that page has not been changed by another member since it was loaded into the LBP. If another member has changed the page, which might happen before the page has been cast out to disk, then the page is said to be *invalid*. If the member with the invalid page requires that page to perform a transaction, the member has to go to the CF to request a new, valid version of the page.

A low LBP hit ratio is an indication that the pages were not found locally, and had to be requested from the CF.

However, in a DB2 pureScale environment, looking at the LBP hit ratios provides only one side of the buffer pool story. You also need to consider the role that the group buffer pool (GBP) plays in retrieving pages, and the hit ratio for the GBP itself. If a member is unable to locate a valid copy of a page in its LBP, it makes a request to the CF to search the GBP for a valid copy of the page. The GBP does one of the following actions:

- If it has a valid copy of the page, the GBP provides it to the member making the request.
- Otherwise, the GBP tells the requesting member that it must read the page from disk.

An additional consideration for LBP usage is the concept of GBP-independent page. A GBP-independent page is a page that is only ever accessed through a LBP of a member, and never exists in the GBP. Pages might be GBP-independent because the operations using the page, or the objects where the pages come from, are only accessed by the local member.

Group buffer pool hit ratios reflect the extent to which pages required by members, for which they do not have a valid local copy, are found in the group buffer pool, as compared to having to be read in from disk. A low hit ratio for the GBP is an indication that relatively few of the pages required by members across the instance are available in the GBP. Increasing the size of the GBP can improve hit rates, and overall performance. Therefore, when calculating the hit ratios for data pages in the local buffer pool (LBP) for a member, you need to consider the number of times the member attempted to read pages from the LBP in comparison to the number of times attempted reads did not find a valid page in the LBP. See “Formulas for calculating buffer pool hit ratios” on page 1583 for details on how LBP and GBP monitor elements are used to calculate the GBP hit rate.

Tip: Hit ratios can vary based on many factors, such as the nature of the data in your database, the queries that are run against it, as well as hardware and software configurations. Generally speaking, higher buffer pool hit ratios are reflective of better query performance. If you find hit ratios seem low, or are declining over time, increasing the size of the buffer pools can help. To increase the size of the group buffer pool, adjust the `cf_gbp_sz` configuration parameter on the CF. To adjust local buffer pools, run the **ALTER BUFFERPOOL** statement on the member with the buffer pools that need correction.

Buffer pool monitor element reporting

In DB2 pureScale environments, as is the case with other DB2 environments, each member reports on its own local buffer pools. No aggregation of data across members takes place. You must take into account which member or members you are interested in, and interpret the data accordingly. In some cases, you might want to calculate the hit ratios for a specific member. In others cases, you might want to

look at the data for all members together, to form an overall view of the hit rates and hit ratios for the DB2 pureScale environment as a whole.

For example, if you submit a query to return data for the number of times a data page was read into a local buffer pool from disk, because it was not found in the GBP (using the `pool_data_gbp_p_reads` monitor element) with the `MON_GET_BUFFERPOOL` table function, and you do not specify which member to return, you will see results like the ones that follow:

```
MEMBER BP_NAME          POOL_DATA_GBP_P_READS
-----
0 IBMDEFAULTBP          408
0 IBMSYSTEMBP4K         0
0 IBMSYSTEMBP8K         0
0 IBMSYSTEMBP16K        0
0 IBMSYSTEMBP32K        0
1 IBMDEFAULTBP          108
1 IBMSYSTEMBP4K         0
1 IBMSYSTEMBP8K         0
1 IBMSYSTEMBP16K        0
1 IBMSYSTEMBP32K        0
2 IBMDEFAULTBP          112
2 IBMSYSTEMBP4K         0
2 IBMSYSTEMBP8K         0
2 IBMSYSTEMBP16K        0
2 IBMSYSTEMBP32K        0
```

15 record(s) selected.

Important: In the preceding example, you can see that the data reported for temporary buffer pools shows all zeros. This is not a coincidence; in DB2 pureScale instances, temporary objects and table spaces are local to the member they are associated with. They do not use the GBP on the CF.

If you are interested in the results across all members, you can use the `SUM` aggregate function to add the numbers for all members together:

```
SELECT  VARCHAR(BP_NAME,15) AS BP_NAME,
        SUM(POOL_DATA_GBP_P_READS) AS TOTAL_P_READS
FROM TABLE(MON_GET_BUFFERPOOL('',-2))
GROUP BY BP_NAME
```

The preceding query returns results like the following output:

```
BP_NAME          TOTAL_P_READS
-----
IBMDEFAULTBP          310
IBMSYSTEMBP16K        0
IBMSYSTEMBP32K        0
IBMSYSTEMBP4K         0
IBMSYSTEMBP8K         0
```

5 record(s) selected.

Formulas for calculating buffer pool hit ratios

Buffer pool hit ratios reflect the extent to which data needed for queries is found in memory, as opposed to having to be read in from external storage. You can calculate hit rates and ratios with formulas that are based on buffer pool monitor elements.

Local buffer pools

Table 2166. Formulas for local buffer pool hit ratios. The formulas shown express the hit ratios as a percentage.

Type of page	Formula for calculating buffer pool hit ratio
Data pages	$(\text{pool_data_lbp_pages_found} - \text{pool_async_data_lbp_pages_found} - \text{pool_temp_data_l_reads}) / (\text{pool_data_l_reads}) \times 100$

Table 2166. Formulas for local buffer pool hit ratios (continued). The formulas shown express the hit ratios as a percentage.

Type of page	Formula for calculating buffer pool hit ratio
Index pages	$((\text{pool_index_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_temp_index_l_reads}) / (\text{pool_index_l_reads}) \times 100$
Temporary data pages	$((\text{pool_temp_data_l_reads} - \text{pool_temp_data_p_reads}) / \text{pool_temp_data_l_reads}) \times 100$
Temporary index pages	$((\text{pool_temp_index_l_reads} - \text{pool_temp_index_p_reads}) / \text{pool_temp_index_l_reads}) \times 100$
XML storage object (XDA) pages	$((\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}) \times 100$
Overall hit ratio	$((\text{pool_data_lbp_pages_found} + \text{pool_index_lbp_pages_found} + \text{pool_xda_lbp_pages_found} - \text{pool_async_data_lbp_pages_found} - \text{pool_async_index_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / (\text{pool_data_l_reads} + \text{pool_index_l_reads} + \text{pool_xda_l_reads} + \text{pool_temp_data_l_reads} + \text{pool_temp_xda_l_reads} + \text{pool_temp_index_l_reads})) \times 100$

Local buffer pools (DB2 pureScale environments)

When calculating LBP hit ratios in a DB2 pureScale environment, the GBP-independent data page hit ratios must also be taken into consideration. When a data page is requested by a member, the LBP is examined first. If the page is found in the LBP, then the **pool_data_lbp_pages_found** monitor element increments. If the page is not found in the LBP, it is read directly from disk, and the **pool_data_p_reads** monitor element increments. However, the **pool_data_lbp_pages_found** monitor counter also increments when a GBP-dependent page is found in local buffer pool. The new monitor element **pool_data_gbp_indep_pages_found_in_lbp** is the only way to distinguish between page access counts in these cases.

Table 2167. Formulas for GBP-independent (LBP) hit ratios. The formulas shown express the hit ratios as a percentage.

Type of page	Formula for calculating buffer pool hit ratio
Data pages	$(\text{pool_data_gbp_indep_pages_found_in_lbp}) / (\text{pool_data_gbp_indep_pages_found_in_lbp} + \text{pool_data_p_reads} + \text{pool_temp_data_p_reads} - \text{pool_data_gbp_p_reads}) \times 100$
Index pages	$(\text{pool_index_gbp_indep_pages_found_in_lbp}) / (\text{pool_index_gbp_indep_pages_found_in_lbp} + \text{pool_index_p_reads} + \text{pool_temp_index_p_reads} - \text{pool_index_gbp_p_reads}) \times 100$
XML storage object (XDA) pages	$(\text{pool_xda_gbp_indep_pages_found_in_lbp}) / (\text{pool_xda_gbp_indep_pages_found_in_lbp} + \text{pool_xda_p_reads} + \text{pool_temp_xda_p_reads} - \text{pool_xda_gbp_p_reads}) \times 100$

For GBP-independent pages, tuning the LBP size will affect the hit ratio. For certain type of operations which are independent of the GBP, like temporary page access or NOT LOGGED INITIALLY operations, you will want to monitor the GBP-independent page hit ratio.

Alternatively, to calculate the local buffer pool hit ratio for a GBP-dependent page agent, you can use the following formulas.

Table 2168. Formulas for GBP-dependent (LBP) hit ratios. The formulas shown express the hit ratios as a percentage.

Type of page	Formula for calculating buffer pool hit ratio
Data pages	$((\text{pool_data_lbp_pages_found} - \text{pool_data_gbp_indep_pages_found_in_lbp}) / (\text{pool_data_l_reads} - \text{pool_data_gbp_indep_pages_found_in_lbp} - (\text{pool_data_p_reads} - \text{pool_data_gbp_p_reads}))) \times 100$
Index pages	$((\text{pool_index_lbp_pages_found} - \text{pool_index_gbp_indep_pages_found_in_lbp}) / (\text{pool_index_l_reads} - \text{pool_index_gbp_indep_pages_found_in_lbp} - (\text{pool_index_p_reads} - \text{pool_index_gbp_p_reads}))) \times 100$
XML storage object (XDA) pages	$((\text{pool_xda_lbp_pages_found} - \text{pool_xda_gbp_indep_pages_found_in_lbp}) / (\text{pool_xda_l_reads} - \text{pool_xda_gbp_indep_pages_found_in_lbp} - (\text{pool_xda_p_reads} - \text{pool_xda_gbp_p_reads}))) \times 100$

You will need to compare both the LBP hit ratio and the GBP hit ratio to decide how to tune both buffer pools, or to validate the results after tuning the GBP and the LBPs.

Group buffer pools (DB2 pureScale environments)

The formulas used to calculate group buffer pool hit ratios in a DB2 pureScale environment are different from formulas for hit ratios used in other DB2 environments. This difference is because of how the group buffer pool in the cluster caching facility works with the local buffer pools in each member to retrieve pages of data. The following formulas, which are based on buffer pool monitor elements, can be used to calculate hit ratios for data, index, and XML storage object pages, for both the local and group buffer pools.

Table 2169. Formulas for group buffer pool (GBP) hit ratios. The formulas shown express the hit ratios as a percentage.

Type of page	Formula for calculating buffer pool hit ratio
Data pages	$((\text{pool_data_gbp_l_reads} - \text{pool_data_gbp_p_reads}) / \text{pool_data_gbp_l_reads}) \times 100$
Index pages	$((\text{pool_index_gbp_l_reads} - \text{pool_index_gbp_p_reads}) / \text{pool_index_gbp_l_reads}) \times 100$
XML storage object (XDA) pages	$((\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}) \times 100$
Overall hit ratio	$((\text{pool_data_gbp_l_reads} + \text{pool_index_gbp_l_reads} + \text{pool_xda_gbp_l_reads} - \text{pool_data_gbp_p_reads} - \text{pool_index_gbp_p_reads} - \text{pool_xda_gbp_p_reads}) / (\text{pool_data_gbp_l_reads} + \text{pool_index_gbp_l_reads} + \text{pool_xda_gbp_l_reads})) \times 100$

In addition to the preceding formulas for calculating buffer pool hit ratios, you can also use the following formulas to show what percentage of the time pages that are prefetched are found in the GBP:

Prefetches for data pages

$$((\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}) / \text{pool_async_data_gbp_l_reads}) \times 100$$

Prefetches for index pages

$$((\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}) / \text{pool_async_index_gbp_l_reads}) \times 100$$

Prefetches for XML storage object (XDA) pages

$$((\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}) / \text{pool_async_xda_gbp_l_reads}) \times 100$$

Calculating buffer pool hit ratios in a DB2 pureScale environment

Calculating buffer pool hit ratios for a DB2 pureScale instance can help you understand where there are opportunities to tune buffer pools to improve I/O efficiency.

Before you begin

Determine which ratio or ratios you are interested in. If you want to see a ratio across all members in an instance, consider formulating your SQL to aggregate data across members using the SUM aggregate function. If you are interested in seeing the data for a specific member only, you can use specify the member for which you want to see data in the MON_GET_BUFFERPOOL table function.

