



IBM Software Group

Monitoring And Managing Distributed DB2 Workloads Using OMEGAMON XE for DB2 Performance Expert and Performance Monitor

Ed Woods

Consulting IT Specialist

 Tivoli software

A decorative horizontal bar with a red background and various colorful icons and patterns, including a white asterisk, a woman's face, and geometric shapes.

@business on demand.

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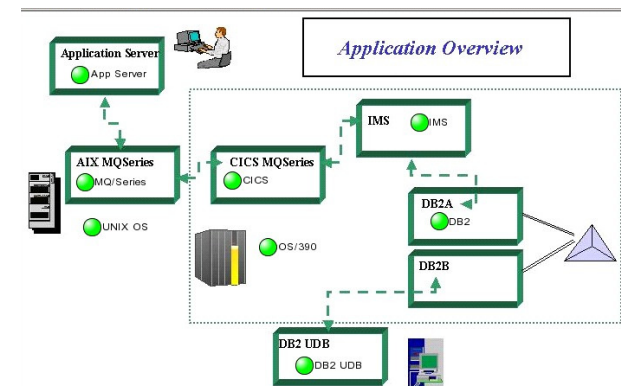
Agenda

- Challenges in performance and availability management of DB2 distributed workloads
- Capabilities of OMEGAMON XE For DB2 PM/PE
- Using Classic 3270 Interface
- OMEGAMON and the Tivoli Enterprise Portal (TEP)
- How the TEP may be used to provide an integrated view of performance
 - ▶ Integration with other OMEGAMON monitoring solutions to provide a more complete monitoring solution



The Challenges Of Performance And Availability Management Of Complex Systems

- Most new applications are composite by design
 - ▶ Applications cross multiple subsystems and platforms
 - ▶ Integration and utilization of multiple core technologies
 - ▶ Pose challenges from a management and monitoring perspective
- Common Technical Challenges
 - ▶ Multiple platforms
 - ▶ Potentially multiple DB systems
 - ▶ Middleware considerations
 - ▶ One or multiple network hops
 - ▶ How best to do alerting, problem isolation, and root cause analysis



Forging An Effective Performance And Availability Strategy

- Monitoring DB2 in depth
 - ▶ OMEGAMON XE For DB2 PM/PE V4.1
 - ▶ Subsystem level distributed performance statistics
 - ▶ Monitor thread activity and detail
 - SQL activity, Elapsed time and CPU time including zIIP usage
 - Distributed thread detail
 - Enclave level information with z/OS Workload Manager (WLM) detail
 - ▶ DB2 Connect gateway monitoring
- Monitoring in breadth
 - ▶ Tivoli Enterprise Portal – Integrated performance and availability
 - ▶ OMEGAMON XE for z/OS V4.1 – Monitor z/OS WLM and enclave activity
 - ▶ OMEGAMON XE for Mainframe Networks V4.1 – Monitor network performance
 - ▶ IT Composite Application Monitoring – Monitor at the application layer
 - ▶ ITM 6.x monitoring – Monitor distributed platforms and DB2 on LUW



OMEGAMON XE For DB2 PM/PE V4.1

Major Features And Components

Real Time Thread Analysis

- ✓ Thread detail & performance
- ✓ Triggers, Procedures, & UDFs

Real Time – DB2 subsystem

- ✓ Virtual & EDM Pool analysis
 - ✓ Performance & snapshot
- ✓ Locking & Logging Analysis
- ✓ Storage Analysis

Application Trace Facility

- ✓ Detailed performance tracing

Choice Of Interfaces

- ✓ (TEP, PE GUI, 3270)

Buffer Pool Analysis (PE only)

