

# IBM System z Technology Summit



## *Administering and Optimizing Your DB2 9 & DB2 10 for z/OS Environment with Tools*

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## DB2 10 for z/OS: Out-of-the-Box Savings

### Up to 20% CPU reductions for transactions, queries, and batch

- Out-of-the-box CPU reductions of 5-10% for traditional workloads
- Out-of-the box CPU reductions of up to 20% for new workloads
- Up to additional 10% CPU savings using new functions

### Scales with less complexity and cost

- 5-10x more concurrent users – up to 20,000 per subsystem
- Significant scale-up capabilities in addition to existing scale-out support
- Consolidate to fewer LPARs and subsystems

### Improved operational efficiencies and lower administration cost

- Automatic diagnostics, tuning, and compression

### Even better performance

- Elapsed time improvement for small LOBS and Complex Queries



## DB2 10 for z/OS: Savings and performance

- Up to 40% savings in processing costs
- Up to 6 times the number of SAP users on a single system
- Time Travel temporal capabilities built directly into the database
- Direct Row access accelerates high performance applications



*"We have measured a 38% reduction in CPU for heavy insert workloads in a data sharing environment. That's a significant savings which provides immediate business benefit."*

*Peter Paetsch, BMW Group*

*We expect to reduce our data sharing requirements by 25%, which means less system, storage and resource expenses*

*Banco do Brasil*



**Major  
Insurance  
Company**

*The new temporal functionality in DB2 10 for z/OS will allow us to drastically simplify our data-related queries and reduce our processing cost by having DB2 handle data movement more efficiently than our custom code*

*"As much as 80% of our applications can use this, which will drastically save developer time and even more importantly make applications easier to understand to improve business efficiency and effectiveness"*

**bankdata**

*"In addition to the cost savings, DB2 10 for z/OS offers a far superior data server environment than Oracle"*

*Manuel Gomez Burrierl, CECA (Spanish Bank Federation)*



*As a multi-national corporation, we must adhere to strict local audit requirements. The security and administration capabilities in DB2 10 are a key driver for us to move to this version."*

**UniCredit Group**

## IBM DB2 Tools: Are you ready for DB2 10?

- Exploit DB2 10 performance savings out-of-the-box
- Optimize Performance Across Multi-Platform Applications
- Lower CPU costs while reducing batch windows
- Higher data availability through simplified recovery operations



### All New with DB2 10!

**DB2 Utilities Suite 10** drives down costs with *autonomics*, page sampling and further offloads processing to zIIPs and FlashCopy. Developed in conjunction with DB2 10 to provide maximum data integrity and exploit all new functions out of the box.

**Tivoli OMEGAMON XE for DB2 Performance Expert 5.1** extends its insight into distributed workloads and offers a robust infrastructure to support DB2 10 subsystem consolidation, with lower monitoring overhead. The recommended performance monitor of DB2 10!

**DB2 Administration Tool/Object Compare 10.1** extends the value of DB2 10 with new capabilities that allow DBAs to quickly exploit DB2 10 features like schema evolution. Reduces the overhead of many routine tasks.

**QMF 10** delivers built-in visualizations and reports that dramatically extend the value to end users. A new metadata layer simplifies the process to understand and create reports.

**DB2 Sort 1.1** lowers the cost of DB2 Utility sort processing by exploiting advanced features of System z and z/OS while optimizing overall system efficiency. Significantly reduces batch windows.

**DB2 High Performance Unload 4.1** reduces the cost of extracting DB2 10 data with support for TCP/IP Pipes and the new internal format as well as a new native XML data unload capability.

## Roadmap to Exploit DB2 10 for z/OS

*Accelerate your ability to leverage compelling DB2 10 features*

Administer DB2 Performance Savings

Optimize Dynamic Infrastructure Performance

Drive DB2 Efficiency and Productivity

Recover DB2 Advanced Technology

*Accelerate Time to Value*



## Administer DB2 10 Performance Savings

### DB2 Administration Tool 10.1 Exploitation

- **Drive immediate DB2 10 out-of-the-box Performance Savings**
- **Exploit DBA-managed Performance Improvements**
  - Include additional Columns in Indexes to Exploit Index Only Access
  - Convert LOBs to in-line to boost performance
- **Extend Administration Capabilities**
  - Manage new Security models
  - Reduce Schema change overhead
  - Recover from Access Path regressions
  - Manage Autonomic Statistics collection
- **Time Travel with Temporal Data – “as of”**
  - Record changes in history – System Time
  - Define, update and query events in past or future – Business Time
  - Browse Temporal Data “as of” a point in time with DB2 Table Editor 4.3

# DB2 Admin Tool 10.1 Include Index non-key Column

```

ADB21XAA          DSNAlter Index - Add Columns          Row 1 to 12 of 12
Command ==> _          Scroll ==> CSR

Line commands:  A - Add as ascending      D - Add as descending
                R - Add as random        I - Add as include
ALTER INDEX "J148286"."ADB_PROP_#_3I4"
ADD COLUMN ( ... )

Sel Column Name      Col Type Length Null ColSeq Ord
*                   * * * * * * *
----->-----
LOG_ID               INTEGER          N          1 A
ID                   INTEGER          N          2
LOG_TIMESTAMP        TIMESTMP         N
LOG_ACTION           INTEGER          N
TIMESTAMP            TIMESTMP         N
DB2SYS               VARCHAR          N
TYPE                 VARCHAR          N
COLLECTION           VARCHAR          N
PROPERTY             VARCHAR          N
VALUE                VARCHAR          Y
CCC                  CLOB            Y
DB2_GENERATED_ROWID ROWID            N
***** END OF DB2 DATA *****

```

Easily include  
columns in  
primary indexes



## Inline LOBs with DB2 Admin Tool 10.1

```

ADB21TAB ----- DSNAlter Table ----- 10:22
Command ==>

ALTER TABLE
Table schema . . . J148286 >
Table name . . . TIMESTZ

ADD
Column name . . . NEWCOL1 > (? to look up)
Column type . . . CLOB (Built-in only)
Data length . . . 10000 (Built-in only)
Inline length . 1000 (0-32680 BLOB or CLOB, 0-16340 DBCLOB)
Precision . . . (used only w/FLOAT and DECIMAL)
Scale . . . . . (used only w/DECIMAL and TIMESTAMP)
Type schema . . . > (User-defined only)
Type name . . . > (User-defined only)
WITH TIME ZONE . (Yes/No - for TIMESTAMP only)

Allow nulls . . . (Yes or blank-nullable, No-NOT NULL)
FOR ? DATA . . . (B-Bit, S-SBCS, M-Mixed, blank-N/A)
WITH DEFAULT . . (Yes, No, L (SECLABEL) or enter value below)
Default value . . >
GENERATED . . . (A-ALWAYS, D-DEFAULT,