Procedure

To calculate buffer pool hit ratios, follow these steps:

1. Retrieve the information for the required monitor elements. This example uses the MON_GET_BUFFERPOOL table function to retrieve the monitor elements that contain the values needed to calculate the hit ratio for data pages for the GBP, **pool_data_gbp_l_reads** and **pool_data_gbp_p_reads**.

```
SELECT varchar(bp_name,20) AS bp_name,
       pool_data_gbp_l_reads,
       pool_data_gbp_p_reads,
       member
FROM TABLE(MON_GET_BUFFERPOOL(' ', -2))
```

The preceding query returns data like the following example:

BP_NAME	POOL_DATA_GBP_L_READS	POOL_DATA_GBP_P_READS	MEMBER
IBMDEFAULTBP	1814911	456990	1
IBMSYSTEMBP4K	0	0	1
IBMSYSTEMBP8K	0	0	1
IBMSYSTEMBP16K	0	0	1
IBMSYSTEMBP32K	0	0	1
IBMDEFAULTBP	1807959	455287	3
IBMSYSTEMBP4K	0	0	3
IBMSYSTEMBP8K	0	0	3
IBMSYSTEMBP16K	0	0	3
IBMSYSTEMBP32K	0	0	3
IBMDEFAULTBP	1813932	455225	2
IBMSYSTEMBP4K	0	0	2
IBMSYSTEMBP8K	0	0	2
IBMSYSTEMBP16K	0	0	2
IBMSYSTEMBP32K	0	0	2
IBMDEFAULTBP	1113396	278845	0
IBMSYSTEMBP4K	0	0	0
IBMSYSTEMBP8K	0	0	0
IBMSYSTEMBP16K	0	0	0
IBMSYSTEMBP32K	0	0	0

20 record(s) selected.

Important: In the preceding example, you can see that the data reported for temporary buffer pools shows all zeros. This is not a coincidence; in DB2 pureScale instances, temporary objects and table spaces are local to the member they are associated with. They do not use the GBP on the CF.

2. Use the values returned for the monitor elements to calculate the hit ratio. The formula for calculating the hit ratio for the GBP (expressed as a percentage) is

$$((\text{pool_data_gbp_l_reads} - \text{pool_data_gbp_p_reads}) \div \text{pool_data_gbp_l_reads}) \times 100$$

So, using the data returned for the monitor elements in step 1:

$$\begin{aligned}
 &(((1,814,911+1,807,959 + 1,813,932+1,113,396) - (456,990+455,287 + 455,225+278,845)) \div (1,814,911+1,807,959 + 1,813,932+1,113,396)) \times 100 \\
 &= ((6,550,198 - 1,646,347) \div 6,550,198) \times 100 \\
 &= 74.9\%
 \end{aligned}$$

In this example, the hit ratio for the GBP is 74.9%

Note: The values shown in the output for queries are for illustrative purposes only.

Example

Example 1: Find the overall hit rates across all members

This example is similar to the one shown in the preceding procedure, except that it uses an aggregate function to provide overall hit rates across all members.

```

SELECT VARCHAR(BP_NAME,20) AS BP,
       SUM(POOL_DATA_GBP_L_READS) AS POOL_DATA_GBP_L_READS,
       SUM(POOL_DATA_GBP_P_READS) AS POOL_DATA_GBP_P_READS
FROM TABLE(MON_GET_BUFFERPOOL('',-2))
GROUP BY BP_NAME

```

Results:

BP	POOL_DATA_GBP_L_READS	POOL_DATA_GBP_P_READS
IBMDEFAULTBP	6550198	1646347
IBMSYSTEMBP16K	0	0
IBMSYSTEMBP32K	0	0
IBMSYSTEMBP4K	0	0
IBMSYSTEMBP8K	0	0

5 record(s) selected.

Example 2: Determining the GBP hit ratio for all data, index, and XML storage object (XDA) pages

This example uses the **MON_GET_BUFFERPOOL** table function to retrieve the data contained in the required monitor elements, and calculates the hit ratio for each member. To calculate the GBP hit ratio for all data, index, and XDA pages, use the following formula:

$$\begin{aligned}
 &((pool_data_gbp_l_reads + pool_index_gbp_l_reads+pool_xda_gbp_l_reads) \\
 &- (pool_data_gbp_p_reads + pool_index_gbp_p_reads+pool_xda_gbp_p_reads)) \\
 &\div (pool_data_gbp_l_reads + pool_index_gbp_l_reads+pool_xda_gbp_l_reads) \times 100
 \end{aligned}$$

```

WITH BPMETRICS AS (
  SELECT BP_NAME,
         POOL_DATA_GBP_L_READS +
         POOL_INDEX_GBP_L_READS +
         POOL_XDA_GBP_L_READS
         AS LOGICAL_READS,
         POOL_DATA_GBP_P_READS +
         POOL_INDEX_GBP_P_READS +
         POOL_XDA_GBP_P_READS
         AS PHYSICAL_READS,
         MEMBER
  FROM TABLE(MON_GET_BUFFERPOOL('',-2)) AS METRICS)
SELECT VARCHAR(BP_NAME,20) AS BP_NAME,
       LOGICAL_READS,
       PHYSICAL_READS,
       CASE WHEN LOGICAL_READS > 0
            THEN DEC(((
              FLOAT(LOGICAL_READS) - FLOAT(PHYSICAL_READS)) /
              FLOAT(LOGICAL_READS))
              * 100,5,2)
            ELSE NULL END AS HIT_RATIO,
       MEMBER
FROM BPMETRICS

```

Results:

BP_NAME	LOGICAL_READS	PHYSICAL_READS	HIT_RATIO	MEMBER
IBMDEFAULTBP	5730213	617628	89.22	1
IBMSYSTEMBP4K	0	0	-	1
IBMSYSTEMBP8K	0	0	-	1
IBMSYSTEMBP16K	0	0	-	1
IBMSYSTEMBP32K	0	0	-	1
IBMDEFAULTBP	5724845	615395	89.25	3
IBMSYSTEMBP4K	0	0	-	3
IBMSYSTEMBP8K	0	0	-	3
IBMSYSTEMBP16K	0	0	-	3
IBMSYSTEMBP32K	0	0	-	3
IBMDEFAULTBP	5731714	615814	89.25	2
IBMSYSTEMBP4K	0	0	-	2
IBMSYSTEMBP8K	0	0	-	2
IBMSYSTEMBP16K	0	0	-	2
IBMSYSTEMBP32K	0	0	-	2
IBMDEFAULTBP	5024809	409159	91.85	0
IBMSYSTEMBP4K	0	0	-	0
IBMSYSTEMBP8K	0	0	-	0
IBMSYSTEMBP16K	0	0	-	0
IBMSYSTEMBP32K	0	0	-	0

20 record(s) selected.

Example 3: Using the SUM aggregate function to compute an overall hit ratio

You can also use the SUM aggregate function to compute an overall hit ratio across all members as follows:

```

WITH BPMETRICS AS (
  SELECT SUM(PPOOL_DATA_GBP_L_READS) +
         SUM(PPOOL_INDEX_GBP_L_READS) +
         SUM(PPOOL_XDA_GBP_L_READS)
  AS LOGICAL_READS,
  SUM(PPOOL_DATA_GBP_P_READS) +
  SUM(PPOOL_INDEX_GBP_P_READS) +
  SUM(PPOOL_XDA_GBP_P_READS)
  AS PHYSICAL_READS
  FROM TABLE(MON_GET_BUFFERPOOL(' ', -2)) AS METRICS)
SELECT LOGICAL_READS,
       PHYSICAL_READS,
       CASE WHEN LOGICAL_READS > 0
       THEN DEC(((FLOAT(LOGICAL_READS) - FLOAT(PHYSICAL_READS)) /
                FLOAT(LOGICAL_READS))
                * 100, 5, 2)
       ELSE NULL END AS HIT_RATIO
FROM BPMETRICS

```

Results:

LOGICAL_READS	PHYSICAL_READS	HIT_RATIO
22211581	2255996	89.84

1 record(s) selected.

What to do next

If hit ratios seem low, or if they decline over time, you might want to increase the size of the buffer pools on either members, CFs, or both. If you are seeing lower than expected hit rates for the LBPs overall across the DB2 pureScale instance, look at the hit rates for each member individually, since the buffer pools on each member can have different sizes. An smaller sized LBP on one member might be unduly influencing the average hit rate for the instance.

Tip: Hit ratios can vary based on many factors, such as the nature of the data in your database, the queries that are run against it, as well as hardware and software configurations. Generally speaking, higher buffer pool hit ratios are reflective of better query performance. If you find hit ratios seem low, or are declining over time, increasing the size of the buffer pools can help. To increase the size of the

group buffer pool, adjust the `cf_gbp_sz` configuration parameter on the CF. To adjust local buffer pools, run the `ALTER BUFFERPOOL` statement on the member with the buffer pools that need correction.

Lock monitoring in a DB2 pureScale environment overview

As with traditional DB2 environments, lock management in a DB2 pureScale environment is essential for maintaining both data integrity and high levels of concurrency.

Locking across members in a DB2 pureScale environment is managed by the global lock manager (GLM) component of the cluster caching facility. Monitoring locking in a DB2 pureScale environment involves reviewing not only locks that might be held within a member, but also lock waits between members.

In a DB2 pureScale environment, the fact that different members work with the same data introduces the possibility of another type of contention for data: when two members want to update the same object. When a member needs a lock for an object, the local lock manager (LLM) component within the member works with the global lock manager (GLM): if the LLM does not already hold a lock for the object in question, the LLM requests a lock from the GLM. In this way, the GLM mediates requests for locks from different members.

When viewed at the global level for the DB2 pureScale instance, monitor elements such as `locks_held`, or `lock_wait_time` report data on *all* locks in the instance, both within and between members. Monitor elements added specifically for the DB2 pureScale Feature can be used to examine just the lock waits between members.

Lock requests between members

In a DB2 pureScale environment, an application on one member might request a lock for an object currently locked by another member. The DB2 pureScale Feature introduces monitor elements that specifically report information about locks across members.

As is the case in traditional DB2 environments, processing *within* members in a DB2 pureScale environment can result in locking of objects as one application attempts to perform an operation that is not compatible with an operation being performed by another application. This can occur, for example, if two applications attempt to update the same row of data at the same time. You can monitor the extent to which this type of locking within a member takes place using the locking event monitor to view lock-related information. In a DB2 pureScale environment, lock waits might also occur *between* members, as one member requests a lock for an object currently locked by an application on a different member. So, in a DB2 pureScale environment, in addition to examining locking on individual members, you might also want to look at cross-member lock information.

Lock waits between members

The following monitor elements report *only* the portion of time that an application has been awaiting a lock held by another member:

- `lock_wait_time_global`
- `lock_wait_time_global_top`
- `lock_waits_global`
- `lock_timeouts_global`

The time reported by these monitor elements is included as part of the overall **lock_wait_time** and **lock_wait_time_top** monitor elements when these elements are viewed from the perspective of the DB2 pureScale instance as a whole. Similarly, the count of lock waits and time-outs is reported as part of both the **lock_waits** and **lock_timeouts** monitor elements when these monitor elements are viewed at the level of the instance as a whole.

The following scenario illustrates the relationship between these cross-member, or global lock-wait monitor elements and the monitor elements that report locks within a member:

1. Application 1 on member 1 holds a shared (S) lock on a row.
2. Application 2 on member 2 requests an exclusive (X) lock on the same row. Application 2 is forced to wait, as the row is currently locked by application 1.
3. 2 ms later, application 3 on member 2 requests an exclusive (X) lock on the same row. Application 3 is also forced to wait.
4. 8 ms later, application 1 releases its lock, and application 2 acquires its lock.
5. 5 ms later, application 2 releases its lock, and application 3 acquires its lock.

The total time spent waiting for locks, as reported by **lock_wait_time** is 23 ms; application 2 had to wait for 10 ms in total, while application 3 had to wait for 13 ms in total. However, the amount of time spent waiting for a lock *between* members, **lock_wait_time_global** is only 10 ms, as this wait time is the only portion of the overall lock wait time that involved one member waiting on a lock held by another.

Similarly, the count of the number of locks held reported by **lock_waits_global** is 1. The wait by application 2 on application 1 counts as one member waiting on another. Even though application 3 was, for a portion of the time it was waiting, held up by an application on member 1, this lock wait is not counted as a lock wait between members because it obtained its lock from the local lock manager on member 2.

Reporting of applications holding locks

The locking event monitor shows information about applications holding locks. Generally speaking, the locking event monitor reports application information regardless of which member the application is running on. However, in rare cases, it might not be possible to determine which application is holding a lock when that application is running on a remote member. Consider the following example:

```
ALTER WORKLOAD finance COLLECT LOCK WAIT DATA WITH HISTORY AND VALUES
FOR LOCKS WAITING MORE THAN 5 SECONDS
```

This statement causes locks held longer than 5 seconds for the “finance” workload to be recorded in a lock event monitor. Now consider the following scenario.

- A lock is held by application 1 on member 1.
- After 5 seconds, the system attempts to write information about the lock to the lock event monitor, including application and member information. However, if the lock is released by application 1 and then a lock is immediately granted for the same object to another application on another member, the application holding the lock might be recorded as “Lock holder was unavailable for collection”.

Also note that if a member that held a lock fails, the locking event monitor is not able to report information about which applications running on that member might have held a lock on a required piece of data.

Finally, there are some limitations on reporting applications holding locks when you use deprecated monitoring features. See “Monitoring locking with snapshot monitor” on page 1597 for more information.