DB2 Connect Monitoring

zIIP Engine utilization

Automation capabilities

Locking & Lock Conflicts

DB2Plex Monitoring View

- ✓ CF structure & lock analysis
- ✓ Group object analysis

Object Analysis

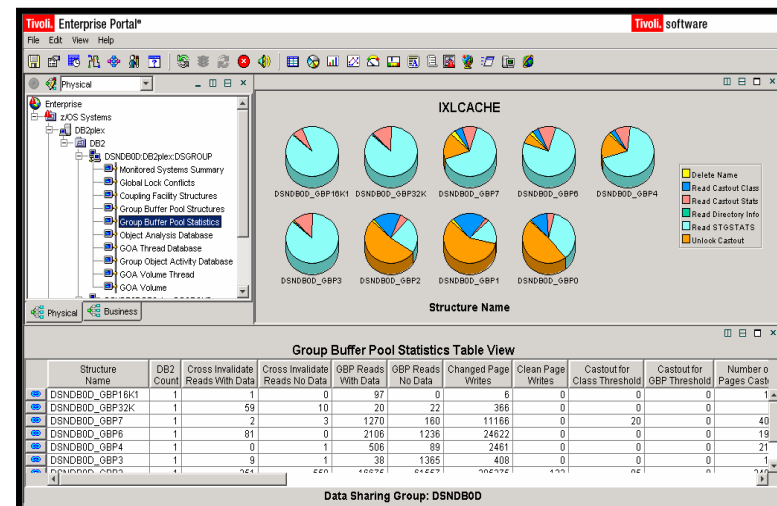
- ✓ I/O & getpage analysis
- ✓ Correlate by object & App

Near-Term Historical

- ✓ Near-term history online

Historical Analysis

- ✓ Batch reporting
- ✓ XE Tivoli Warehouse
- ✓ Snapshot History
- ✓ Performance Warehouse



Monitoring In Depth OMEGAMON XE For DB2 PM/PE – Classic Interface

Thread activity including SQL, elapsed and CPU, zIIP usage, enclave detail

Subsystem level distributed statistics

DB2 connect gateway monitoring

```

_____ ZMENU      VTM      O2      V410./I DSN 03/12/08 10:38:03  2
> Help/News/Index PF1      Exit PF3      PF Keys PF5
> Type a selection letter at the left end of the top line and press ENTER.
=====
>          OMEGAMON II FOR DB2 CLASSIC INTERFACE -- REALTIME MAIN MENU
- S  SUMMARY ..... Summary of DB2 activity
- E  EXCEPTIONS ..... Current or potential system problems
- T  THREAD ACTIVITY ..... Thread activity information
- U  THREAD ACTIVITY ..... Thread activity information by Package
- L  LOCKING CONFLICTS .... Locking conflict information
- R  RESOURCE MANAGERS .... Resource manager, other DB2 subsystem information
- A  APPLICATION TRACE .... Trace and view application activity
- D  DISTRIBUTED DATA ..... Distributed database system information
- O  OBJECT ANALYSIS ..... Object and Volume information
- G  DB2 CONNECT SERVER ... DB2 Connect/Gateways with connection to DB2
- C  MVS CONSOLE ..... MVS console to issue commands and view messages
- B  DB2 CONSOLE ..... DB2 console to issue commands and view messages
- M  MISCELLANEOUS ..... Address space information, OMEGAMON commands, etc.
- P  PROFILE ..... Customize OMEGAMON session and exception settings
- H  HISTORICAL ..... Near-Term History information
- I  IFCID TRACE ..... Start an IFCID Trace
- V  SQL PA REPORTS..... View SQL PA Reports
- Z  OTHER DB2 ..... Redirect monitoring to another DB2
=====
    
```


Near Term History DDF Activity Statistics By Time Interval

```

_____ ZHDFS   VTM   O2   V410./I DSNC 03/12/08 10:41:19  2
> Help PF1   Back PF3   Up PF7   Down PF8   Zoom PF11
> H.A.E
>
> Enter a selection letter on the top line.
>
> A-SUBSYSTEM SUPPORT      B-BIND          C-BUFFER POOL   D-GROUP BP
> *-DISTRIBUTED DATABASE  F-EDM POOL     G-LOG MANAGER   H-OPEN/CLOSE
> I-SQL/RID/PARALLEL/PROC J-LOCK/CLAIM/DRAIN K-GLOBAL LOCK   L-DB2 COMMANDS
> O-OPTIONS
=====
> DISTRIBUTED DATA FACILITY STATISTICS SUMMARY
HDFS
+ Collection Interval: 15 min
+ Report Interval: 15 min   Combine Level: NONE   End: 03/12 10:41
+
+ Interval      # of  Total  Total  Total  Total  Total  Total  Total  Total  Total  Total
+ Interval      Rmts  Trans  SQL   Rows  Msgs  Bytes  Commit Abort  Conv  Convq
+ -----
+ 03/12 10:41   1     4     356  33507  1330  3146K   146   55    4     0
+ 03/12 10:30   1     4     313   875   1398 493134  157   73    4     0
+ 03/12 10:15   1     0     229   29   1068 334037  115   64    0     0
+ 03/12 10:00   1     0     101   17    452 137137  51    24    0     0
+ 03/12 09:45   1     0     0     0     0     0     0     0    0     0
    
```