```

More: +

**Specify length of inline portion of LOB**

# Fine Grain Security with DB2 Admin Tool 10.1

```
ADBP6CPM ----- DSNAl Create Row Permission ----- 13:49
Command ==>
```

```
Commands: EDIT COPY CREATE
```

```
CREATE PERMISSION
```

```
Schema . . . . . J148286 > (default is J148286)
```

```
Name . . . . . T14676_PERMISSI > (? to look up)
```

```
ON (Table)
```

```
Schema . . . . . J148286 > (default is J148286)
```

```
Name . . . . . T14676 > (? to look up)
```

```
AS (Correlation)
```

```
Name . . . . . - >
```

```
FOR ROWS WHERE Search condition: (first 6 lines displayed, use EDIT to modify)
```

```
C1 = 1
```

```
ADBP6CCM ----- DSNAl Create Column Mask ----- 13:50
Command ==>
```

```
Commands: EDIT COPY CREATE
```

```
ENFORCED FOR ALL AC
```

```
ENABLE/DISABLE
```

```
Initial state . . . E
```

```
CREATE MASK
```

```
Schema . . . . . J148286 > (default is J148286)
```

```
Name . . . . . LI827MK1 > (? to look up)
```

```
ON (Table)
```

```
Schema . . . . . J148286 > (default is J148286)
```

```
Name . . . . . LI827TB1 > (? to look up)
```

```
AS (Correlation)
```

```
Name . . . . . - >
```

```
FOR COLUMN
```

```
Name . . . . . C1 (? to look up)
```

```
RETURN (Expression): (first 5 lines displayed, use EDIT to modify)
```

```
CASE
```

```
WHEN (SESSION_USER = 'PAUL') THEN
```

```
J148286.LI827TB1.C1
```

```
ELSE
```

```
J148286.LI827TB1.C1 - 10
```

```
ENABLE/DISABLE
```

```
Initial state . . ENABLE (Enable/Disable)
```

## Time Travel “as of” with DB2 Table Editor 4.3

```
ETI$HIST V4R3 ----- History View ----- 2010/11/19 11:55:23
Option ==> ----- Scroll ==> CSR
-----
Creator ==> PDDAB >
Table ==> POLICY_INFO_STIME >
-----
Date Changed          Data
2010-08-11-10.40.22.4288759070  A457802
2010-08-11-10.40.15.5550727820  A456802
2010-07-05-11.38.59.7969314680  A456802
2010-07-05-11.38.48.9224441870  A45680
2010-06-19-13.07.43.5821303760  A456
***** Bottom of Data *****

Valid Commands: CANCEL, END/PF3
```

**Historical view of data changes**

# Optimize Dynamic Infrastructure Performance

## OMEGAMON XE for DB2 Performance Expert 5.1 Exploitation

### Extended Insight

- Surface DB2 for z/OS end-to-end response time metrics
  - Visibility to **all** the components that make up end-user response time
  - Facilitates platform-agnostic identification of response time bottlenecks
  - Enables near-instantaneous response to and prevention of application slowdowns
- Leverages Tivoli Enterprise Portal GUI
- Support DB2 9 & 10

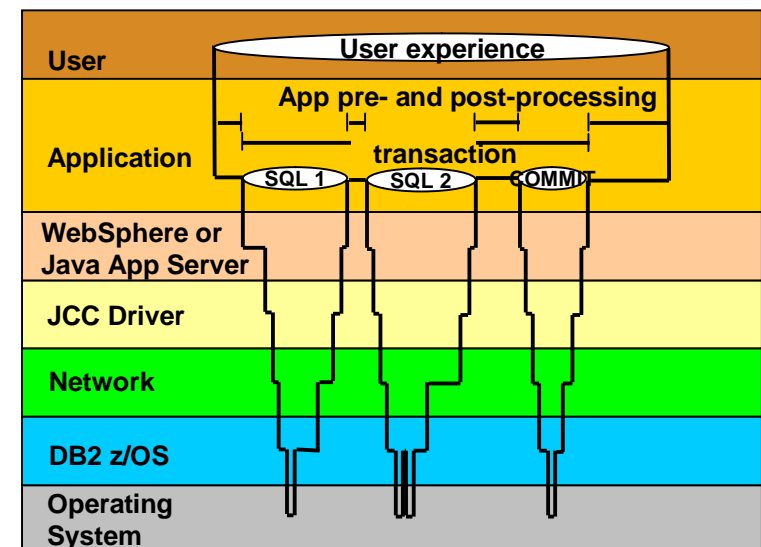
### Summary SQL Reporting

### Manage thousands of Threads

### Support new DB2 10 Monitoring Data

### Lower Monitoring Overhead

### 25% zIIP offload of Near Term History \*



# OMEGAMON DB2 PE 5.1 Extended Insight

## Zoom into selected workload and see the TOP SQL list

**Optim Performance Manager** | TSCHAFFL | Log out | About | ?

Task Manager | Manage Database Connections | Welcome - My Optim Central

Welcome - My Optim Central | Manage Database Connections | Health Summary | Workload | System | Overview | **Extended Insight Dashboard**

Extended Insight Analysis Dashboard: OMP1D911

Back

Locate the source of performance problems, determine how those problems affect different parts of the workload, and analyze the workload to find the source of the problem.

Response Time Details: 9.152.205.30

Graph | Grid

Selected layer: Average End-to-End Response Time | Show Maximum

Graph showing Average End-to-End Response Time (sec) over time (03/19 12:00:00 to 03/19 14:30:00).