Monitor elements for viewing locks between members

The IBM DB2 pureScale Feature adds a number of new monitor elements that you can use to monitor locking in a DB2 pureScale environment. These monitor elements report specifically on information about lock waits between members in a DB2 pureScale instance.

Locking-related monitor elements

The following monitor elements can be used to get information about lock waits between members and lock escalations:

- “lock_waits_global - Lock waits global monitor element” on page 1016
- “lock_wait_time_global - Lock wait time global monitor element” on page 1011
- “lock_wait_time_global_top - Top global lock wait time monitor element” on page 1013
- “lock_timeouts_global - Lock timeouts global monitor element” on page 1006
- “lock_escals_maxlocks - Number of maxlocks lock escalations monitor element” on page 994
- “lock_escals_locklist - Number of locklist lock escalations monitor element” on page 993
- “lock_escals_global - Number of global lock escalations monitor element” on page 991

While not directly related to locking, the following elements can be used to get information about the extent to which things like statements, units of work or workloads in a DB2 pureScale instance wait on a cluster caching facility:

- “cf_waits - Number of cluster caching facility waits monitor element” on page 767
- “cf_wait_time - cluster caching facility wait time monitor element” on page 767

The cf_wait_time element shows how long a statement, unit or work, or workload has had to wait for the cluster caching facility to service a request. Use this element in conjunction with cf_waits ($cf_wait_time \div cf_waits$) to find the average wait time for each request. Generally speaking, the average wait time for requests to be serviced by the cluster caching facility is on the order of a few milliseconds. If you find they are substantially longer (that is, an order of magnitude or more), you might have an InfiniBand setup issue. Alternatively, your cluster caching facility may be overwhelmed with requests that it is not able to keep up with.

Refer to the reference topics for each monitor element to see what monitoring interfaces you can use to examine the data associated with that monitor element.

You can also use the other monitor elements supported by the locking event monitor to view information about locking *within* members.

Page reclaiming

Different members in a DB2 pureScale instance might require access to a page of data that another member is already using. The process whereby one member requests and is granted a page being used by another member is known as *page reclaiming*.

If different members require access to the same page of data, the cluster caching facility manages which member accesses the page and when. In some cases, the cluster caching facility (also known as the CF) might permit one member to *reclaim* the page from another member before the other member is finished with it. The following example illustrates how page reclaiming occurs:

Assume there are two members, M1 and M2 that intend to update two different rows on the same page of data.

1. M1 is doing an update on a row R1 within a page of data. It is granted exclusive access to the page containing that row of data.
2. M2 requires an exclusive to the same page to update row R2. It passes this request to the CF. M2 waits while the request is processed.
3. The CF sees that member M1 already has an exclusive access to the page. It issues a request to M1 to reclaim the page. In the meantime, M2 waits.
4. M1 processes the reclaim request by writing the page back to the GBP and then releasing the page. (M1 retains any row or table locks it might have.)
5. The CF grants M2 access to the page. M2 reads the page from the GBP to perform whatever operations for which the page is needed.

It is important to note that as pointed out in step 4, any locks that a member has on rows or tables for the purposes of updates are retained until the unit of work has completed, even if another member reclaims and begins using the page before the end of that unit of work. In this way, different members can work with the same page of data without compromising lock integrity. If it happens that two members require incompatible row locks to the same row of data, then as is the case with lock management on a single member, one member must complete its processing before the second is allowed to proceed.

Monitor elements for page reclaiming

The IBM DB2 pureScale Feature adds a number of new monitor elements that you can use to monitor the extent to which page reclaiming is taking place in a DB2 pureScale instance.

Page reclaiming-related monitor elements

The following monitor elements can be used to get information about the extent to which page reclaiming is taking place in a DB2 pureScale instance:

- “page_reclaims_x - Page reclaims exclusive access monitor element” on page 1099
- “page_reclaims_initiated_s - Page reclaims initiated shared access monitor element” on page 1100
- “spacemappage_page_reclaims_x - Space map page reclaims exclusive access monitor element” on page 1336
- “spacemappage_page_reclaims_s - Space map page reclaims shared access monitor element” on page 1337

- “page_reclaims_initiated_x - Page reclaims initiated exclusive access monitor element” on page 1100
- “page_reclaims_initiated_s - Page reclaims initiated shared access monitor element” on page 1100
- “spacemappage_page_reclaims_initiated_x - Space map page reclaims initiated exclusive access monitor element” on page 1338
- “spacemappage_page_reclaims_initiated_s - Space map page reclaims initiated shared access monitor element” on page 1338
- “reclaim_wait_time - Reclaim wait time monitor element” on page 1269
- “spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element” on page 1339

Refer to the reference topics for each monitor element to see what monitoring interfaces you can use to examine the data associated with that monitor element.

Monitoring page reclaiming between members

When examining where a particular application or statement is spending its time, in addition to the time spent waiting for locks, applications, or statements in a DB2 pureScale environment might need to wait for a page to become available when it is in use by another member.

You can use page reclaiming monitor elements to view the extent to which this type of wait might be affecting throughput on your system.

About this task

To view page reclaiming statistics, use the `MON_GET_PAGE_ACCESS_INFO` table function. This table function returns object-level information about the extent to which members both request pages currently in use by other members, and the extent to which members release those pages at the request of other members. You can also retrieve the wait times involved.

Procedure

1. Determine what types of pages you are interested in viewing results for. The example that follows retrieves information about the number of times pages were reclaimed for all data and index pages, using the `page_reclaims_x` and `page_reclaims_s` monitor elements.
2. Formulate an SQL statement that uses the `MON_GET_PAGE_ACCESS_INFO` table function. For example, to retrieve information about data and index pages reclaimed for all members, you can construct a statement like the one that follows:

```
SELECT MEMBER,
       VARCHAR(TABNAME,30) AS TABLE,
       VARCHAR(OBJTYPE,8) AS OBJTYPE,
       PAGE_RECLAIMS_X,
       PAGE_RECLAIMS_S
FROM TABLE(MON_GET_PAGE_ACCESS_INFO('DTW',' ', -2))
WHERE PAGE_RECLAIMS_X !=0 OR PAGE_RECLAIMS_S !=0
ORDER BY MEMBER ASC, PAGE_RECLAIMS_X ASC
```

3. Run the query. In this case, the results returned would look like the following example:

MEMBER	TABLE	OBJTYPE	PAGE_RECLAIMS_X	PAGE_RECLAIMS_S
0	CUSTOMER	TABLE	196	0
0	STOCK_1_250	TABLE	213	0
0	STOCK_1251_1500	TABLE	237	0

0	STOCK_251_500	TABLE	239	0
0	STOCK_501_750	TABLE	245	0
0	STOCK_1751_2000	TABLE	253	0
0	STOCK_2001_2250	TABLE	254	0
0	STOCK_751_1000	TABLE	259	0
0	STOCK_1501_1750	TABLE	269	0
0	STOCK_2251_2500	TABLE	274	0
0	STOCK_251_500	INDEX	276	2934
0	STOCK_1001_1250	TABLE	280	0
0	STOCK_1501_1750	INDEX	284	3070
0	STOCK_501_750	INDEX	294	3029
0	STOCK_1_250	INDEX	296	2916
0	STOCK_751_1000	INDEX	301	3056
1	STOCK_1001_1250	TABLE	247	0
1	STOCK_501_750	TABLE	255	0
1	STOCK_751_1000	TABLE	257	0
1	STOCK_1501_1750	TABLE	257	0
1	STOCK_251_500	INDEX	287	2921
1	STOCK_1_250	INDEX	292	2916
1	STOCK_751_1000	INDEX	316	3190
1	STOCK_501_750	INDEX	319	2956
1	ORDERS	INDEX	42434	1416
1	ORDER_LINE	INDEX	116107	3731
2	CUSTOMER	TABLE	180	0
2	STOCK_2001_2250	TABLE	221	0
.
.
.
2	STOCK_1501_1750	TABLE	240	0
2	STOCK_2251_2500	TABLE	247	0
2	STOCK_1251_1500	TABLE	268	0
2	STOCK_251_500	INDEX	276	2976
2	STOCK_1_250	INDEX	284	2846
2	STOCK_501_750	TABLE	285	0
2	STOCK_501_750	INDEX	293	3143
2	DISTRICT	TABLE	18402	0
2	ORDERS	INDEX	41581	1474
2	ORDER_LINE	INDEX	114442	3815
3	CUSTOMER	TABLE	159	0
3	STOCK_251_500	TABLE	226	0
3	ORDERS	INDEX	42192	1340
3	ORDER_LINE	INDEX	115459	3871

112 record(s) selected.

Note: Part of the lengthy output from the query has been excluded, as denoted by the vertical ellipsis.

Results

In the preceding example, you can see that information for data and index pages is returned separately. Also, the schema is specified to exclude data from objects associated with the SYSIBM schema from being reported.

Example

Example 1: Retrieving page reclaim wait times

The following SQL retrieves the total pages reclaimed and total wait time across all members.

```
SELECT
    SUM(PAGE_RECLAIMS_X+PAGE_RECLAIMS_S+SPACEMAPPAGE_PAGE_RECLAIMS_X
        +SPACEMAPPAGE_PAGE_RECLAIMS_S)AS PAGE_RECLAIMS,
    SUM(RECLAIM_WAIT_TIME) AS RECLAIM_WAIT_TIME
FROM TABLE(MON_GET_PAGE_ACCESS_INFO('',' ', -2))
```

The results of this query would look like the following example::

PAGE_RECLAIMS	RECLAIM_WAIT_TIME
-----	-----
156	91

1 record(s) selected.

(Wait time is reported in milliseconds)

Example 2: Show the 10 tables that are associated with the highest number of pages reclaimed

This example shows how you can see which table objects are involved with page reclaiming.

```
SELECT SUBSTR(TABSCHEMA,1,8) AS TABSCHEMA,  
       SUBSTR(TABNAME,1,20) AS TABNAME,  
       RECLAIM_WAIT_TIME,  
       MEMBER,  
       SUBSTR(OBJTYPE,1,10) AS OBJTYPE  
FROM TABLE(MON_GET_PAGE_ACCESS_INFO(NULL,NULL,-2))  
WHERE RECLAIM_WAIT_TIME > 0  
ORDER BY RECLAIM_WAIT_TIME DESC  
FETCH FIRST 10 ROWS ONLY
```

Results:

TABSCHEMA	TABNAME	RECLAIM_WAIT_TIME	MEMBER	OBJTYPE
DTW	ORDER_LINE	1307192	1	INDEX
DTW	ORDER_LINE	1250134	2	INDEX
DTW	ORDER_LINE	1249452	0	INDEX
DTW	ORDER_LINE	1159741	3	INDEX
DTW	DISTRICT	827598	0	TABLE
DTW	DISTRICT	785354	2	TABLE
DTW	DISTRICT	767148	1	TABLE
DTW	DISTRICT	687608	3	TABLE
DTW	ORDERS	556538	0	INDEX
DTW	ORDERS	539858	2	INDEX

10 record(s) selected.

(Wait time is reported in milliseconds)

Example 3: Show the 10 statements that are causing the highest number of pages reclaimed

This query is a variation on the preceding example; in this case, the query returns the 10 statements associated with the highest number of pages reclaimed:

```
SELECT SUBSTR(STMT_TEXT,1,50) AS STMT_TEXT,  
       RECLAIM_WAIT_TIME  
FROM TABLE(MON_GET_PKG_CACHE_STMT('D',NULL,NULL,-2))TABLE  
WHERE RECLAIM_WAIT_TIME > 0  
ORDER BY RECLAIM_WAIT_TIME DESC  
FETCH FIRST 10 ROWS ONLY
```

Results:

STMT_TEXT	RECLAIM_WAIT_TIME
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03	796668
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03	785863
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03	746521
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03	623461
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?	610602
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?	522899
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?	518076
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID =	419022
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID =	406028
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID =	406006

10 record(s) selected.

(Wait time is reported in milliseconds)

Example 4: Show the 10 statements that are causing the highest number of pages reclaimed, with the average wait time for each execution of each statement

In the preceding example, the wait time is expressed as an overall value per statement. The query does not take into account the fact that a given statement might have run numerous times. This example shows how you can examine the average wait time for each execution of each of the top 10 statements:

```
SELECT SUBSTR(STMT_TEXT,1,75) AS STMT_TEXT,
       NUM_EXECUTIONS,
       RECLAIM_WAIT_TIME,
       DEC(FLOAT(RECLAIM_WAIT_TIME)/FLOAT(NUM_EXECUTIONS),10,8)
       AS AVG_WAIT_PEREXEC
FROM TABLE(MON_GET_PKG_CACHE_STMT('D',NULL,NULL,-2))TABLE
WHERE RECLAIM_WAIT_TIME > 0
ORDER BY AVG_WAIT_PEREXEC DESC
FETCH FIRST 10 ROWS ONLY
```

Results:

STMT_TEXT	NUM_EXECUTIONS	RECLAIM_WAIT_TIME	AVG_WAIT_PEREXEC
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	157173	419497	2.66901439
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	155752	397870	2.55450973
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	155352	385613	2.48218883
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	155151	347847	2.24199006
Insert into ORDERS values (?, ?, ?, ?, ?, ?, ?, ?)	157173	259076	1.64834927
Insert into ORDERS values (?, ?, ?, ?, ?, ?, ?, ?)	155752	253548	1.62789562
Insert into ORDERS values (?, ?, ?, ?, ?, ?, ?, ?)	155352	232300	1.49531386
Insert into ORDERS values (?, ?, ?, ?, ?, ?, ?, ?)	155151	219607	1.41544044
Delete from NEW_ORDER where NO_W_ID = ? and NO_D_ID = ? and NO_O_ID = ?	152968	106525	0.69638747
Delete from NEW_ORDER where NO_W_ID = ? and NO_D_ID = ? and NO_O_ID = ?	152591	101367	0.66430523

10 record(s) selected.