If investigating performance issues, look for spikes in activity

F11 zoom to see detail for a time interval



Thread Summary Views

View All Threads Or Select Various Views

```

I DSN0 03/11/08 16:24:29 2
8 Sort PF10 Zoom PF11
> Help PF1 Ba
> T.A
>
THREAD ACTIVITY: Enter a selection letter on the top line.
> *-ALL P-ISO C-CICS D-IMS E-BACKGROUND F-DIST ALLIED
> G-DIST DBAC H-UTIL I-INACT J-FILTER K-FUNCTIONS L-STORED PROC
> M-TRIGGERS N-SYSPLEX O-ENCLAVES P-WORKSTA
=====
>
ALL THREADS CONNECTED TO DB2
PTHDA
+
+ Elapsed Package CPU Status GetPg Update Commit CORRID
+ -----
+ 03-02:13 DGO@PC1 00.1% NOT-IN-DB2 80511K 31782K 307322 CXEGO2
+ 03-02:20 ADHAAF LR 00.0% SWAPPED-OUT 226622 162116 42
+ 03-02:13 DGO@SDBO 00.0% NOT-IN-DB2 140771 1040 40 CXEGO2
+ 00:03:56.4 SYSLH200 00.0% IN-DB2 97321 0 67 db2jcc_appli
+ 03-02:19 ADHMSUMT 00.0% NOT-IN-DB2 52703 52647 447
+ 08:11:41.1 DGO@WR2C 00.0% NOT-IN-DB2 31013 13583 1474 CXEGO2
+ 03-02:20 ADHMARM 00.0% NOT-IN-DB2 25600 1211 632
+ 07:12:27.4 ADBMAIN 00.0% SWAPPED-OUT 18090 10 19 DBA282
+ 00:09:39.2 ADBMAIN 00.0% SWAPPED-OUT 219 22 4 DDS0261
+ 00:01:53.2 SYSSH200 00.0% IN-DB2 42 19 9 DB2PEAgent.e
    
```

Select letter command for various distributed thread views

Sort PF10 Zoom PF11

F10 to sort the display

F11 zoom to see detail

Various Distributed Thread Views

```

_____ ZICLI      VTM      O2      V410./I DSN 03/12/08 10:46:38 2
> Help PF1      Back PF3      Up PF7      Down PF8      Sort PF10      Zoom PF11
> T.O
>
>      THREAD ACTIVITY:  Enter a selection letter on the top line.

> A-ALL      B-TSO      C-CICS      D-IMS      E-BACKGROUND
> G-DIST DBAC  H-UTIL      I-INACT      J-FILTER  K-FUNCTIONS
> M-TRIGGERS  N-SYSPLEX  O-ENCLAVES *-WORKSTA
=====
>      THREADS HAVING REMOTE ID INFORMATION
THDP
+
+ *
+ Elapsed      WorkStation ID      End User UserID      End User Transaction Name
+ -----
+ 00:00:57.5    IBM-TRTL08U8STG      dnet271              DB2PEAgent.exe
+ 00:00:48.9    IBM-TRTL08U8STG      dnet271              DB2PEAgent.exe
+ 00:02:42.1    IBM-1E47754C52F      dnet581              db2jcc_application
+ 00:17:34.8    IBM-2A1C47HHT        DDS0261              javaw.exe
+ 00:17:34.7    IBM-2A1C47HHT        DDS0261              db2bp.exe
+ 00:18:34.1    IBM-2A1C47HHT        DDS0261              javaw.exe
+ 00:03:18.7    IBM-2A1C47HHT        DDS0261              javaw.exe
=====
    
```

View distributed threads with workstation id or remote id information

F11 zoom to see detail

```

_____ ZDBACT     VTM      O2      V410./I DSN 03/12/08 10:44:13 2
> Help PF1      Back PF3      Up PF7      Down PF8      Sort PF10      Zoom PF11
> T.G
>
>      THREAD ACTIVITY:  Enter a selection letter on the top line.

> A-ALL      B-TSO      C-CICS      D-IMS      E-BACKGROUND      F-DIST ALLIED
> *-DIST DBAC  H-UTIL      I-INACT      J-FILTER  K-FUNCTIONS      L-STORED PROC
> M-TRIGGERS  N-SYSPLEX  O-ENCLAVES  P-WORKSTA
=====
>      DISTRIBUTED DATABASE ACCESS THREAD SUMMARY
THDR
+
+ *
+ Elapsed      WrkSta or Pln/Ath      CPU      Status      Remote      SQL      Rows
+ -----
+ 00:00:17      IBM-1E47754C52F        00.0%    IN-DB2      G94C1C2D    7230    15    2880
+ 00:00:17      IBM-2A1C47HHT          00.0%    IN-DB2      G94155A7    446     12    20
+ 00:00:17      IBM-2A1C47HHT          00.0%    IN-DB2      G94155A7    409     18    74
+ 00:00:17      IBM-TRTL08U8STG        00.0%    IN-DB2      G9307328    42      18    0
+ 00:00:17      IBM-TRTL08U8STG        00.0%    IN-DB2      G9307328    22      8     0
+ 00:00:17      IBM-2A1C47HHT          00.0%    IN-DB2      G94155A7    3        2    0
+ 00:15:09      IBM-2A1C47HHT          00.0%    IN-DB2      G94155A7    3        1    0
=====
    
```