**SQL Statements** | Clients

Show highest 10 by Average Data Server Time (sec)

Statement Text	Statement Executions	Average Data Server Time (sec)
SELECT 'PVT_40K' AS WKLID, '...	1	0.504
SELECT 'PVT_40K' AS WKLID, '...	1	0.474
SELECT 'PVT_40K' AS WKLID, '...	1	0.518
SELECT 'PVT_40K' AS WKLID, '...	1	1.393
N/P	1	1.023

Display this list by the selected graph layer

**Detail Area for Average End-to-End Response Time**

**End-to-End Response Time**

Overall average response time per transaction:	0.075 sec
Maximum response time:	15.282 sec
Maximum Time of running transactions	10.688 sec
Number of transactions:	61,245
Statements:	65,344

**Time Distribution (%)**

Client time	6.67%
Network time	32.00%
Data server time	61.33%

**Transaction Throughput**

Transaction throughput graph showing /min over time (03/19 12:00:00 to 03/19 13:56:40).

**Statement Throughput**

Statement throughput graph showing /min over time (03/19 12:00:00 to 03/19 14:11:21).

**Top SQL statements executed by Java or CLI applications like SAP, Cognos, DataStage or WebSphere**

- Zoom in on a selected SQL

**Detailed End-to-End Response Time**

# OMEGAMON DB2 PE 5.1 Extended Insight Select Static or Dynamic SQL and zoom into SQL details

Extended Insight Analysis Dashboard: OMP1D911

Back

Locate the source of performance problems, determine how those problems affect different parts of the workload, and analyze the performance of individual SQL statements, clients, and partitions.  
Response Time Details: 9.152.205.30

Graph Grid

Selected layer: No layer selected Show Maximum

SQL Statements Clients

Show highest 10 by Average Data Server Time (sec)

Statement Text	Statement Executions	Average Data Server Time (sec)
SELECT 'PVT_40K' AS WKLD, '...	1	0.504
...	1	0.474
...	1	0.518
...	1	1.393
N/P	1	1.023

Display this list by the selected graph layer

Statement information

```
SELECT 'PVT_40K' AS WKLD, '100319#13:45:21:250' AS TIME, '1' AS STMTNR, '40000' AS LENGTH, '0' AS LB, '0' AS TB, 'false' AS TABNEWLINE, COUNT(*) AS COUNT FROM LGQ#0002 WHERE A=0001000 OR A=0001000 OR...
```

Statement Performance

- Number of Executions: 1
- Average end-to-end elapsed time: 0
- Average client time: 0
- Average driver time: 088 sec
- Average data server time: 03 sec

Open Optim Query Tuner to analyze this SQL statement.

Statement Time Distribution (%)

Statement Outcome

- Failure rate (with negative SQL code): 0 %
- First SQL code: N/P

Package name: N/P  
Section number: 0  
Package name: N/P  
Section number: 0  
Package Consistency token: N/P  
Package Version: N/P  
Collection: N/P

Java class	Java package	Method	Source line number	Build version	Source expression	Method Signature	Application Name	Metadata File

Transfer Volume

- Average bytes transferred locally: 0 bytes
- Average bytes transferred remotely: 41.369 KB
- Average rows returned: 0
- Average number of round trips: 1

Java class, package and method shown if pureQuery Is installed.

Tune SQL with Optim Query Workload Tuner

SQL Statement Text



# Optim Query Workload Tuner Streamlined Analysis

## Define or select a workload

## Execute Advisors



## Drill Down into advice

Recommendations - 11

Advisor	Number	Priority	Description
Recommendations			
Statistics Advisor	1	HIGH	Repair statistics problems for this query. Gather missing statistics. Recollect conflicting st...
Query Advisor	2	MEDIUM	Provide a join predicate based on the referential constraint between tables DSN8910.EM...
Query Advisor	3	MEDIUM	Provide a predicate on column WORKDEPT.
Access Path Advisor	4	LOW	Avoid reading all index keys on an index scan (QBLOCKNO = 1, PLANNO = 1).
Index Advisor	5	LOW	Index recommendations found.

## Validate improvement

Name	Summary Status	Owner	Execution Time
WorkloadWithTypicalStats	ANALYZING	B3OSC12	CPU time: 97.32 (second...
WorkloadTunedWithStatsAdvisor	ANALYZING	B3OSC12	CPU time: 53.19 (second...
WorkloadTunedWithIndexAdvisor	ANALYZING	B3OSC07	CPU time: 40.67 (second...
AbsoluteCPUTimeExceptionMonitor	ENABLED/STARTED	SYSADM	N/A
NormalMonitor	ENABLED/STARTED	SYSADM	N/A



# Improve Statistics Quality and Collection



Statements | Recommendation Summary | **Workload Statistics Advisor** | Workload Query Advisor

Existing statistics status - 5 tables need repair out of the 7 tables that were checked

**Repair** Complete

This version of the RUNSTATS command repairs the problems that the Workload Statistics Advisor found. Run this version to conserve time

RUNSTATS Control Statements

```

RUNSTATS TABLESPACE DB4LINE1.TSLINE1
TABLE(SYSADM.LINEITEM) SAMPLE 5
COLGROUP(L_QUANTITY) FREQVAL COUNT 10
COLGROUP(L_DISCOUNT) FREQVAL COUNT 10
COLGROUP(L_DISCOUNT) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_SUPPKEY) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_SHIPDATE) FREQVAL COUNT 10
COLGROUP(L_SHIPDATE) HISTOGRAM NUMQUANTILES 20
COLGROUP(L_RECEIPTDATE) FREQVAL COUNT 10
COLGROUP(L_RETURNFLAG) FREQVAL COUNT 10
COLGROUP(L_TAX) FREQVAL COUNT 10
COLGROUP(L_RECEIPTDATE,L_RETURNFLAG,L_SHIPDATE,L_SHIPMODE)
COLGROUP(L_SHIPMODE) FREQVAL COUNT 10
COLGROUP(L_ORDERKEY,L_QUANTITY)
    
```

Generates RUNSTATS control statements

- Provides advice on
  - Missing statistics
  - Conflicting statistics
  - Out-of-date statistics

Statistics Advisor report

Interesting columns:

S\_SUPPKEY  
 Cardinality: 10000.0  
 Uniform statistics collection time: 2008-09-29 10:06:48.376482  
 Uniform statistics status: OK  
 Frequency statistics collection time: 2008-09-29 10:06:48.376482  
 Frequency statistics status: OK  
 Histogram statistics collection time: null  
 Histogram statistics status: **missing**  
 Possibly point skewed: No  
 Possibly range skewed: No