(Wait time is reported in milliseconds)

A slightly different version of this query shows how long each statement took to execute:

```
SELECT SUBSTR(STMT_TEXT,1,75) AS STMT_TEXT,
       NUM_EXECUTIONS,
       RECLAIM_WAIT_TIME,
       DEC(FLOAT(RECLAIM_WAIT_TIME)/FLOAT(NUM_EXECUTIONS),10,8) AS AVG_EXEC_TIME
FROM TABLE(MON_GET_PKG_CACHE_STMT('D',NULL,NULL,-2))TABLE
WHERE RECLAIM_WAIT_TIME > 0
ORDER BY RECLAIM_WAIT_TIME DESC
FETCH FIRST 10 ROWS ONLY
```

Results:

STMT_TEXT	NUM_EXECUTIONS	RECLAIM_WAIT_TIME	AVG_EXEC_TIME
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03, S_DIST_04, S_DIST_05, S	1555470	755544	0.48573357
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03, S_DIST_04, S_DIST_05, S	1554405	754231	0.48522167
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03, S_DIST_04, S_DIST_05, S	1570256	741047	0.47192750
Select S_QUANTITY, S_DIST_01, S_DIST_02, S_DIST_03, S_DIST_04, S_DIST_05, S	1550835	707148	0.45597887
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?, ?, ?)	1554392	508568	0.32718130
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?, ?, ?)	1555454	497197	0.31964751
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?, ?, ?)	1570245	493692	0.31440444
Insert into ORDER_LINE values (?, ?, ?, ?, ?, ?, ?, ?, ?)	1550813	465049	0.29987432
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	157145	419283	2.66812816
Update DISTRICT set D_NEXT_O_ID = ? where D_W_ID = ? and D_ID = ?	155719	397364	2.55180164

10 record(s) selected.

(Wait time is reported in milliseconds)

Chapter 14. Using deprecated monitoring features in a DB2 pureScale environment

The IBM DB2 pureScale Feature extends the DB2 monitoring infrastructure with a rich set of monitor elements that you can use to retrieve information about a DB2 pureScale instance. However, there are some limitations to be aware of when retrieving and interpreting monitoring data using deprecated monitoring interfaces.

This topic describes the limitations to keep in mind when you are using any of the following deprecated features:

- “Monitoring locking with snapshot monitor”
- “Deadlock event monitor” on page 1598
- “LIST TABLESPACES and LIST TABLESPACE CONTAINERS commands” on page 1601

Monitoring locking with snapshot monitor

If you use snapshot monitoring commands, functions or views to examine information about locks between members, details about the applications holding locks are only displayed if the application is running on the same member as where the snapshot is being taken. Otherwise, the ID of the application holding the lock are reported as REMOTE APPLICATION, and other information, such as the application ID and the lock mode are omitted. For this reason, consider taking a global snapshot so that information from all members is returned.

For example, Figure 23 shows the output of a **GET SNAPSHOT FOR APPLICATION** command, where the application holding the lock is on the same member as where the command is run:

```
ID of agent holding lock           = 73
Application ID holding lock        = *N0.user1.080616184956
Database partition lock wait occurred on = 0
Lock name                          = 0x0200040000000000000000000054
Lock attributes                     = 0x00000000
Release flags                       = 0x00000000
Lock object type                    = Table
Lock mode                           = Exclusive Lock (X)
Lock mode requested                 = Share Lock (S)
Name of tablespace holding lock     = USERSPACE1
Schema of table holding lock        = USER1
Name of table holding lock          = T1
Data Partition Id of table holding lock = 0
Lock wait start timestamp           = 06/16/2009 14:50:26.744694
```

Figure 23. Output for GET SNAPSHOT FOR APPLICATION command - command run on member holding lock. In this example, the application holding the lock is running on the same member on which the **GET SNAPSHOT** command is being run:

However, if the lock is held by an application on a remote member, the same report would look like what is shown in Figure 24 on page 1598:

```

Application ID holding lock          = REMOTE APPLICATION
Database partition lock wait occurred on = 0
Lock name                           = 0x02000400000000000000000000000054
Lock attributes                      = 0x00000000
Release flags                        = 0x00000000
Lock object type                     = Table
Lock mode requested                  = Share Lock (S)
Name of tablespace holding lock      = USERSPACE1
Schema of table holding lock         = USER1
Name of table holding lock           = T1
Data Partition Id of table holding lock = 0
Lock wait start timestamp            = 06/16/2009 14:50:26.744694

```

Figure 24. Output for `GET SNAPSHOT FOR APPLICATION` command - command run on member other than one holding lock. In this example, the application holding the lock is running on a different member on which the `GET SNAPSHOT` command is being run. The **ID of agent holding lock** and the **Lock mode** lines are omitted. Also, the **Application ID holding lock** is shown as `REMOTE APPLICATION`.

If you take a global snapshot, data for all members is returned. You can determine where the lock is being held by examining the lock name from the snapshot output. If you skim through the reports for each of the members, you can quickly find which application holds the lock in question.

Deadlock event monitor

When a deadlock occurs, the deadlock detector generates information used by event monitors that track deadlocks. The `CREATE EVENT MONITOR ... FOR DEADLOCKS` command, which is deprecated, might not show certain details for deadlocks between members in a DB2 pureScale environment. For deadlock event reporting, the details regarding the application that was the victim of the deadlock might not be shown in the output of the `dbevmon` tool, as shown in Figure 25 and in Figure 26: (Whether application details are shown or not is dependent on several factors,

```

3) Deadlock Event ...
  Deadlock ID: 1
  Deadlock node: 0
  Number of applications deadlocked: 2
  Deadlock detection time: 06/17/2009 14:46:22.543136
  Rolled back Appl participant no: 2

```

Figure 25. Sample `db2evmon` output, DB2 pureScale instances

```

3) Deadlock Event ...
  Deadlock ID: 1
  Deadlock node: 0
  Number of applications deadlocked: 2
  Deadlock detection time: 06/17/2009 14:46:22.543136
  Rolled back Appl participant no: 2
  Rolled back Appl Id: *N0.finance.081217170042
  Rolled back Appl seq number: : 0001
  Rolled back Appl handle: 66

```

Figure 26. Sample `db2evmon` output, all other types of DB2 instances

none of which are under user control.) However, you can determine which applications are involved in the deadlock by correlating the data reported for the deadlock ID and the rolled-back application participant number with information found in the Deadlocked Connection section of the `dbevmon` output.

Similarly, the Deadlocked Connection section of the output does not include the application ID, sequence number, or lock mode of the application holding the requested lock. However, the deadlock ID, member ID, lock name, lock time

stamp, and participant number of the application holding the lock are displayed. (The member ID appears as “Deadlock node” in the output of the **dbevmon** tool.) You can use this information to correlate which applications are causing the contention. The following sample output from the **db2evmon** tool illustrates this behavior. The information to use for correlating the applications involved in the deadlock is underlined:

```

5) Deadlock Event ...
  Deadlock ID: 1
  Deadlock node: 0
  Number of applications deadlocked: 2
  Deadlock detection time: 12/17/2008 12:01:12.735436
  Rolled back Appl participant no: 2
  Rolled back Appl Id: *N0.finance.081217170042
  Rolled back Appl seq number: : 0001
  Rolled back Appl handle: 66

6) Connection Header Event ...
  Appl Handle: 66
  Appl Id: *N0.finance.081217170042
  Appl Seq number: 00001
  DRDA AS Correlation Token: *N0.finance.081217170042
  Program Name : db2bp
  Authorization Id: FINANCE
  Execution Id : finance
  Codepage Id: 1208
  Territory code: 1
  Client Process Id: 7201
  Client Database Alias: A
  Client Product Id: SQL09070
  Client Platform: Unknown
  Client Communication Protocol: Local
  Client Network Name: so2.torolab.ibm.com
  Connect timestamp: 12/17/2008 12:00:42.176747

7) Deadlocked Connection ...
  Deadlock ID: 1
  Deadlock Node: 0
  Participant no.: 2
  Participant no. holding the lock: 1
  Appl Id: *N0.finance.081217170042
  Appl Seq number: 00001
  Appl Id of connection holding the lock: REMOTE APPLICATION
  Lock wait start time: 12/17/2008 12:01:01.607230
  Lock Name : 0x020005000400000100000000052
  Lock Attributes : 0x00000000
  Release Flags : 0x00000000
  Lock Count : 0
  Hold Count : 0
  Current Mode : none
  Deadlock detection time: 12/17/2008 12:01:17.730069
  Table of lock waited on : T2
  Schema of lock waited on : FINANCE
  Data partition id for table : 0
  Tablespace of lock waited on : USERSPACE1
  Type of lock: Row
  Mode application requested on lock: NS - Share (CS/RS)
  Node lock occurred on: 2
  Lock object name: 16777220
  Application Handle: 66
  Deadlocked Statement:
    Type : Dynamic
    Operation: Fetch
    Section : 201
    Creator : NULLID
    Package : SQLC2G17
    Cursor : SQLCUR201
    Cursor was blocking: FALSE
    Text : select * from t2

```

List of Locks:

...

```

Database partition : 0
Lock Name : 0x020004000100FFFFFFF81000000000052
Lock Attributes : 0x00000008
Release Flags : 0x40000000
Lock Count : 1

```

```

Hold Count          : 0
Lock Object Name    : 8454145
Object Type         : Row
Tablespace Name     : USERSPACE1
Table Schema        : FINANCE
Table Name          : T1
Data partition id   : 0
Mode                : X - Exclusive

Database partition  : 0
Lock Name           : 0x02000500000000000000000000000054
Lock Attributes     : 0x00000000
Release Flags       : 0x00000001
Lock Count          : 1
Hold Count          : 0
Lock Object Name    : 5
Object Type         : Table
Tablespace Name     : USERSPACE1
Table Schema        : FINANCE
Table Name          : T2
Data partition id   : 0
Mode                : IS - Intent Share
...

Locks Held: 6
Locks in List: 6
Locks Displayed: 6

```

```

8) Connection Header Event ...
AppI Handle: 131137
AppI Id: *N2.finance.081217170053
AppI Seq number: 00001
DRDA AS Correlation Token: *N2.finance.081217170053
Program Name      : db2bp
Authorization Id: finance
Execution Id      : finance
Codepage Id: 1208
Territory code: 1
Client Process Id: 7260
Client Database Alias: A
Client Product Id: SQL09070
Client Platform: Unknown
Client Communication Protocol: Local
Client Network Name: so2.torolab.ibm.com
Connect timestamp: 12/17/2008 12:00:43.542242

```

```

9) Deadlocked Connection ...
Deadlock ID: 1
Deadlock Node: 0
Participant no.: 1
Participant no. holding the lock: 2
AppI Id: *N2.finance.081217170053
AppI Seq number: 00001
AppI Id of connection holding the lock: REMOTE_APPLICATION
Lock wait start time: 12/17/2008 12:00:57.844388
Lock Name          : 0x020004000100FFFFFFF810000000000052
Lock Attributes    : 0x00000000
Release Flags      : 0x00000000
Lock Count         : 0
Hold Count         : 0
Current Mode       : none
Deadlock detection time: 12/17/2008 12:01:17.744611
Table of lock waited on : T1
Schema of lock waited on : FINANCE
Data partition id for table : 0
Tablespace of lock waited on : USERSPACE1
Type of lock: Row
Mode application requested on lock: NS - Share (CS/RS)
Node lock occurred on: 0
Lock object name: 8454145
Application Handle: 131137
Deadlocked Statement:
  Type      : Dynamic
  Operation: Fetch
  Section   : 201
  Creator   : NULLID
  Package   : SQLC2G17
  Cursor    : SQLCUR201
  Cursor was blocking: FALSE
  Text      : select * from t1

```

List of Locks:

...

```
Database partition      : 2
Lock Name               : 0x02000500040000010000000052
Lock Attributes         : 0x00000008
Release Flags          : 0x40000000
Lock Count             : 1
Hold Count             : 0
Lock Object Name       : 16777220
Object Type            : Row
Tablespace Name        : USERSPACE1
Table Schema           : FINANCE
Table Name             : T2
Data partition id      : 0
Mode                   : X - Exclusive
```

```
Database partition      : 2
Lock Name               : 0x02000500000000000000000054
Lock Attributes         : 0x00000000
Release Flags          : 0x40000000
Lock Count             : 1
Hold Count             : 0
Lock Object Name       : 5
Object Type            : Table
Tablespace Name        : USERSPACE1
Table Schema           : FINANCE
Table Name             : T2
Data partition id      : 0
Mode                   : IX - Intent Exclusive
```

```
Database partition      : 2
Lock Name               : 0x02000400000000000000000054
Lock Attributes         : 0x00000000
Release Flags          : 0x00000001
Lock Count             : 1
Hold Count             : 0
Lock Object Name       : 4
Object Type            : Table
Tablespace Name        : USERSPACE1
Table Schema           : FINANCE
Table Name             : T1
Data partition id      : 0
Mode                   : IS - Intent Share
```

```
Locks Held: 6
Locks in List: 6
Locks Displayed: 6
```

LIST TABLESPACES and LIST TABLESPACE CONTAINERS commands

Both the **LIST TABLESPACES** and **LIST TABLESPACE CONTAINERS** commands were deprecated in DB2 Version 9.7. These commands report only information known on the member they are run on. They do not retrieve information from other members in the instance. So, some data, such as the number of used pages in a table space might not be reported accurately. Use the **MON_GET_TABLESPACE** and **MON_GET_CONTAINER** table functions instead.