View database access thread summary

Thread Detail

```

ZTDTL  VTM  O2  V410./I DSN 03/11/08 16:25:37 2
> Help PF1                                     Back PF3

>          THREAD INFORMATION:  Enter a selection letter on the top line.

> *--THREAD DETAIL B-LOCK COUNTS C-LOCK WAITS      D-LOCKS OWNED  E-GLOBAL LOCKS
> F-CURRENT SQL   G-SQL COUNTS  H-DISTRIBUTED     I-BUFFER POOL  J-GROUP
> K-PACKAGES      L-RES LIMIT   M-PARALLEL TASKS N-UTILITY    O-OBJECTS
> P-CANCEL THREAD Q-DB2 CONSOLE R-DSN ACTIVITY   S-APPL TRACE  T-ENCLAVE
> U-LONG NAMES

=====
>          THREAD DETAIL
PLAN
+ Thread: Plan=DISTSERV Connid=SERVER Corrid=db2jcc_appli Authid=DNET581
+ Dist : Type=DATABASE ACCESS, Luwid=G94C1C2D.H279.C21403F6E2A9=875948
+ Location : NDCDB203
act
+ Thread Activity                               User Defined Functions
+-----
+ DB2 Status = IN-DB2 TCB Time (SQL) = 00:00:00.000
+ MVS Status =          Wait for TCB Time = 00:00:00.000
+ Total Elapsed Time = 00:05:04.820 Elapsed Time = 00:00:00.000
+ CP CPU Utilization = 00.0% Elapsed Time (SQL) = 00:00:00.000
+ Total CP CPU Time = 00:00:01.017 SQL Events = 0
+ IIP In-DB2 Time = 00:00:00.529
+ Total Parallel Tasks = 0
+ Current Parallel Tasks= 0
+
+ Stored Procedures                               Triggers
+-----
+ Total CPU = 00:00:00.000 TCB not in Enclave = 00:00:00.000
+ Elapsed time = 00:00:00.000 Elapsed not in Enclave = 00:00:00.000
+ Elapsed Time (SQL) = 00:00:00.000 TCB prior to Enclave = 00:00:00.000
+ Wait for TCB Time = 00:00:00.000
+ Wait Event Count = 0
+ Curr Wait TCB Time = 00:00:00.000
+
+ SavePoints
+-----
+ Savepoint Requests =
+ Release Savepoints =
+ Rollback Savepoints =
    
```