S\_NATIONKEY  
 Cardinality: 25.0  
 Uniform statistics collection time: 2008-09-29 16:06:48.376482  
 Uniform statistics status: OK  
 Frequency statistics collection time: null  
 Frequency statistics status: **missing**  
 Histogram statistics collection time: null

Indicates conflicting and missing statistics

## Results

- Accurate estimated costs
- Better query performance
- Less CPU consumption
- Improved maintenance window throughput

Conflicts detail

TABLE SYSADM.LINEITEM  
 One of the frequency records (-1.0) of the L\_ORDERKEY column group is greater than the average frequency, or 1 divided by the tolerance.  
 Tolerance: 0.0010

The maximum frequency of the column group or column (L\_ORDERKEY), (0.0), is less than the average frequency, or 1 divided by the tolerance, unless only least-frequently occurring values are being collected.  
 Tolerance: 0.0010

Conflicting statistics explanation

*“Half of access path PMRs could be resolved by statistics advisor before calling IBM support.” – IBM Support*

# Indexing Advice to Improve Query Efficiency

- Improve query efficiency
  - Indexing foreign keys in queries that do not have indexes defined
  - Identifying index filtering and screening
  - Support for index only access
  - Indexing to avoid sorts
- Simplify use
  - Consolidate indexes and provide a single recommendation
  - Enables what-if analysis
  - Provides DDL to create indexes
  - Run immediately or save
- Test before deployment
  - Utilize virtual index capabilities built into the DB2 engine

The screenshot displays the IBM DB2 software interface. A yellow starburst with the word "New!" is positioned in the upper right. A table titled "New Index Columns" and "Old Index Columns" is visible, with columns for "Session ID(ASC)" and "Table ID(ASC)".

A dialog box titled "DDL for Selected Indexes" is open, showing SQL DDL for creating and altering indexes. A callout bubble points to the "ALTER INDEX" statement with the text "Modify existing indexes". The DDL includes:

```
CREATE INDEX "DB2OE"."DSN_WIA_COLUMNS" ("TABLE_ID" ASC) NOT PADDED FREEPAGE 0 PCTFREE 10;
CREATE INDEX "DB2OE"."ORDER_VIRT_IDX_1285039654881" ON "SYSADM"."ORDER" ("O_SHIPPRIORITY" ASC, "O_TOTALPRICE" ASC, "O_ORDERKEY" ASC, "O_ORDERDATE" ASC) NOT PADDED FREEPAGE 0 PCTFREE 10;
CREATE INDEX "DB2OE"."LINEITEM_VIRT_IDX_1285039654881" ON "SYSADM"."LINEITEM" ("L_LINESTATUS" ASC, "L_COMMENT" ASC, "L_SHIPDATE" ASC, "L_ORDERKEY" ASC, "L_SHIPMODE" ASC, "L_PARTKEY" ASC, "L_COMMITDATE" ASC, "L_RECEIPTDATE" ASC) NOT PADDED FREEPAGE 0 PCTFREE 10;
CREATE INDEX "DB2OE"."LINEITEM_VIRT_IDX_1285039472493" ON "SYSADM"."LINEITEM" ("L_LINESTATUS" ASC, "L_ORDERKEY" ASC, "L_RECEIPTDATE" ASC) NOT PADDED FREEPAGE 0 PCTFREE 10;
ALTER INDEX "SYSADM"."MIS" ADD COLUMN ("PS_AVAILQTY" ASC);
```

Below the DDL dialog, a section titled "Index elimination priority" is shown. A callout bubble points to the "Estimated performance cost" radio button with the text "Index elimination". The "Estimated performance cost" option is selected. Below this, "Index elimination settings" are visible, including fields for "Amount of disk space to recover:" and "Limit for performance cost increase:".

# Drive DB2 10 Efficiency & Productivity

## DB2 Automation Tool 3.1 Exploitation

- Autonomic Statistics
  - Exploit real-time, sampling driven Statistics collection
  - Invoke RUNSTATS with new Profile option
  - Interface with existing Job Schedulers
- FlashCopy Image Copy
  - Reduce Batch-windows
  - Reduce CPU consumption with Storage-based Backups
  - Drive improved Recovery Time Objectives
- Avoid Unnecessary Reorgs
  - Set REORG thresholds based on DB2 10 Best Practices
  - Detect when Indexes are insensitive to Clustering
  - Avoid REORGs for poorly structured Indexes

## Exploit Online Reorgs with DB2 Utilities Enhancement Tool 2.1

- New Utility Syntax Monitor to enforce enterprise Utility standards
- Define policy to cancel Threads immediately before Switch Phase
  - Exploit REORG Force option to eliminate Drain Failures
- No changes required to REORG Jobs

# Drive DB2 9 & 10 Efficiency & Productivity

## DB2 Sort 1.1

- Significant CPU and Elapsed Time reduction in Sort
  - LOAD, REORG, RUNSTATS, REBUILD INDEX, CHECK INDEX, CHECK DATA
  - Presort from DB2 Utilities Enhancement Tool for LOAD REPLACE
- Unique API to allow authorized utilities to invoke the sorting software
- Valuable for customers with large amount of data and aggressive SLA's

## Internal Format for up to 4x Load Performance Improvements

- DB2 UNLOAD & LOAD Utilities
- DB2 High Performance Unload 4.1
- Exploit with DB2 Utilities Enhancement Tool 2.1 Constant & Valuelf Options

## Unload and Load DB2 Data via USS Pipes & TCP/IP

- DB2 UNLOAD & LOAD Utilities
- DB2 High Performance Unload 4.1

## Fast XML Data Unload

- DB2 High Performance Unload 4.1

# Recover DB2 10 Advanced Technology

## DB2 Recovery Expert 2.2

- Exploit FlashCopy Image Copy
  - Take Consistent Online Image Copies in seconds
  - Reduce CPU and Batch-windows
  - Improve Recovery Times
  - Automate Recovery Jobs
  - Native EMC Storage-based copies
  - **Supports DB2 V8, 9 and 10!**
- Exploit RECOVER BACKOUT for faster recoveries
- Undo and Redo Temporal Data