Chapter 15. New and changed monitor elements

cf_wait_time - cluster caching facility wait time monitor element

The cf_wait_time monitor element stores the amount of time spent communicating with the cluster caching facility.

This time does not include time spent performing any of the processing that may have been requested by, or that may occur as a result of the communications, such as granting locks or performing page reclaims. The unit of measurement is milliseconds.

Table 2170. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Usage

This value is an indicator of the amount of time DB2 has spent waiting while communicating with the cluster caching facility.

cf_waits - Number of cluster caching facility waits monitor element

The number of times that the DB2 database system waited while it communicated with a cluster caching facility.

Table 2171. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2172. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

configured_cf_gbp_size - Configured cluster caching facility group buffer pool size monitor element

The allocated and reserved group buffer pool memory specified using the **cf_gbp_sz** configuration parameter, in pages with a page size of 4 KB.

Table 2173. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_lock_size - Configured cluster caching facility lock size monitor element

Global lock memory configured, in pages with a page size of 4 KB. This value is specified using the **cf_lock_sz** configuration parameter.

Table 2174. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_mem_size - Configured cluster caching facility memory size monitor element

Configured total memory size for the cluster caching facility, in pages with a page size of 4 KB. This value is specified using the **cf_mem_sz** configuration parameter.

Table 2175. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

configured_cf_sca_size - Configured cluster caching facility shared communications area size monitor element

Shared communications area memory currently allocated and reserved, in pages with a page size of 4 KB. This value is specified using the **cf_sca_sz** configuration parameter.

Table 2176. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_gbp_size - Current cluster caching facility group buffer pool size monitor element

Group buffer pool memory currently in use at the cluster caching facility, in pages with a page size of 4 KB.

Table 2177. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_lock_size - Current cluster caching facility lock size monitor element

Global lock memory currently in use, in pages with a page size of 4 KB.

Table 2178. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_mem_size - Current cluster caching facility memory size monitor element

Total memory currently in use, in pages with a page size of 4 KB.

Table 2179. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

current_cf_sca_size - Current cluster caching facility shared communications area size monitor element

Shared communications area memory currently in use, in pages with a page size of 4 KB.

Table 2180. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

db_name - Database name monitor element

The real name of the database for which information is collected or to which the application is connected. This is the name the database was given when created.

Table 2181. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample workload metrics	ACTIVITY METRICS BASE

Table 2182. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Database	dbase_remote	Basic
Application	appl_id_info	Basic
Application	appl_remote	Basic
Table Space	tablespace_list	Buffer Pool
Buffer Pool	bufferpool	Buffer Pool
Table	table_list	Table
Lock	db_lock_list	Basic
Dynamic SQL	dynsql_list	Basic
DCS Database	dcs_dbase	Basic
DCS Application	dcs_appl_info	Basic

Table 2183. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Database	event_dbheader	Always collected

Usage

You may use this element to identify the specific database to which the data applies.

For applications that are not using DB2 Connect to connect to a host or System i database server, you can use this element in conjunction with the **db_path** monitor element to uniquely identify the database and help relate the different levels of information provided by the monitor.

dbpartitionnum - Database partition number monitor element

In a partitioned database environment, this is the numeric identifier for the database member. For DB2 Enterprise Server Edition and in a DB2 pureScale environment, this value is 0.

Table 2184. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_MSGS table function - Retrieve messages generated by a data movement utility that is executed through the ADMIN_CMD procedure	ACTIVITY METRICS BASE
ADMIN_GET_STORAGE_PATHS table function - Get storage path information for storage groups	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
AUDIT_ARCHIVE procedure and table function - Archive audit log file	ACTIVITY METRICS BASE
DBCFCG administrative view and DB_GET_CFG table function - Retrieve database configuration parameter information	ACTIVITY METRICS BASE
DBPATHS administrative view and ADMIN_LIST_DB_PATHS table function - Retrieve database paths	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS table function - Get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_TABLE table function - get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE
PDLOGMSG_LAST24HOURS administrative view and PD_GET_LOG_MSGS table function - Retrieve problem determination messages	ACTIVITY METRICS BASE

Table 2184. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Usage

In a DB2 pureScale environment, multiple members operate on a single partition. When running in such a configuration, physical attributes of storage, such as the number of free pages in a table space, are duplicated across all members in the system. Each member reports the total accurate size for the system. In a multiple partition configuration, the values from each partition must be correlated by the user in order to understand the overall value for the system.

The **dbpartitionnum** monitor element is different to the **data_partition_id** monitor element, which is used to identify a data partition that was created by subdividing data in a table based on a value.

host_name - Host name monitor element

Name of the host on which the cluster caching facility process resides.

Table 2185. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB_MEMBERS table function	ACTIVITY METRICS BASE
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

Table 2185. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE

id - cluster caching facility identification monitor element

cluster caching facility identifier, as defined in the `db2nodes.cfg` file.

Table 2186. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
DB2_MEMBER and DB2_CF administrative views and DB2_GET_INSTANCE_INFO table function	ACTIVITY METRICS BASE
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE
MON_GET_CF_CMD table function - Get cluster caching facility command processing time	ACTIVITY METRICS BASE
MON_GET_CF_WAIT_TIME table function - Get cluster caching facility command wait time	ACTIVITY METRICS BASE

lock_escals - Number of lock escalations monitor element

The number of times that locks have been escalated from several row locks to a table lock.

Table 2187. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 2187. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2188. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Database	dbase	Basic
Application	appl	Basic

For snapshot monitoring, this counter can be reset.

Table 2189. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE

Table 2189. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Database	event_db	Always collected
Connection	event_conn	Always collected
Transactions	event_xact	Always collected
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

A lock is escalated when the total number of locks held by an application reaches the maximum amount of lock list space available to the application, or the lock list space consumed by all applications is approaching the total lock list space. The amount of lock list space available is determined by the **maxlocks** and **locklist** configuration parameters.

When an application reaches the maximum number of locks allowed and there are no more locks to escalate, it will then use space in the lock list allocated for other applications. When the entire lock list is full, an error occurs.

This data item includes a count of all lock escalations, including exclusive lock escalations and escalations in the DB2 pureScale environment. To determine just the lock escalations in the DB2 pureScale environment, use the **lock_escals_global** monitor element.

There are several possible causes for excessive lock escalations:

- The lock list size (**locklist**) may be too small for the number of concurrent applications
- The percent of the lock list usable by each application (**maxlocks**) may be too small
- One or more applications may be using an excessive number of locks.
- In the DB2 pureScale environment, the global lock list size (**cf_lock_sz**) may be too small.

To resolve these problems, you may be able to:

- Increase the **locklist** configuration parameter value.
- Increase the **maxlocks** configuration parameter value.
- Identify the applications with large numbers of locks, or those that are holding too much of the lock list, using one of the following formulae, and comparing the value to **maxlocks**.
 - On 64-bit systems, $((locks\ held * 64) / (locklist * 4096)) * 100$
 - On 32-bit systems, $((locks\ held * 48) / (locklist * 4096)) * 100$

These applications can also cause lock escalations in other applications by using too large a portion of the lock list. These applications may need to resort to using table locks instead of row locks, although table locks may cause an increase in **lock_waits** and **lock_wait_time** monitor element values.

lock_escals_global - Number of global lock escalations monitor element

Number of lock escalations on a global lock due to global lock memory usage reaching the limit specified in the **cf_lock_sz** database configuration parameter.

Table 2190. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2191. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_maxlocks** and **lock_escals_locklist** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_escals_locklist - Number of locklist lock escalations monitor element

Number of lock escalations due to local lock memory usage reaching the limit specified in the **locklist** database configuration parameter.

Table 2192. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected

Table 2192. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2193. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_maxlocks** and **lock_escals_global** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_escals_maxlocks - Number of maxlocks lock escalations monitor element

Number of lock escalations due to local lock memory usage reaching the limit specified in the **maxlocks** database configuration parameter.

Table 2194. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2195. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE

Table 2195. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element together with the **lock_escals_locklist** and **lock_escals_global** monitor elements to determine which lock space configuration parameter is causing escalations on the database.

lock_timeouts_global - Lock timeouts global monitor element

Number of lock timeouts where the application holding the lock was on a remote member.

Table 2196. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE

Table 2196. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2197. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this element in conjunction with the **lock_timeouts** monitor element. The **lock_timeouts_global** monitor element represents the number of times a lock timeout has occurred while waiting to acquire a lock held on another member. To determine the number of times a lock timeout has occurred while waiting to acquire a lock held on the same member, use the following formula:

$$\text{lock_timeouts} - \text{lock_timeouts_global}$$

Outside of the DB2 pureScale environment, this value is always zero.

lock_wait_time_global - Lock wait time global monitor element

Time spent on global lock waits. The unit of measurement for time is in milliseconds.

Table 2198. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT_TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2198. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2199. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element in conjunction with the **lock_wait_time** monitor element, which represents all the time spent waiting for locks. The **lock_wait_time_global** monitor element represents the time spent waiting for locks held by conflicting applications on different members. To determine the total time spent waiting for locks held by conflicting applications on the same member, use the following formula:

$$\text{lock_wait_time} - \text{lock_wait_time_global}$$

Outside of the DB2 pureScale environment, this value is always zero.

lock_wait_time_global_top - Top global lock wait time monitor element

The longest lock wait that has occurred for a lock that is held on another member. This value is reported in milliseconds.

Table 2200. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_wlstats	Always collected

lock_waits_global - Lock waits global monitor element

Number of lock waits due to the application holding the lock being on a remote member.

Table 2201. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLE table function - get table metrics	DATA OBJECT METRICS EXTENDED
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	DATA OBJECT METRICS EXTENDED
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2202. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

Use this monitor element in conjunction with the **lock_waits** monitor element, which reports the total number of lock waits due to locks held by conflicting applications on all members. The **lock_waits_global** monitor element indicates the number of times that a lock wait was held by conflicting applications on different members. To determine the number of lock waits held by a conflicting application on the same member as the waiting application, use the following formula:

$lock_waits - lock_waits_global$

Outside of the DB2 pureScale environment, this value is always zero.

member - Database member monitor element

The numeric identifier for the database member from which the data was retrieved for this result record.