Letter commands to see additional thread detail

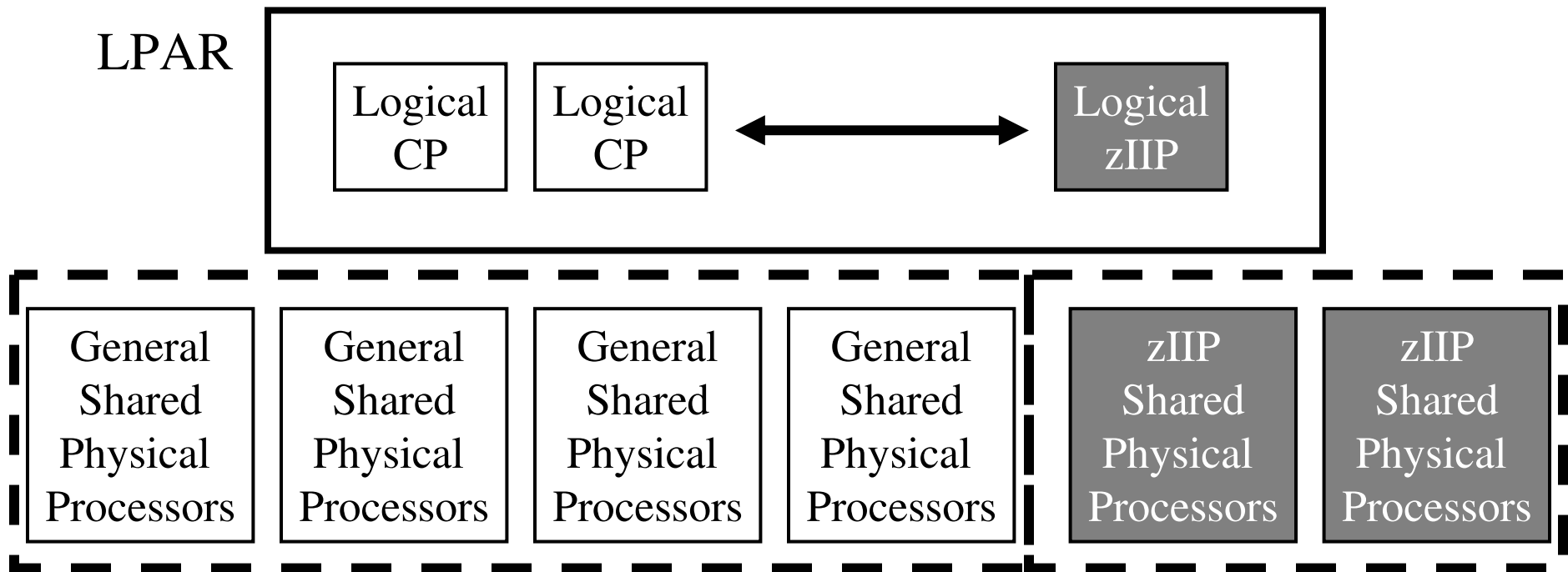
CPU time with zIIP CPU breakout

CPU time with zIIP CPU breakout

```

+
+ In-DB2 Times                                     Total          Current
+-----
+ Elapsed Time                                     00:00:01.199   00:00:00.000
+ CP CPU Time                                       00:00:00.439   00:00:00.439
+ IIP CPU Time                                       00:00:00.529   00:00:00.529
+ Stored Procedure CPU Time                         00:00:00.000   00:00:00.000
+
+ Waits                                             Count          Total          Current
+-----
+ Synchronous I/O Wait                             0              00:00:00.000   00:00:00.000
+ Asynchronous Read I/O Wait                       0              00:00:00.000   00:00:00.000
+ Asynchronous Write I/O Wait                     0              00:00:00.000   00:00:00.000
+ Local Lock/Latch Wait                           0              00:00:00.000   00:00:00.000
+ Page Latch Wait                                  0              00:00:00.000   00:00:00.000
+ Drain Lock Wait                                   0              00:00:00.000   00:00:00.000
+ Drain of Claims Wait                             0              00:00:00.000   00:00:00.000
+ Archive Log Mode(Quiesce) Wait                   0              00:05:04.820   00:05:04.820
+ Archive Read from Tape Wait                      0              00:00:00.000   00:00:00.000
+ Switch to Open/Close Wait                       0              00:00:00.000   00:00:00.000
+ Switch to SYSLGRNG Service Wait                  0              00:00:00.000   00:00:00.000
+ Switch to DMS Waits                              0              00:00:00.000   00:00:00.000
+ Other Service Waits                             0              00:00:00.000   00:00:00.000
+ Force at Commit Waits                           0              00:00:00.000   00:00:00.000
+ Log Write I/O Wait                               0              00:00:00.000   00:00:00.000
+ Sync EX Unit Sw-com/abort/dealloc               0              00:00:00.000   00:00:00.000
=====
    
```