## DB2 Log Analysis Tool 3.2

- Undo and Redo Temporal Data
- Support FlashCopy Image Copy
- Support all new DB2 10 Log changes

## Further Exploit FlashCopy Image Copy

- DB2 Administration Tool 10.1
- DB2 Automation Tool 3.2
- DB2 Change Accumulation Tool 2.1
- DB2 High Performance Unload 4.1

# DB2 Recovery Expert 2.2

## FlashCopy and Snap Image Copies

```

ROCKBACK V2R2 ----- Image Copy Options ----- 2010/11/19 11:58:23
Option ==> █

-----
Creator: PDDUDEA      Name: PAYROLL APPLICATION      SSID: EA1A
Share Option: U      (Upd,View,No)      Description: EMC Snap
-----

Enter the Image Copy options to associate with this Object profile:

Global Image Copy Options
Fast Replication Method ==> D      (Snap/Dfmsdss)
  Update Fast Rep Options ==> N      (Yes/No)
  Sharelevel              ==> C      (Reference/Change)
  Scope                   ==> A      (All/Pending)
  Number of Tasks         ==> 04     (01-99)
Traditional Image Copy options
  All Parts in one Copy   ==> Y      (Yes/No)
  Local Primary           ==> N      (Yes/No/Update)
  Local Backup            ==> N      (Yes/No/Update)
  Recovery Site Primary   ==> N      (Yes/No/Update)
  Recovery Site Backup    ==> N      (Yes/No/Update)
VSAM Image Copy options
  Register VSAM Copy      ==> Y      (Yes/No)
  Number of VSAM Generations ==> 0001 (0000-9999 0 = Keep all gens)

```

# RECOVER BACKOUT with DB2 Recovery Expert 2.2

**Recovery Advisor**

1. Location  
2. Objects  
3. Point in Time  
4. Recovery Plan

**Generate and execute a plan to recover the selected objects.**  
Click Generate to generate one or more recovery plans for the selected objects.  
After generating, you can select a plan to review its details.  
If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.  
Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view

Recovery plans  
Generate...

Plans

- Plan 1: Using RECOVER with BACKOUT (cost = 0.37)
  - Job 1
    - Check Status
    - START DATABASE
    - Check Status
    - RECOVER
      - Table space ICTEST.SEG4K
      - Index PDDUDE.IX4KS
    - CHECK INDEX
    - Check Status
    - START DATABASE
    - Check Status
- Plan 2: Using RECOVER (cost = 0.57)
- Plan 3: Using DSN1COPY and RECOVER LOGONLY (cost = 0.69)
- Plan 4: Using undo SQL (cost = 50.75)
- Plan 5: Using RECOVER to IC and redo SQL (cost = 52.76)
- Plan 6: Using DSN1COPY of IC and redo SQL (cost = 52.85)
- Recovered Objects

Name	Value
Estimated number of cpu milliseconds	37
Estimated number of disk allocations	1
Estimated number of disk page copies	13
Estimated number of tape drive allocations	0
Estimated number of tape page copies	0
Estimated relative cost of the recovery p...	0.37
Log point	0001198632F1
Plan name	Using RECOVER with BACKOUT

Validate Run View JCL...

Back Next Save... Close Help

**Drive RECOVER BACKOUT based on relative cost**

# DB2 Log Analysis Tool 3.2 Redo Temporal Data

```
Menu Utilities Compilers Help
BROWSE PDJOH2.ALA.RUN.SQLOUTR 000 Col 001 080
Command ==> Scroll ==> CSR
***** Top of Data *****
--REDO SQL FOR SUBSYSTEM: DATA
--#00000001 *REDO INSERT* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....
    INSERT INTO
    "PDJOH2"."POLICY_INFO"
    VALUES(
    'A123'
    ,+12000
    , '2010-01-01'
    , '2010-07-01'
    )
--#00000002 *REDO INSERT* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....
    INSERT INTO
    "PDJOH2"."POLICY_INFO"
    VALUES(
    'A123'
    ,+12000
    , '2010-07-01'
    , '2010-12-01'
    );
--#00000003 *REDO UPDATE* URID:0014F9FC7634 DATE/TIME:2010-11-19/13.07.16 ....
```

Redo Business Time



**Jump into DB2 10! The water's fine.**



**DB2 V8**

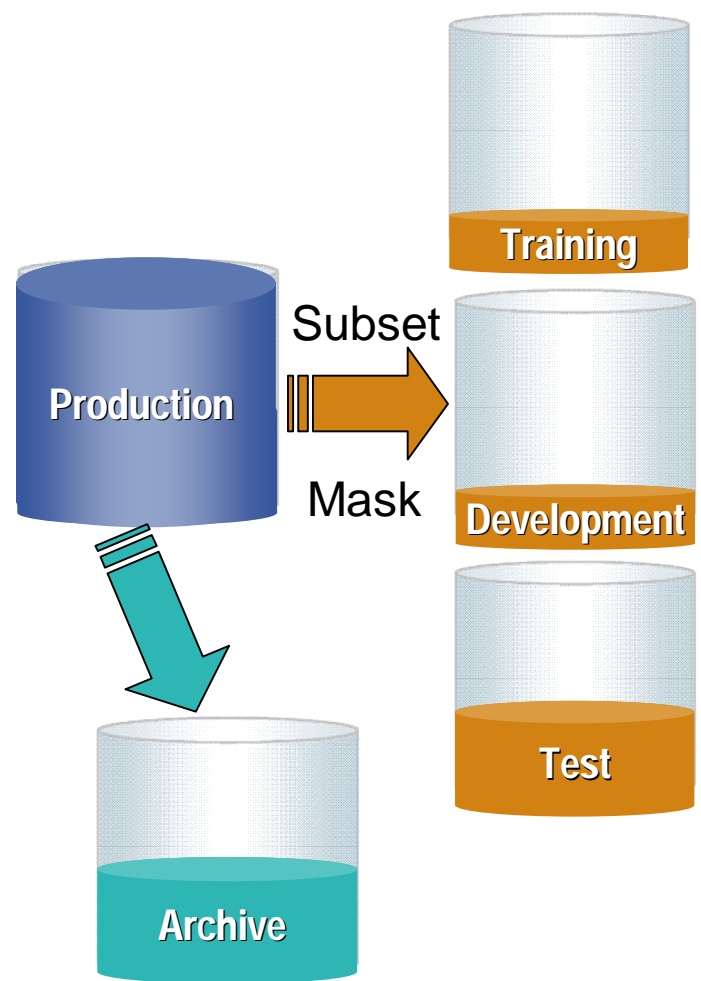
**DB2 9**

**DB2 10**

**Key Questions are WHEN? and HOW?**

# IBM InfoSphere Optim solutions

*Managing data throughout its lifecycle in heterogeneous environments*



## Data Growth Management

### Benefits

- Reduce hardware, storage & maintenance costs
- Streamline application upgrades & improve application performance
- Safely retire legacy & redundant applications while retaining the data