Table 2203. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
ADMIN_GET_MEM_USAGE table function - Get total memory consumption for instance	ACTIVITY METRICS BASE
AUDIT_ARCHIVE procedure and table function - Archive audit log file	ACTIVITY METRICS BASE
DBCFC administrative view and DB_GET_CFG table function - Retrieve database configuration parameter information	ACTIVITY METRICS BASE
ENV_GET_REG_VARIABLES table function - Retrieve DB2 registry settings in use	ACTIVITY METRICS BASE
ENV_GET_DB2_SYSTEM_RESOURCES table function - Return DB2(r) system information	ACTIVITY METRICS BASE
ENV_GET_SYSTEM_RESOURCES table function - Return system information	ACTIVITY METRICS BASE

Table 2203. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
ENV_GET_NETWORK_RESOURCES table function - Return network adapter information	ACTIVITY METRICS BASE
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details	ACTIVITY METRICS BASE
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	ACTIVITY METRICS BASE
MON_GET_CF_WAIT_TIME table function - Get cluster caching facility command wait time	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	ACTIVITY METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics	ACTIVITY METRICS BASE
MON_GET_CONTAINER table function - Get table space container metrics	ACTIVITY METRICS BASE
MON_GET_EXTENDED_LATCH_WAIT table function - Return information for latches	ACTIVITY METRICS BASE
MON_GET_EXTENT_MOVEMENT_STATUS - Get extent movement progress status metrics	ACTIVITY METRICS BASE
MON_GET_FCM - Get FCM metrics	ACTIVITY METRICS BASE
MON_GET_FCM_CONNECTION_LIST - Get details for all FCM connections	ACTIVITY METRICS BASE
MON_GET_GROUP_BUFFERPOOL table function - Get group buffer pool metrics	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_INDEX_USAGE_LIST table function - Returns information from an index usage list	ACTIVITY METRICS BASE
MON_GET_LOCKS table function - list all locks in the currently connected database	ACTIVITY METRICS BASE
MON_GET_MEMORY_POOL table function - Get memory pool information	ACTIVITY METRICS BASE
MON_GET_MEMORY_SET table function - Get memory set information	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Table 2203. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries	ACTIVITY METRICS BASE
MON_GET_REBALANCE_STATUS table function - get rebalance progress for a table space	ACTIVITY METRICS BASE
MON_GET_ROUTINE table function - get aggregated execution metrics for routines	Always collected
MON_GET_ROUTINE_DETAILS table function - get aggregated execution metric details for routines	Always collected
MON_GET_ROUTINE_EXEC_LIST table function - get list of statements executed by routine	Always collected
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS BASE
MON_GET_SERVERLIST table function - get member priority details	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	ACTIVITY METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE
MON_GET_TRANSACTION_LOG table function - Get log information	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	ACTIVITY METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status on a usage list	ACTIVITY METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE

Table 2203. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics	ACTIVITY METRICS BASE
MON_SAMPLE_SERVICE_CLASS_METRICS - Get sample service class metrics	ACTIVITY METRICS BASE
MON_SAMPLE_WORKLOAD_METRICS - Get sample	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE
PDLOGMSG_LAST24HOURS administrative view and PD_GET_LOG_MSGS table function - Retrieve problem determination messages	ACTIVITY METRICS BASE
WLM_GET_QUEUE_STATS table function - Return threshold queue statistics	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_AGENTS table function - list agents running in a service class	ACTIVITY METRICS BASE
WLM_GET_SERVICE_CLASS_WORKLOAD_OCCURRENCES table function - list workload occurrences	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUBCLASS_STATS table function - Return statistics of service subclasses	ACTIVITY METRICS BASE
WLM_GET_SERVICE_SUPERCLASS_STATS table function - Return statistics of service superclasses	ACTIVITY METRICS BASE
WLM_GET_WORK_ACTION_SET_STATS table function - Return work action set statistics	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_OCCURRENCE_ACTIVITIES table function - Return a list of activities	ACTIVITY METRICS BASE
WLM_GET_WORKLOAD_STATS table function - Return workload statistics	ACTIVITY METRICS BASE

Table 2204. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	-	COLLECT BASE DATA

Table 2204. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Change history	changesummary dbdbmcfg regvar ddlstmtexec txncompletion evmonstart utilstart utillocation utilstop	Always collected

Usage

A DB2 member is a database manager instance that runs DB2 server software on a single host. A DB2 member accepts and processes database requests from applications connected to it.

objtype - Object type monitor element

The type of object for which monitoring data is being reported. This monitor element is an alias of the object_type monitor element.

Table 2205. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
MON_GET_AUTO_MAINT_QUEUE table function - Get information on automatic maintenance jobs	ACTIVITY METRICS BASE
MON_GET_AUTO_RUNSTATS_QUEUE table function - Retrieve information about objects queued for evaluation	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_RTS_RQST table function - Retrieve information about real-time statistics requests	ACTIVITY METRICS BASE
MON_GET_USAGE_LIST_STATUS table function - Returns the status on a usage list	ACTIVITY METRICS BASE
PD_GET_DIAG_HIST table function - Return records from a given facility	ACTIVITY METRICS BASE

Table 2206. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Change history	utilphase utilstart	Always collected

Usage Notes

- When this element is returned by the ADMIN_GET_TAB_COMPRESS_INFO table function or the ADMIN_GET_TAB_DICTIONARY_INFO table function, the returned value for the object_type monitor element can be either 'XML' or 'DATA'.
- When this element is returned by the MON_GET_RTS_RQST table function, the returned value for the object_type monitor element is 'TABLE'.
- When this element is returned by the MON_GET_AUTO_MAINT_QUEUE table function, the returned value for the object_type monitor element can be 'DATABASE', 'TABLE', 'NICKNAME', or 'VIEW'.
- When this element is returned by the MON_GET_AUTO_RUNSTATS_QUEUE table function, the returned value for the object_type monitor element can be 'TABLE', 'NICKNAME', or 'VIEW'.
- When this element is returned by the change history event monitor, the returned value for the object_type monitor element can be 'DATABASE', 'INDEX', 'PARTITIONGROUP', 'TABLE' or 'TABLESPACE'.

page_reclaims_initiated_s - Page reclaims initiated shared access monitor element

The number of times a page accessed in shared mode caused the page to be reclaimed from another member. Page reclaims related to internally maintained object space maps are counted separately.

Table 2207. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

page_reclaims_initiated_x - Page reclaims initiated exclusive access monitor element

The number of times a page accessed in exclusive mode caused the page to be reclaimed from another member. Page reclaims related to internally maintained object space maps are counted separately.

Table 2208. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

page_reclaims_s - Page reclaims shared access monitor element

The number of times a page related to the object was reclaimed by another member in the DB2 pureScale instance before its planned release, where the member that reclaimed the page required shared access.

Table 2209. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

Page reclaims related to internally maintained object space maps are counted separately.

page_reclaims_x - Page reclaims exclusive access monitor element

The number of times a page related to the object was reclaimed by another member in the DB2 pureScale instance before its planned release, where the member that reclaimed the page required exclusive access.

Table 2210. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

Page reclaims related to internally maintained object space maps are counted separately.

pool_async_data_gbp_invalid_pages - Asynchronous group buffer pool invalid data pages monitor element

The number of times a data page was attempted to be read from the group buffer pool by a prefetcher because the page was invalid in the local buffer pool.

Table 2211. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_gbp_l_reads - Asynchronous group buffer pool data logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 2212. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_gbp_p_reads - Asynchronous group buffer pool data physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 2213. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads}}{\text{pool_async_data_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_data_lbp_pages_found - Asynchronous local buffer pool data pages found monitor element

The number of times a data page was present in the local buffer pool when a prefetcher attempted to access it.

Table 2214. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) data page hit ratios can be computed as follows:

$$\text{GBP} = \left(\text{pool_async_data_gbp_l_reads} - \text{pool_async_data_gbp_p_reads} \right) / \text{pool_async_data_gbp_l_reads}$$

Buffer pool hit rates are important factors in the overall performance of the IBM DB2 pureScale Feature. Using this formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_gbp_invalid_pages - Asynchronous group buffer pool invalid index pages monitor element

The number of times an index page was attempted to be read from the group buffer pool by a prefetcher because the page was invalid in the local buffer pool.

Table 2215. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads} \right) / \text{pool_async_index_gbp_l_reads}$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_gbp_l_reads - Asynchronous group buffer pool index logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 2216. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_gbp_p_reads - Asynchronous group buffer pool index physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 2217. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_index_lbp_pages_found - Asynchronous local buffer pool index pages found monitor element

The number of times an index page was present in the local buffer pool when a prefetcher attempted to access it.

Table 2218. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) index page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_index_gbp_l_reads} - \text{pool_async_index_gbp_p_reads}}{\text{pool_async_index_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_gbp_invalid_pages - Asynchronous group buffer pool invalid XDA data pages monitor element

The number of times a request for a data page for an XML storage object (XDA) was made from the group buffer pool by a prefetcher due to the page being marked invalid in the local buffer pool.

Table 2219. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}}{\text{pool_async_xda_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_gbp_l_reads - Group buffer pool XDA data asynchronous logical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was attempted to be read from the group buffer pool by a prefetcher because the page was either invalid or not present in the local buffer pool.

Table 2220. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}}{\text{pool_async_xda_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_gbp_p_reads - Group buffer pool XDA data asynchronous physical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was read into the local buffer pool by a prefetcher from disk because it was not found in the GBP.

Table 2221. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\frac{\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads}}{\text{pool_async_xda_gbp_l_reads}} \right)$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_async_xda_lbp_pages_found - Asynchronous local buffer pool XDA data pages found monitor element

The number of times a data page for an XML storage object (XDA) was requested by a prefetcher from and found in the local buffer pool.

Table 2222. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE

Usage

The prefetcher (or asynchronous) XDA page hit ratios can be computed as follows:

$$\text{GBP} = \left(\text{pool_async_xda_gbp_l_reads} - \text{pool_async_xda_gbp_p_reads} \right) / \text{pool_async_xda_gbp_l_reads}$$

Buffer pool hit rates are important factors in the overall performance of the DB2 pureScale instance. Using the previously mentioned formula can help you determine whether the group buffer pool may be a limiting factor on your database's throughput.

pool_data_gbp_invalid_pages - Group buffer pool invalid data pages monitor element

The number of times a data page was invalid in the local buffer pool and was read from the group buffer pool instead. Outside of a DB2 pureScale environment, this value is null.

Table 2223. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE

Table 2223. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2224. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_gbp_l_reads - Group buffer pool data logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was attempted to be read from the group buffer pool because the page was either invalid or not present in the Local Buffer Pool (LBP).

Table 2225. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 2225. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2226. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_gbp_p_reads - Group buffer pool data physical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent data page was read into the local buffer pool from disk because it was not found in the GBP.

Table 2227. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2228. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$$(POOL_DATA_LBP_PAGES_FOUND - POOL_ASYNC_DATA_LBP_PAGES_FOUND) / POOL_DATA_L_READS$$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$$(POOL_DATA_GBP_L_READS - POOL_DATA_GBP_P_READS) / POOL_DATA_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_data_lbp_pages_found - Local buffer pool found data pages monitor element

The number of times a data page was present in the local buffer pool.

Table 2229. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2229. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2230. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested page was found in the local buffer pool, use the following formula:

$(\text{POOL_DATA_LBP_PAGES_FOUND} - \text{POOL_ASYNC_DATA_LBP_PAGES_FOUND}) / \text{POOL_DATA_L_READS}$

To determine how many times a requested page was found in the group bufferpool, use the following formula

$(\text{POOL_DATA_GBP_L_READS} - \text{POOL_DATA_GBP_P_READS}) / \text{POOL_DATA_GBP_L_READS}$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_gbp_invalid_pages - Group buffer pool invalid index pages monitor element

The number of times an index page was attempted to be read from the group bufferpool because the page was invalid in the local buffer pool.

Table 2231. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE

Table 2231. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2232. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_gbp_l_reads - Group buffer pool index logical reads monitor element

The number of times a Group Buffer Pool (GBP) dependent index page was attempted to be read from the group buffer pool because the page was either invalid or not present in the local buffer pool.

Table 2233. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2234. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_gbp_p_reads - Group buffer pool index physical reads monitor elements

The number of times a Group Buffer Pool (GBP) dependent index page was read into the local buffer pool from disk because it was not found in the GBP.

Table 2235. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE

Table 2235. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2236. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_index_lbp_pages_found - Local buffer pool index pages found monitor element

The number of times an index page was present in the local buffer pool.

Table 2237. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2237. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2238. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected
Package cache	-	Always collected
Locking	-	Always collected

Usage

To determine how often a requested index page was found in the local buffer pool, use the following formula:

$$(POOL_INDEX_LBP_PAGES_FOUND - POOL_ASYNC_INDEX_LBP_PAGES_FOUND) / POOL_INDEX_L_READS$$

To determine how many times a requested index page was found in the group bufferpool, use the following formula

$$(POOL_INDEX_GBP_L_READS - POOL_INDEX_GBP_P_READS) / POOL_INDEX_GBP_L_READS$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_gbp_invalid_pages - Group buffer pool invalid XDA data pages monitor element

The number of times a request for a data page for an XML storage object (XDA) was made from the group buffer pool due to the page being marked invalid in the local buffer pool.

Table 2239. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2239. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2240. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_gbp_l_reads - Group buffer pool XDA data logical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was attempted to be read from the group buffer pool because the page was either invalid or not present in the local buffer pool.

Table 2241. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2241. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2242. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_gbp_p_reads - Group buffer pool XDA data physical read requests monitor element

The number of times a GBP dependent data page for an XML storage object (XDA) was read into the local buffer pool from disk because it was not found in the group buffer pool.

Table 2243. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2243. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2244. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

pool_xda_lbp_pages_found - Local buffer pool XDA data pages found monitor element

The number of times a data page for an XML storage object (XDA) was requested from and found in the local buffer pool.