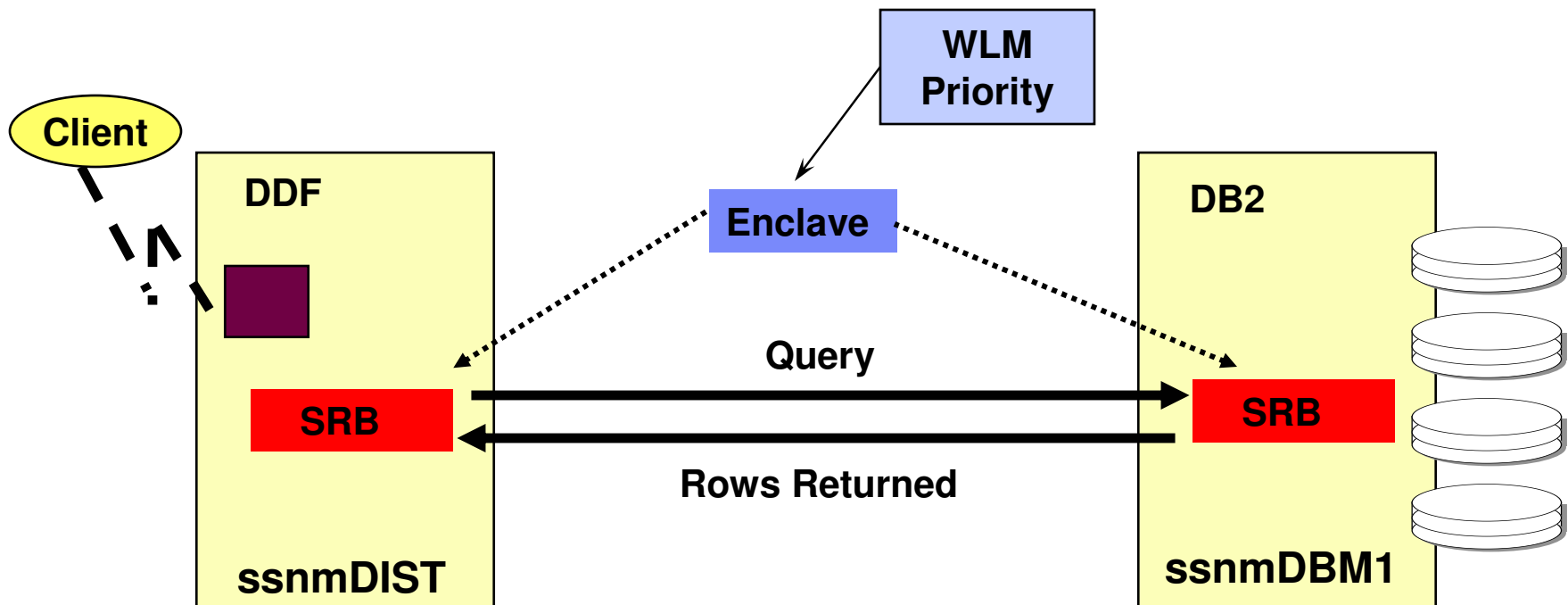
About zIIP Processors



- Certain types of DB2 work may take advantage of zIIP
 - ▶ DRDA - Queries that access DB2 for z/OS V8 via DRDA over a TCP/IP connection are dispatched within z/OS in enclave SRBs. z/OS directs a portion of this work to the zIIP
 - ▶ Complex parallel queries
 - ▶ DB2 utilities for index maintenance
 - ▶ LOAD, REORG, and REBUILD

Enclaves Are Used By z/OS To Manage And Prioritize DB2 Distributed Workload

- Each Enclave is an individual transaction to be managed by priorities as defined in Workload Manager
 - As a DDF request arrives in DB2 an enclave is created to tie together the SRB tasks and to allow WLM to set its priority