## Test Data Management

### Benefits

- Easily refresh & maintain data in non-production environments
- Deploy new functionality more quickly and with improved quality
- Reduce storage and operational costs

## Data Masking

### Benefits

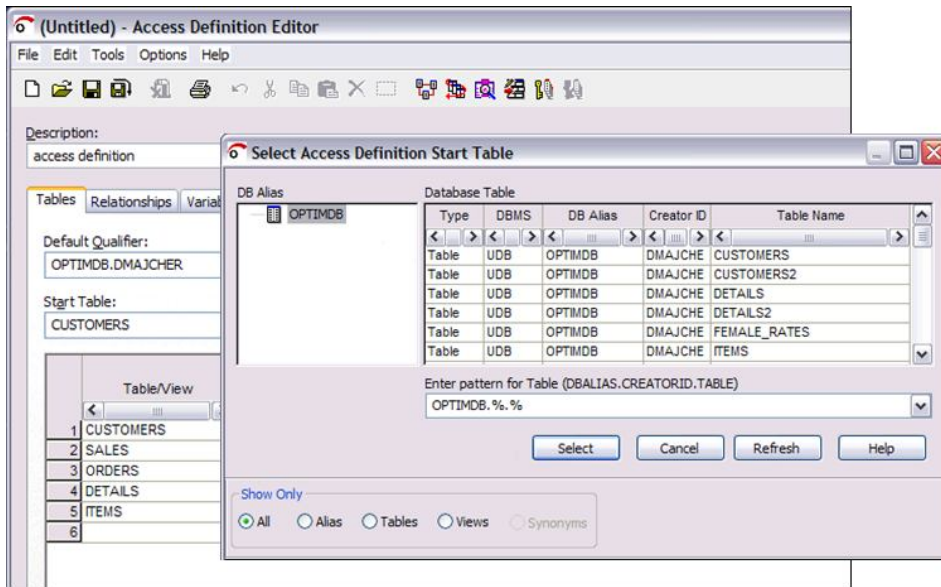
- Protect sensitive information from misuse & fraud
- Prevent data breaches and associated fines
- Achieve better data governance

# IBM InfoSphere Optim Test Data Management Solution



**Test Data Management**

Create “right-size” production-like environments for application testing



## Requirements

- Create referentially intact, “right-sized” test databases
- Automate test result comparisons to identify hidden errors
- Shorten iterative testing cycles and accelerate time to market

## Benefits

- Deploy new functionality more quickly and with improved quality
- Easily refresh & maintain test environments
- Reduce storage and operational costs

# IBM InfoSphere Optim Data Growth Solution



**Data Growth**

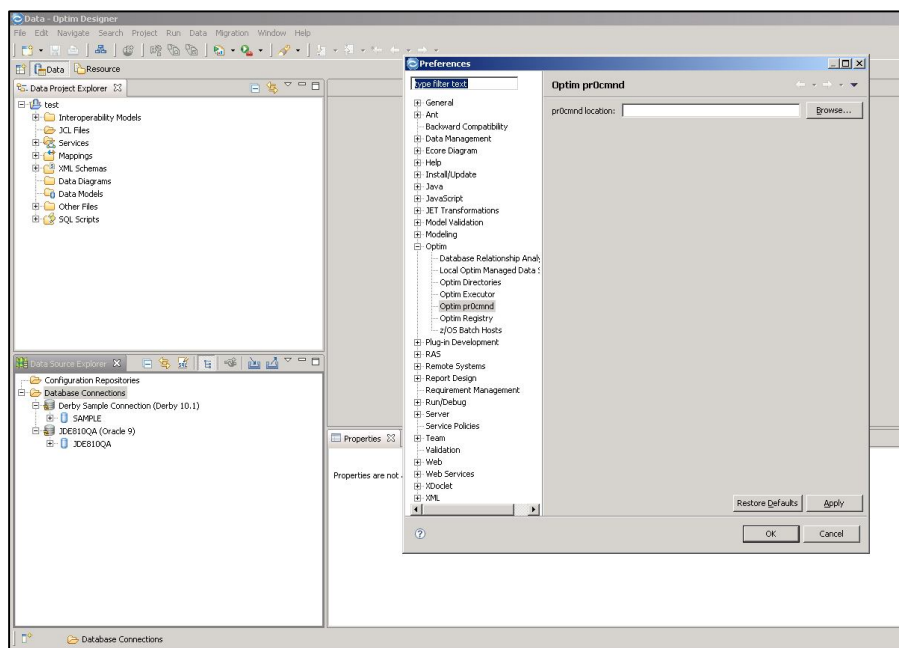
Manage data growth and improve performance by intelligently archiving historical data

## Requirements

- Archive, manage and retain application data according to business policies
- Minimize downtime during application upgrades
- Consolidate application portfolio and retire legacy applications

## Benefits

- Reduce hardware, storage and maintenance costs
- Streamline application upgrades and improve application performance
- Safely retire legacy & redundant applications while retaining the data