Table 2245. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_BUFFERPOOL table function - Get buffer pool metrics	DATA OBJECT METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT_DETAILS table function - get detailed metrics for package cache entries (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_TABLESPACE table function - Get table space metrics	DATA OBJECT METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE

Table 2245. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2246. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	Reported in the system_metrics document.	REQUEST METRICS BASE
Package cache	Reported in the activity_metrics document.	ACTIVITY METRICS BASE

Usage

To determine how often a requested XDA page was found in the local buffer pool, use the following formula:

$$(\text{pool_xda_lbp_pages_found} - \text{pool_async_xda_lbp_pages_found}) / \text{pool_xda_l_reads}$$

To determine how many times a requested XDA page was found in the group buffer pool, use the following formula

$$(\text{pool_xda_gbp_l_reads} - \text{pool_xda_gbp_p_reads}) / \text{pool_xda_gbp_l_reads}$$

Local buffer pool and group buffer pool hit rates are both important factors in the overall performance of the cluster caching facility. Using these formulas can help you determine whether the local or group buffer pool may be a limiting factor on your database's throughput.

reclaim_wait_time - Reclaim wait time monitor element

In a DB2 pureScale environment, this element represents the amount of time spent waiting on page locks, where the lock request caused a page to be reclaimed. The unit of measurement for time is in milliseconds.

Table 2247. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 2247. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_WAIT _TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	ACTIVITY METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	ACTIVITY METRICS BASE

Table 2248. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE

Table 2248. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activitymetrics	ACTIVITY METRICS BASE
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected

Usage

The time spent waiting for reclaims on space map pages is counted separately and reported in the `spacemappage_reclaim_wait_time` monitor element.

spacemappage_page_reclaims_initiated_s - Space map page reclaims initiated shared access monitor element

The number of times a page accessed in shared mode of a space map page caused the page to be reclaimed from another member.

Table 2249. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the `reclaimable_space_enabled` monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the `page_reclaims_initiated_s` monitor element, in addition to being included the value of the `spacemappage_page_reclaims_initiated_s` monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the `spacemappage_page_reclaims_initiated_s` monitor element.

spacemappage_page_reclaims_initiated_x - Space map page reclaims initiated exclusive access monitor element

The number of times a page accessed in exclusive mode for a space map page caused the page to be reclaimed from another member.

Table 2250. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_initiated_x** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_initiated_x** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_initiated_x** monitor element.

spacemappage_page_reclaims_s - Space map page reclaims shared access monitor element

The number of times a page related to a space map page was reclaimed by another member in the DB2 pureScale instance before its planned release. The member that reclaimed the page required shared access to the space map page.

Table 2251. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_s** monitor element, in addition to being included the value of

the **spacemappage_page_reclaims_s** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_s** monitor element.

spacemappage_page_reclaims_x - Space map page reclaims exclusive access monitor element

The number of times a page related to a space map page was reclaimed by another member in the DB2 pureScale instance before its planned release. The member that reclaimed the page required exclusive access to the space map page.

Table 2252. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE

Usage

This value is only reported for object-relative table spaces, that is table spaces that have been enabled for reclaimable storage. Use the **reclaimable_space_enabled** monitor element to determine if the table space has been enabled for reclaimable storage.

Since Extent Map Pages (EMPs) are metadata, EMPs are included in the value of this monitor element.

Data space map pages contain user data, therefore they are included in the value of the **page_reclaims_x** monitor element, in addition to being included the value of the **spacemappage_page_reclaims_x** monitor element. Index space map pages do not contain user data, therefore they are included only in the value of the **spacemappage_page_reclaims_x** monitor element.

spacemappage_reclaim_wait_time - Space map page reclaim wait time monitor element

In a DB2 pureScale environment, this element represents the amount of time spent waiting on page locks for pages related to internally maintained object space management where the lock request caused a reclaim from another member. The unit of measurement for time is in milliseconds.

Table 2253. Table Function Monitoring Information

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_METRICS_BY_ROW - Get formatted row-based output for all metrics	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_FORMAT_XML_TIMES_BY_ROW - Get formatted row-based combined hierarchy wait and processing times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.

Table 2253. Table Function Monitoring Information (continued)

Table Function	Monitor Element Collection Level(For more information about monitor element collection levels, see Chapter 8, "Monitor element collection levels," on page 569.)
MON_FORMAT_XML_WAIT _TIMES_BY_ROW - Get formatted row-based output for wait times	Not applicable; reports whichever elements are contained in the XML document provided as input to the formatting function.
MON_GET_ACTIVITY_DETAILS table function - Get complete activity details (reported in DETAILS XML document)	ACTIVITY METRICS BASE
MON_GET_CONNECTION table function - Get connection metrics	REQUEST METRICS BASE
MON_GET_CONNECTION_DETAILS table function - Get detailed connection metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	REQUEST METRICS BASE
MON_GET_PKG_CACHE_STMT table function - Get SQL statement activity metrics in the package cache	ACTIVITY METRICS BASE
MON_GET_ROUTINE - get aggregated execution metrics for routines table function	Always collected
MON_GET_ROUTINE_DETAILS - get aggregated execution metric details for routines table function	Always collected
MON_GET_SERVICE_SUBCLASS table function - Get service subclass metrics	REQUEST METRICS BASE
MON_GET_SERVICE_SUBCLASS_DETAILS table function - Get detailed service subclass metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK table function - Get unit of work metrics	REQUEST METRICS BASE
MON_GET_UNIT_OF_WORK_DETAILS table function - Get detailed unit of work metrics (reported in DETAILS XML document)	REQUEST METRICS BASE
MON_GET_WORKLOAD table function - Get workload metrics	REQUEST METRICS BASE
MON_GET_WORKLOAD_DETAILS table function - Get detailed workload metrics (reported in DETAILS XML document)	REQUEST METRICS BASE

Table 2254. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Activities	event_activity (reported in the details_xml document)	ACTIVITY METRICS BASE
Activities	event_activitymetrics	ACTIVITY METRICS BASE

Table 2254. Event Monitoring Information (continued)

Event Type	Logical Data Grouping	Monitor Switch
Statistics	event_scstats (reported in the metrics document)	REQUEST METRICS BASE
Statistics	event_wlstats (reported in the metrics document)	REQUEST METRICS BASE
Unit of work	-	Always collected

table_name - Table name monitor element

The name of the table.

Table 2255. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
ADMINTEMPCOLUMNS administrative view and ADMIN_GET_TEMP_COLUMNS table function - Retrieve column information for temporary tables	ACTIVITY METRICS BASE
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

Table 2256. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Lock
Lock	lock_wait	Lock

Table 2257. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Tables	event_table	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Along with **table_schema**, this element can help you determine the source of contention for resources.

At the application-level, application-lock level, and deadlock-monitoring-level, this is the table that the application is waiting to lock, because it is currently locked by another application. For snapshot monitoring, this item is only valid when the “lock” monitor group information is set to ON, and when **lock_object_type** indicates that the application is waiting to obtain a table lock.

For snapshot monitoring at the object-lock level, this item is returned for table-level and row-level locks. The table reported at this level is the table against which this application holds these locks.

For snapshot and event monitoring at the table level, this is the table for which information has been collected. For temporary tables, the format for **table_name** is “TEMP (*n*, *m*)”, where:

- *n* is the table space ID
- *m* is the **table_file_id** element

table_schema - Table schema name monitor element

The schema of the table.

Table 2258. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
ADMIN_GET_INDEX_COMPRESS_INFO table function - returns compressed index information	ACTIVITY METRICS BASE
ADMIN_GET_INDEX_INFO table function - returns index information	ACTIVITY METRICS BASE
ADMIN_GET_TAB_COMPRESS_INFO table function - estimate compression savings	ACTIVITY METRICS BASE
ADMIN_GET_TAB_DICTIONARY_INFO table function - report properties of existing table dictionaries	ACTIVITY METRICS BASE
ADMINTABINFO administrative view and ADMIN_GET_TAB_INFO table function - retrieve table size and state information	ACTIVITY METRICS BASE
ADMINTEMPCOLUMNS administrative view and ADMIN_GET_TEMP_COLUMNS table function - Retrieve column information for temporary tables	ACTIVITY METRICS BASE
ADMINTEMPTABLES administrative view and ADMIN_GET_TEMP_TABLES table function - Retrieve information for temporary tables	ACTIVITY METRICS BASE
MON_FORMAT_LOCK_NAME table function - Format the internal lock name and return details	ACTIVITY METRICS BASE
MON_GET_INDEX table function - Get index metrics	ACTIVITY METRICS BASE
MON_GET_PAGE_ACCESS_INFO table function - Get buffer pool page waiting information	ACTIVITY METRICS BASE
MON_GET_TABLE table function - Get table metrics	ACTIVITY METRICS BASE
MON_GET_TABLE_USAGE_LIST table function - Returns information from a table usage list	ACTIVITY METRICS BASE

Table 2259. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table	table	Basic
Application	appl	Lock
Lock	appl_lock_list	Lock
Lock	lock	Lock
Lock	lock_wait	Lock

Table 2260. Event Monitoring Information

Event Type	Logical Data Grouping	Monitor Switch
Locking	-	Always collected
Tables	event_table	Always collected
Deadlocks ¹	lock	Always collected
Deadlocks ¹	event_dlconn	Always collected
Deadlocks with Details ¹	event_detailed_dlconn	Always collected

- 1 This event monitor has been deprecated. Its use is no longer recommended and might be removed in a future release. Use the CREATE EVENT MONITOR FOR LOCKING statement to monitor lock-related events, such as lock timeouts, lock waits, and deadlocks.

Usage

Along with **table_name**, this element can help you determine the source of contention for resources.

For application-level, application-lock-level, deadlock-monitoring-level, this is the schema of the table that the application is waiting to lock, because it is currently locked by another application. This element is only set if **lock_object_type** indicates that the application is waiting to obtain a table lock. For snapshot monitoring at the application-level and application-lock levels, this item is only valid when the “lock” monitor group information is set to ON.

For snapshot monitoring at the object-lock level, this item is returned for table and row level locks. The table reported at this level is the table against which this application holds these locks.

For snapshot and event monitoring at the table level, this element identifies the schema of the table for which information has been collected. For temporary tables, the format for **table_schema** is “<agent_id><auth_id>”, where:

- *agent_id* is the Application Handle of the application creating the temporary table
- *auth_id* is the authorization ID used by the application to connect to the database

tablespace_min_recovery_time - Minimum recovery time for rollforward monitor element

A timestamp showing the earliest point in time to which a table space can be rolled forward. The timestamp reflects local time.

Table 2261. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_TABLESPACE table function - Get table space metrics	ACTIVITY METRICS BASE

Table 2262. Snapshot Monitoring Information

Snapshot Level	Logical Data Grouping	Monitor Switch
Table Space	tablespace_nodeinfo	Basic

Usage

Displayed only if non zero.

target_cf_gbp_size - Target cluster caching facility group buffer pool size monitor element

During a dynamic resize, this monitor element shows the group buffer pool memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 2263. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

target_cf_lock_size - Target cluster caching facility lock size monitor element

During a dynamic resize, this monitor element shows the global lock memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 2264. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

target_cf_sca_size - Target cluster caching facility shared communications area size monitor element

During a dynamic resize, this monitor element shows the shared communications area memory target value, in pages with a page size of 4 KB. A resize is complete when the target value matches the configured value.

Table 2265. Table Function Monitoring Information

Table Function	Monitor Element Collection Level
MON_GET_CF table function - Get CF metrics	ACTIVITY METRICS BASE

Part 4. Appendixes

Appendix A. Overview of the DB2 technical information

DB2 technical information is available in multiple formats that can be accessed in multiple ways.

DB2 technical information is available through the following tools and methods:

- DB2 Information Center
 - Topics (Task, concept and reference topics)
 - Sample programs
 - Tutorials
- DB2 books
 - PDF files (downloadable)
 - PDF files (from the DB2 PDF DVD)
 - printed books
- Command-line help
 - Command help
 - Message help

Note: The DB2 Information Center topics are updated more frequently than either the PDF or the hardcopy books. To get the most current information, install the documentation updates as they become available, or refer to the DB2 Information Center at ibm.com.

You can access additional DB2 technical information such as technotes, white papers, and IBM Redbooks® publications online at ibm.com. Access the DB2 Information Management software library site at <http://www.ibm.com/software/data/sw-library/>.

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DB2 technical library in hardcopy or PDF format

The following tables describe the DB2 library available from the IBM Publications Center at www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss. English and translated DB2 Version 10.1 manuals in PDF format can be downloaded from www.ibm.com/support/docview.wss?rs=71&uid=swg27009474.

Although the tables identify books available in print, the books might not be available in your country or region.

The form number increases each time a manual is updated. Ensure that you are reading the most recent version of the manuals, as listed below.