Thread Enclave Information

```

_____ ZENCU   VTM   O2   V410./I DSN0 03/11/08 16:29:33  2
> Help PF1   Back PF3   Up PF7   Down PF8   Sort PF10   Zoom PF11
> U.O
>          THREAD ACTIVITY:  Enter a selection letter on the top line.

> A-ALL      B-TSO      C-CICS      D-IMS      E-BACKGROUND  F-DIST ALLIED
> G-DIST DBAC H-UTIL    I-INACT    J-FILTER   K-FUNCTIONS  L-STORED PROC
> M-TRIGGERS N-SYSPLEX *-ENCLAVES P-WORKSTA

>
=====
ENCLAVE THREAD SUMMARY BY PACKAGE
PTHDE
+ *
+ Elapsed    Package Jobname AuthID CPU P/I SvcClass Pd# Status
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+ 00:00:57.6 SYSSH200 DB2PEAge DNET271 00.0% .50 DDFDEF 1 IN-DB2
+ 00:00:49.2 SYSSH200 DB2PEAge DNET271 00.0% .50 DDFDEF 1 IN-DB2
+ 00:00:01.2 SYSLH200 db2jcc_a DNET581 00.0% .50 DDFDEF 1 IN-DB2
=====
    
```

```

_____ ZENCLD  VTM   O2   V410./I DSN0 03/11/08 16:31:56  2
> Help PF1   Back PF3
>          THREAD INFORMATION:  Enter a selection letter on the top line.

> A-THREAD DETAIL B-LOCK COUNTS C-LOCK WAITS   D-LOCKS OWNED   E-GLOBAL LOCKS
> F-CURRENT SQL   G-SQL COUNTS   H-DISTRIBUTED   I-BUFFER POOL   J-GROUP BP
> K-PACKAGES      L-RES LIMIT   M-PARALLEL TASKS N-UTILITY       O-OBJECTS
> P-CANCEL THREAD Q-DB2 CONSOLE R-DSN ACTIVITY  S-APPL TRACE    *-ENCLAVE
> U-LONG NAMES

>
=====
ENCLAVE DETAIL INFORMATION
PLAN
+ Thread: Plan=DISTSERV Connid=SERVER Corrid=db2jcc_appli Authid=DNET581
+ Dist : Type=DATABASE ACCESS, Luwid=G94C1C2D.H27E.C2140560BC5B=875433
+ Location : NDCDB203
enc
+ ENCLAVE TOKEN: 2C00004CB6 Enclave Type: Original Indep
+ Owing System: DEMOMVS Owing Job: DSNCDIST
+ WLM Mode: Goal Enclave CPU Time 00:00:00.516
+
+ SERVICE PERIOD INFORMATION
+ Period(s) for Service Class DDFDEF: 2
+ Current Period for This Thread: 2
+ Performance Index This Period: .37
+
+-----+-----+-----+-----+-----+-----+-----+-----+
+ | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | | | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | | | | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | | | | | +-----+-----+-----+-----+-----+-----+-----+-----+
+ | | | | | | | +-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+
+ 1 3 500 80% 2500 MilliSecs Percentile Response Time Goal
+ 2 4 .20 Velocity Goal

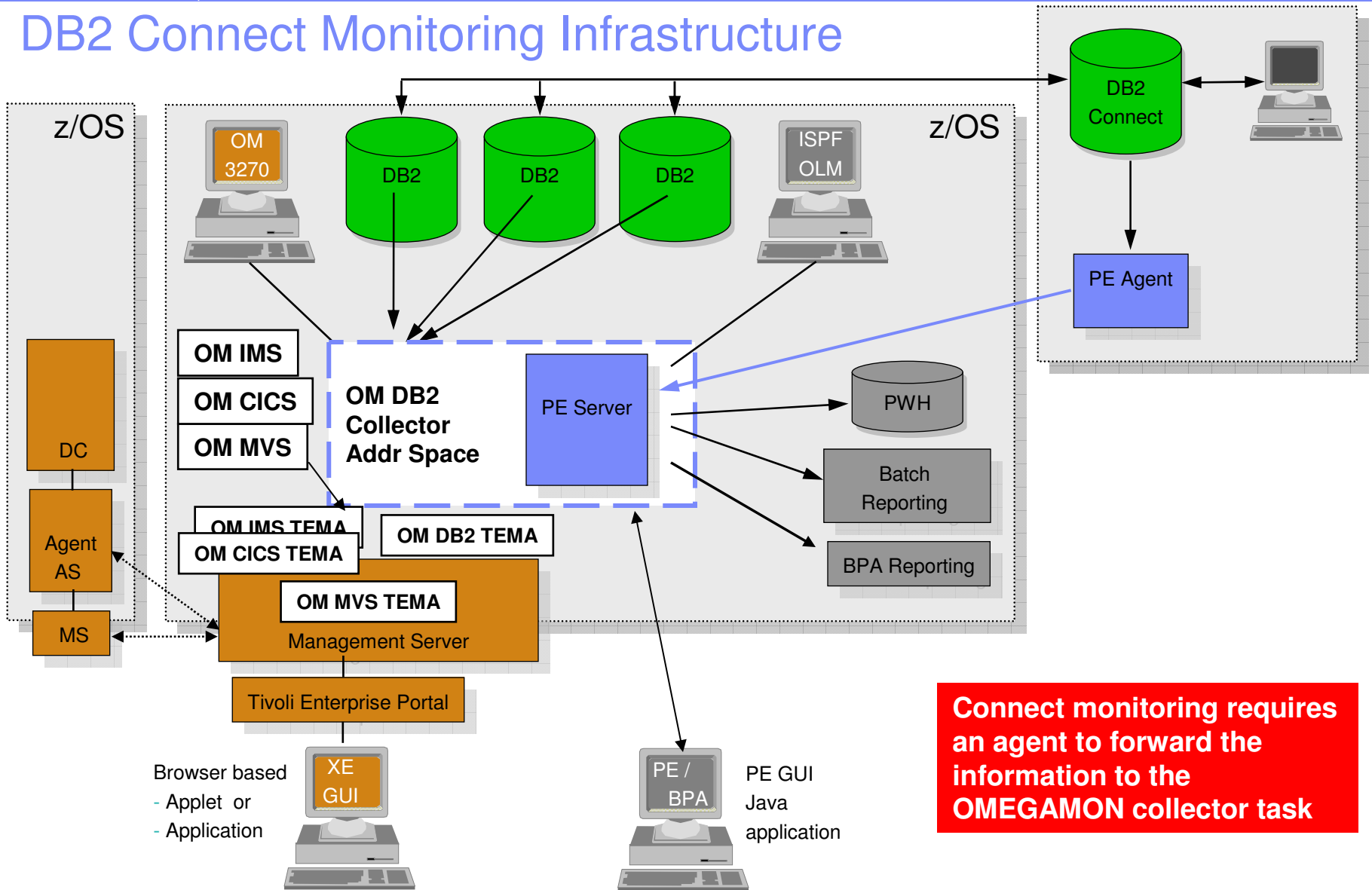
+ SERVICE CLASS INFORMATION
+ CPU Critical: No Storage Protection: No
+ Name: Description
+-----+-----+-----+-----+
+ Service Class: DDFDEF DDF Default
+ Workload: DB_WKL database workloads
+ Resource Group:
+ Report Class: RDDDEF default for ddf
+ WLM APPLICATION ENVIRONMENT
+ Application Environment Name: NO WLM ENVIRONMENT
+ Description:
+ Subsystem Type:
+ WLM Started Task Procedure Name:
+ Start Parameters:

+ CLASSIFICATION WORK QUALIFIERS
+ Subsystem Type: DDF Correlation: DB2JCC_APPLI
+ Proc Name: Trans Program Name:
+ UserId: DNET581 Transaction Class:
+ Network ID: Logical Unit Name:
+ Plan Name: DISTSERV Package Name: SYSLH200
+ Connection: SERVER Collection: NULLID
+ Function Name: DB2_DRDA Subsystem Name: DSN0
+ Accounting Info: JCC02100IBM-1E47 Subsystem Parm: DNET581
    
```