# IBM InfoSphere Guardium

## Database Protection and Compliance Made Simple

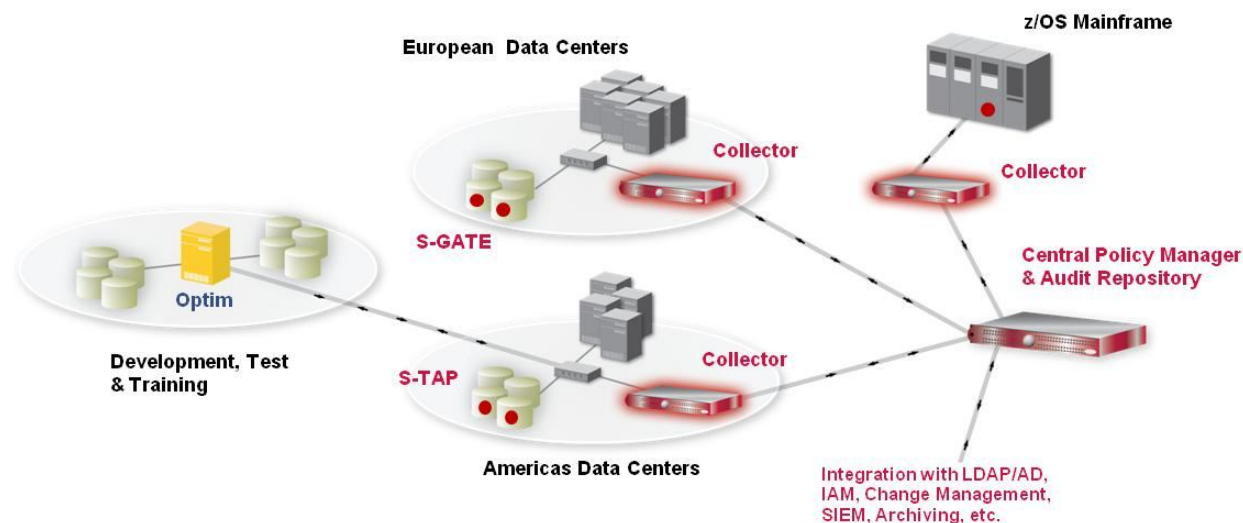
16

### Requirements

- **Maintain a trusted information supply chain by protecting sensitive data from unauthorized access or changes**
  - **In 2010 92% of compromised records came from DB servers**
- **Validate compliance with regulatory mandates**
- **Minimize operational costs**

### Benefits

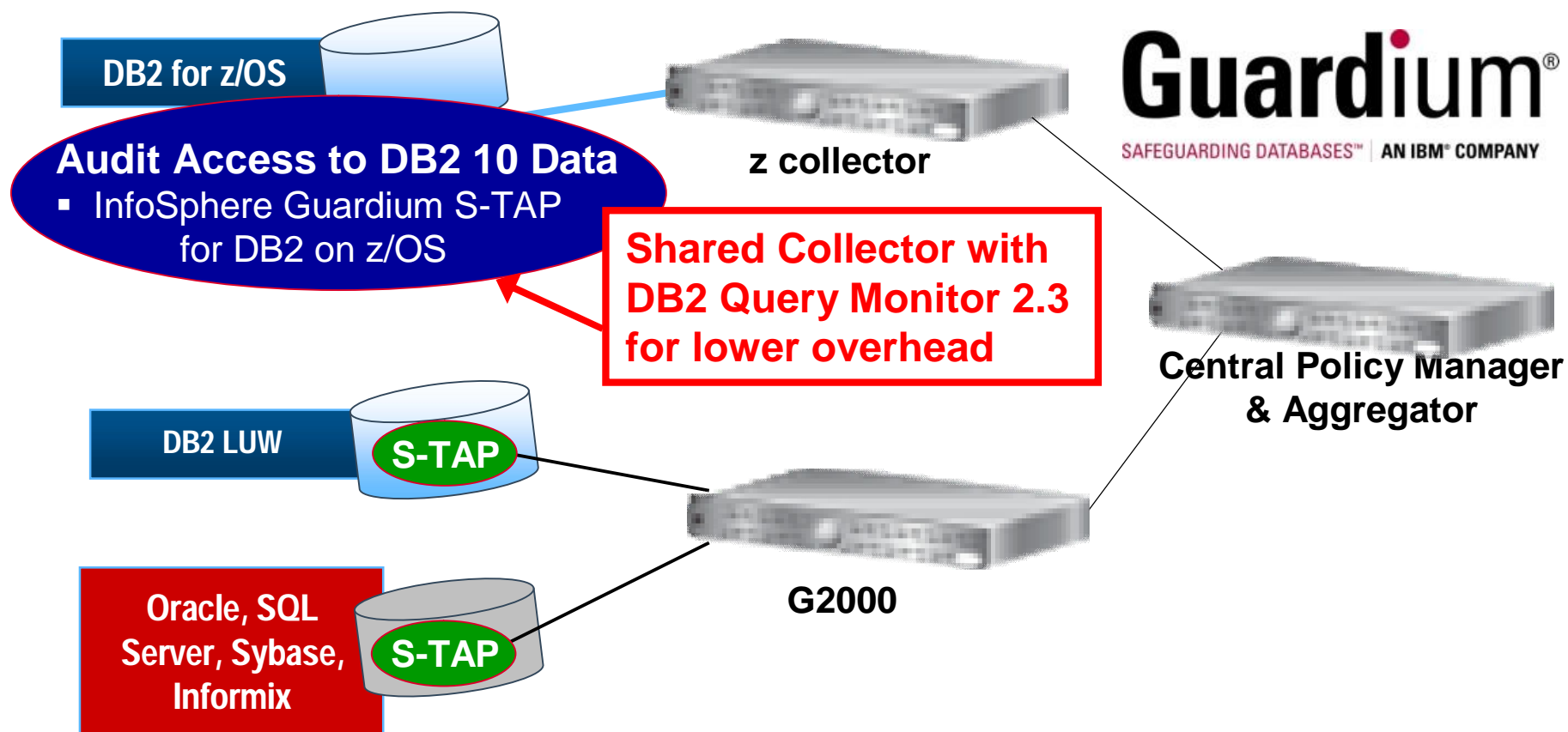
- **Secures high-value databases by continuous monitoring and protecting against threats from legitimate users and potential hackers**
- **Streamlines compliance processes with automated and centralized controls; slashing compliance costs**