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Table 2266. DB2 technical information

Name	Form Number	Available in print	Last updated
<i>Administrative API Reference</i>	SC27-3864-00	Yes	April, 2012
<i>Administrative Routines and Views</i>	SC27-3865-01	No	January, 2013
<i>Call Level Interface Guide and Reference Volume 1</i>	SC27-3866-01	Yes	January, 2013
<i>Call Level Interface Guide and Reference Volume 2</i>	SC27-3867-01	Yes	January, 2013
<i>Command Reference</i>	SC27-3868-01	Yes	January, 2013
<i>Database Administration Concepts and Configuration Reference</i>	SC27-3871-01	Yes	January, 2013
<i>Data Movement Utilities Guide and Reference</i>	SC27-3869-01	Yes	January, 2013
<i>Database Monitoring Guide and Reference</i>	SC27-3887-01	Yes	January, 2013
<i>Data Recovery and High Availability Guide and Reference</i>	SC27-3870-01	Yes	January, 2013
<i>Database Security Guide</i>	SC27-3872-01	Yes	January, 2013
<i>DB2 Workload Management Guide and Reference</i>	SC27-3891-01	Yes	January, 2013
<i>Developing ADO.NET and OLE DB Applications</i>	SC27-3873-01	Yes	January, 2013
<i>Developing Embedded SQL Applications</i>	SC27-3874-01	Yes	January, 2013
<i>Developing Java Applications</i>	SC27-3875-01	Yes	January, 2013
<i>Developing Perl, PHP, Python, and Ruby on Rails Applications</i>	SC27-3876-00	No	April, 2012
<i>Developing RDF Applications for IBM Data Servers</i>	SC27-4462-00	Yes	January, 2013
<i>Developing User-defined Routines (SQL and External)</i>	SC27-3877-01	Yes	January, 2013
<i>Getting Started with Database Application Development</i>	GI13-2046-01	Yes	January, 2013

Table 2266. DB2 technical information (continued)

Name	Form Number	Available in print	Last updated
<i>Getting Started with DB2 Installation and Administration on Linux and Windows</i>	GI13-2047-00	Yes	April, 2012
<i>Globalization Guide</i>	SC27-3878-00	Yes	April, 2012
<i>Installing DB2 Servers</i>	GC27-3884-01	Yes	January, 2013
<i>Installing IBM Data Server Clients</i>	GC27-3883-00	No	April, 2012
<i>Message Reference Volume 1</i>	SC27-3879-01	No	January, 2013
<i>Message Reference Volume 2</i>	SC27-3880-01	No	January, 2013
<i>Net Search Extender Administration and User's Guide</i>	SC27-3895-01	No	January, 2013
<i>Partitioning and Clustering Guide</i>	SC27-3882-01	Yes	January, 2013
<i>Preparation Guide for DB2 10.1 Fundamentals Exam 610</i>	SC27-4540-00	No	January, 2013
<i>Preparation Guide for DB2 10.1 DBA for Linux, UNIX, and Windows Exam 611</i>	SC27-4541-00	No	January, 2013
<i>pureXML Guide</i>	SC27-3892-01	Yes	January, 2013
<i>Spatial Extender User's Guide and Reference</i>	SC27-3894-00	No	April, 2012
<i>SQL Procedural Languages: Application Enablement and Support</i>	SC27-3896-01	Yes	January, 2013
<i>SQL Reference Volume 1</i>	SC27-3885-01	Yes	January, 2013
<i>SQL Reference Volume 2</i>	SC27-3886-01	Yes	January, 2013
<i>Text Search Guide</i>	SC27-3888-01	Yes	January, 2013
<i>Troubleshooting and Tuning Database Performance</i>	SC27-3889-01	Yes	January, 2013
<i>Upgrading to DB2 Version 10.1</i>	SC27-3881-01	Yes	January, 2013
<i>What's New for DB2 Version 10.1</i>	SC27-3890-01	Yes	January, 2013
<i>XQuery Reference</i>	SC27-3893-01	No	January, 2013

Table 2267. DB2 Connect-specific technical information

Name	Form Number	Available in print	Last updated
<i>DB2 Connect Installing and Configuring DB2 Connect Personal Edition</i>	SC27-3861-00	Yes	April, 2012

Table 2267. DB2 Connect-specific technical information (continued)

Name	Form Number	Available in print	Last updated
DB2 Connect Installing and Configuring DB2 Connect Servers	SC27-3862-01	Yes	January, 2013
DB2 Connect User's Guide	SC27-3863-01	Yes	January, 2013

Displaying SQL state help from the command line processor

DB2 products return an SQLSTATE value for conditions that can be the result of an SQL statement. SQLSTATE help explains the meanings of SQL states and SQL state class codes.

Procedure

To start SQL state help, open the command line processor and enter:

```
? sqlstate or ? class code
```

where *sqlstate* represents a valid five-digit SQL state and *class code* represents the first two digits of the SQL state.

For example, ? 08003 displays help for the 08003 SQL state, and ? 08 displays help for the 08 class code.

Accessing different versions of the DB2 Information Center

Documentation for other versions of DB2 products is found in separate information centers on ibm.com[®].

About this task

For DB2 Version 10.1 topics, the *DB2 Information Center* URL is <http://publib.boulder.ibm.com/infocenter/db2luw/v10r1>.

For DB2 Version 9.8 topics, the *DB2 Information Center* URL is <http://publib.boulder.ibm.com/infocenter/db2luw/v9r8/>.

For DB2 Version 9.7 topics, the *DB2 Information Center* URL is <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/>.

For DB2 Version 9.5 topics, the *DB2 Information Center* URL is <http://publib.boulder.ibm.com/infocenter/db2luw/v9r5/>.

For DB2 Version 9.1 topics, the *DB2 Information Center* URL is <http://publib.boulder.ibm.com/infocenter/db2luw/v9/>.

For DB2 Version 8 topics, go to the *DB2 Information Center* URL at: <http://publib.boulder.ibm.com/infocenter/db2luw/v8/>.

Updating the DB2 Information Center installed on your computer or intranet server

A locally installed DB2 Information Center must be updated periodically.

Before you begin

A DB2 Version 10.1 Information Center must already be installed. For details, see the “Installing the DB2 Information Center using the DB2 Setup wizard” topic in *Installing DB2 Servers*. All prerequisites and restrictions that applied to installing the Information Center also apply to updating the Information Center.

About this task

An existing DB2 Information Center can be updated automatically or manually:

- Automatic updates update existing Information Center features and languages. One benefit of automatic updates is that the Information Center is unavailable for a shorter time compared to during a manual update. In addition, automatic updates can be set to run as part of other batch jobs that run periodically.
- Manual updates can be used to update existing Information Center features and languages. Automatic updates reduce the downtime during the update process, however you must use the manual process when you want to add features or languages. For example, a local Information Center was originally installed with both English and French languages, and now you want to also install the German language; a manual update will install German, as well as, update the existing Information Center features and languages. However, a manual update requires you to manually stop, update, and restart the Information Center. The Information Center is unavailable during the entire update process. In the automatic update process the Information Center incurs an outage to restart the Information Center after the update only.

This topic details the process for automatic updates. For manual update instructions, see the “Manually updating the DB2 Information Center installed on your computer or intranet server” topic.

Procedure

To automatically update the DB2 Information Center installed on your computer or intranet server:

1. On Linux operating systems,
 - a. Navigate to the path where the Information Center is installed. By default, the DB2 Information Center is installed in the `/opt/ibm/db2ic/V10.1` directory.
 - b. Navigate from the installation directory to the `doc/bin` directory.
 - c. Run the `update-ic` script:

```
update-ic
```
2. On Windows operating systems,
 - a. Open a command window.
 - b. Navigate to the path where the Information Center is installed. By default, the DB2 Information Center is installed in the `<Program Files>\IBM\DB2 Information Center\Version 10.1` directory, where `<Program Files>` represents the location of the Program Files directory.
 - c. Navigate from the installation directory to the `doc\bin` directory.
 - d. Run the `update-ic.bat` file:

```
update-ic.bat
```

Results

The DB2 Information Center restarts automatically. If updates were available, the Information Center displays the new and updated topics. If Information Center updates were not available, a message is added to the log. The log file is located in `doc\eclipse\configuration` directory. The log file name is a randomly generated number. For example, `1239053440785.log`.

Manually updating the DB2 Information Center installed on your computer or intranet server

If you have installed the DB2 Information Center locally, you can obtain and install documentation updates from IBM.

About this task

Updating your locally installed *DB2 Information Center* manually requires that you:

1. Stop the *DB2 Information Center* on your computer, and restart the Information Center in stand-alone mode. Running the Information Center in stand-alone mode prevents other users on your network from accessing the Information Center, and allows you to apply updates. The Workstation version of the DB2 Information Center always runs in stand-alone mode. .
2. Use the Update feature to see what updates are available. If there are updates that you must install, you can use the Update feature to obtain and install them

Note: If your environment requires installing the *DB2 Information Center* updates on a machine that is not connected to the internet, mirror the update site to a local file system by using a machine that is connected to the internet and has the *DB2 Information Center* installed. If many users on your network will be installing the documentation updates, you can reduce the time required for individuals to perform the updates by also mirroring the update site locally and creating a proxy for the update site.

If update packages are available, use the Update feature to get the packages. However, the Update feature is only available in stand-alone mode.

3. Stop the stand-alone Information Center, and restart the *DB2 Information Center* on your computer.

Note: On Windows 2008, Windows Vista (and higher), the commands listed later in this section must be run as an administrator. To open a command prompt or graphical tool with full administrator privileges, right-click the shortcut and then select **Run as administrator**.

Procedure

To update the *DB2 Information Center* installed on your computer or intranet server:

1. Stop the *DB2 Information Center*.
 - On Windows, click **Start > Control Panel > Administrative Tools > Services**. Then right-click **DB2 Information Center** service and select **Stop**.
 - On Linux, enter the following command:

```
/etc/init.d/db2icdv10 stop
```
2. Start the Information Center in stand-alone mode.
 - On Windows:
 - a. Open a command window.

- b. Navigate to the path where the Information Center is installed. By default, the *DB2 Information Center* is installed in the *Program_Files\IBM\DB2 Information Center\Version 10.1* directory, where *Program_Files* represents the location of the Program Files directory.
- c. Navigate from the installation directory to the `doc\bin` directory.
- d. Run the `help_start.bat` file:


```
help_start.bat
```
- On Linux:
 - a. Navigate to the path where the Information Center is installed. By default, the *DB2 Information Center* is installed in the `/opt/ibm/db2ic/V10.1` directory.
 - b. Navigate from the installation directory to the `doc/bin` directory.
 - c. Run the `help_start` script:


```
help_start
```

The systems default Web browser opens to display the stand-alone Information Center.

3. Click the **Update** button (🔄). (JavaScript must be enabled in your browser.) On the right panel of the Information Center, click **Find Updates**. A list of updates for existing documentation displays.
4. To initiate the installation process, check that the selections you want to install, then click **Install Updates**.
5. After the installation process has completed, click **Finish**.
6. Stop the stand-alone Information Center:
 - On Windows, navigate to the `doc\bin` directory within the installation directory, and run the `help_end.bat` file:


```
help_end.bat
```

Note: The `help_end` batch file contains the commands required to safely stop the processes that were started with the `help_start` batch file. Do not use `Ctrl-C` or any other method to stop `help_start.bat`.
 - On Linux, navigate to the `doc/bin` directory within the installation directory, and run the `help_end` script:


```
help_end
```

Note: The `help_end` script contains the commands required to safely stop the processes that were started with the `help_start` script. Do not use any other method to stop the `help_start` script.
7. Restart the *DB2 Information Center*.
 - On Windows, click **Start > Control Panel > Administrative Tools > Services**. Then right-click **DB2 Information Center** service and select **Start**.
 - On Linux, enter the following command:


```
/etc/init.d/db2icdv10 start
```

Results

The updated *DB2 Information Center* displays the new and updated topics.

DB2 tutorials

The DB2 tutorials help you learn about various aspects of DB2 database products. Lessons provide step-by-step instructions.

Before you begin

You can view the XHTML version of the tutorial from the Information Center at <http://publib.boulder.ibm.com/infocenter/db2luw/v10r1/>.

Some lessons use sample data or code. See the tutorial for a description of any prerequisites for its specific tasks.

DB2 tutorials

To view the tutorial, click the title.

"pureXML" in *pureXML Guide*

Set up a DB2 database to store XML data and to perform basic operations with the native XML data store.

DB2 troubleshooting information

A wide variety of troubleshooting and problem determination information is available to assist you in using DB2 database products.

DB2 documentation

Troubleshooting information can be found in the *Troubleshooting and Tuning Database Performance* or the Database fundamentals section of the *DB2 Information Center*, which contains:

- Information about how to isolate and identify problems with DB2 diagnostic tools and utilities.
- Solutions to some of the most common problem.
- Advice to help solve other problems you might encounter with your DB2 database products.

IBM Support Portal

See the IBM Support Portal if you are experiencing problems and want help finding possible causes and solutions. The Technical Support site has links to the latest DB2 publications, TechNotes, Authorized Program Analysis Reports (APARs or bug fixes), fix packs, and other resources. You can search through this knowledge base to find possible solutions to your problems.

Access the IBM Support Portal at http://www.ibm.com/support/entry/portal/Overview/Software/Information_Management/DB2_for_Linux,_UNIX_and_Windows

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Printed in USA

SC27-3887-01



Spine information:

IBM DB2 10.1 for Linux, UNIX, and Windows

Database Monitoring Guide and Reference