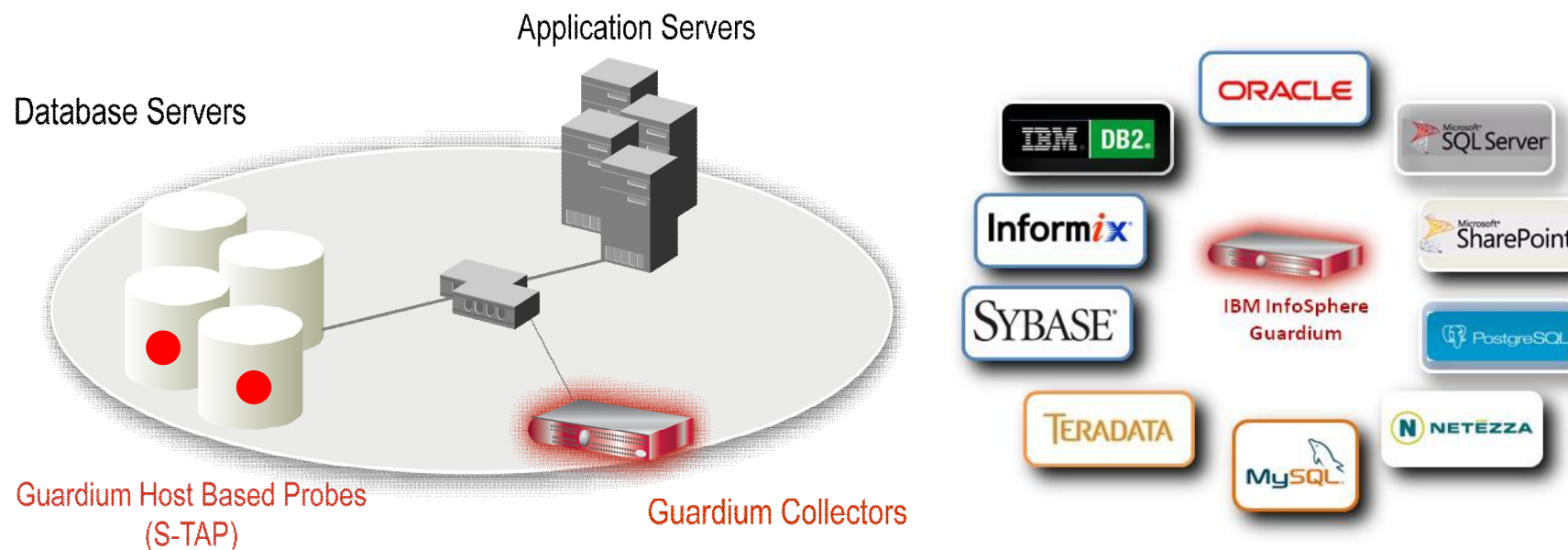
# Safeguard DB2 10 Data

## Encrypt DB2 10 Data

- Data Encryption Tool for DB2



# Guardium Database Activity Monitoring



- Non-invasive architecture
  - Outside database
  - Minimal performance impact
  - No DBMS or application changes
- Cross-DBMS solution
- 100% visibility including local DBA access
- Enforces separation of duties
- Does not rely on DBMS-resident logs that can easily be erased by attackers, rogue insiders
- Granular, real-time policies & auditing
  - *Who, what, when, how*
- Automated compliance reporting, sign-offs & escalations (SOX, PCI, NIST, etc.)

# Accelerate DB2 10 Time to Value

## DB2 Cloning Tool 2.2

- Exploit Storage-based copies to drastically reduce CPU and outages
- Create Subsystem and Object Clones to test DB2 10 with minimal effort
  - Automatically reduce number of Data Sharing Members
  - Convert Data Sharing to non-Data Sharing
  - Create Subsystem Clone from System Level Backup
  - Mask sensitive production data
- Supports native IBM, EMC and Hitachi Storage-based copies

## DB2 Query Monitor 2.3

- Track SQL Performance before and after Migration

## DB2 Path Checker 4.1

- Identify potential Access Path regressions
- Export SQL to Optim Query Workload Tuner or Data Studio for tuning
- Selectively save packages in DB2 9 & 10 (CM8,CM9,NFM) with Plan Mgmt

## DB2 Bind Manager 2.4

- Identify and Free unused Packages
- Reduce Bind impacts



## Accelerate DB2 10 Time to Value

### **Optim Query Workload Tuner 2.2.1**

- Tune applications/queries created against DB2 V8, 9 & 10
- Support of new workload explain format in DB2 10
- Identify Indexes not being used as candidates for elimination
- Provide advice on modifying existing indexes to reduce CPU
- Identify potential Access Path regressions after Migration based on cost
- Support all of the new access types introduced in DB2 10
  - hash access(H), range list access (NR), and in memory access(IN)

### **SQL Performance Analyzer 4.1**

- Support for DB2 10 Explain format
- Support new DB2 10 access types
- New Tabular Report
- Improved ISPF interface
- Initial release of Tools Customizer for z/OS (TCz)

# Exploit DB2 10 for z/OS with IBM DB2 Tools

*Accelerate your ability to leverage compelling DB2 10 features with comprehensive Tools support*

**Data Encryption Tool for IMS and DB2 Databases**  
**DB2 Administration Tool / DB2 Object Compare for z/OS**  
**DB2 Audit Management Expert for z/OS**  
**DB2 Automation Tool for z/OS**  
**DB2 Bind Manager for z/OS**  
**DB2 Change Accumulation Tool for z/OS**  
**DB2 Cloning Tool for z/OS**  
**DB2 High Performance Unload for z/OS**  
**DB2 Log Analysis Tool for z/OS**  
**DB2 Object Restore for z/OS**  
**DB2 Path Checker for z/OS**  
**DB2 Query Management Facility for z/OS**  
**DB2 Query Monitor for z/OS**  
**DB2 Recovery Expert for z/OS**  
**DB2 SQL Performance Analyzer for z/OS**  
**DB2 Table Editor for z/OS**  
**DB2 Utilities Enhancement Tool for z/OS**  
**DB2 Utilities Suite for z/OS**  
**InfoSphere Change Data Capture**  
**InfoSphere Data Event Publisher**  
**InfoSphere Replication Server**  
**Optim Data Growth Solution for z/OS**  
**Optim Development Studio**  
**Optim pureQuery Runtime**  
**Optim Query Workload Tuner**  
**Optim Test Data Management Solution for z/OS**  
**Tivoli OMEGAMON XE for DB2 Performance Expert on z/OS**



# IBM DB2 Tools and DB2 10 for z/OS

***Exploit out-of-the-box Savings***

***Extend Productivity***

***Accelerate Time to Value***



***Are your Tools ready for DB2 10?***



*Thank You!*