See enclave token, WLM service class, and service class performance index (PI)

See WLM service class details and the service class classification rules

DB2 Connect Monitoring Infrastructure



Connect monitoring requires an agent to forward the information to the OMEGAMON collector task

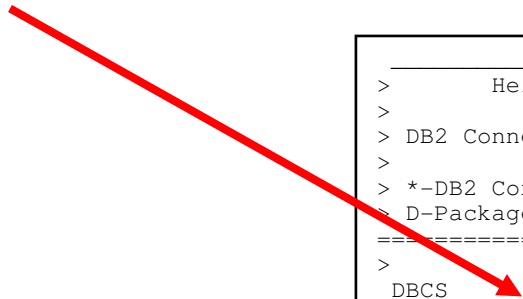
DB2 Connect Server Monitoring

```

_____ ZDB2C   VTM   O2   V410./I DSN 03/12/08 10:51:47  2
> Help PF1   Back PF3   Up PF7   Down PF8   Zoom PF11
> G.
=====
>
                DB2 CONNECT SERVER

DB2C
+ Name          IP Address   Node Name  Status      Server Name
+-----+-----+-----+-----+-----+
+ IBM-TRTL08U8STG 9.48.115.40  N/P       ACTIVE      DB2
=====
    
```

Connect server overview status with F11 zoom drill down



```

_____ ZDBCD   VTM   O2   V410./I DSN 03/12/08 10:52:26  2
> Help PF1   Back PF3   Up PF7   Down PF8
>
> DB2 Connect/Gateway: Enter a selection letter on the top line.
>
> *-DB2 Connect/Gateway Statistics  B-Tasks List  C-Performance
> D-Package Statistics
=====
>
                DB2 Connect/Gateway Statistics
DBCS
+ Name: IBM-TRTL08U8STG IP Addr: 9.48.115.40      Srv Inst Name:DB2
+ Gateway Snapshot Time:2008-03-12-10.52.15.624000
>
> d b c d
+
+ DB2 Connect Information                               DB2 Connect Agents
+-----+-----+-----+-----+-----+-----+
+ Name          =IBM-TRTL08U8STG   Registered      =      15
+ IP Address     =9.48.115.40      Max Registered  =      15
+ Node Name      =N/P              Wait For Token  =       0
+ Node Number    =      0          Max Wait Token  =       0
+ Srv Product/Version ID =SQL08024   From Pool      =   53987
+ Srv Instance Name =DB2              Create Empty Pool =      17
+ Srv Version    =      5          Stolen         =       0
    
```

DB2 Connect Gateway Performance

```

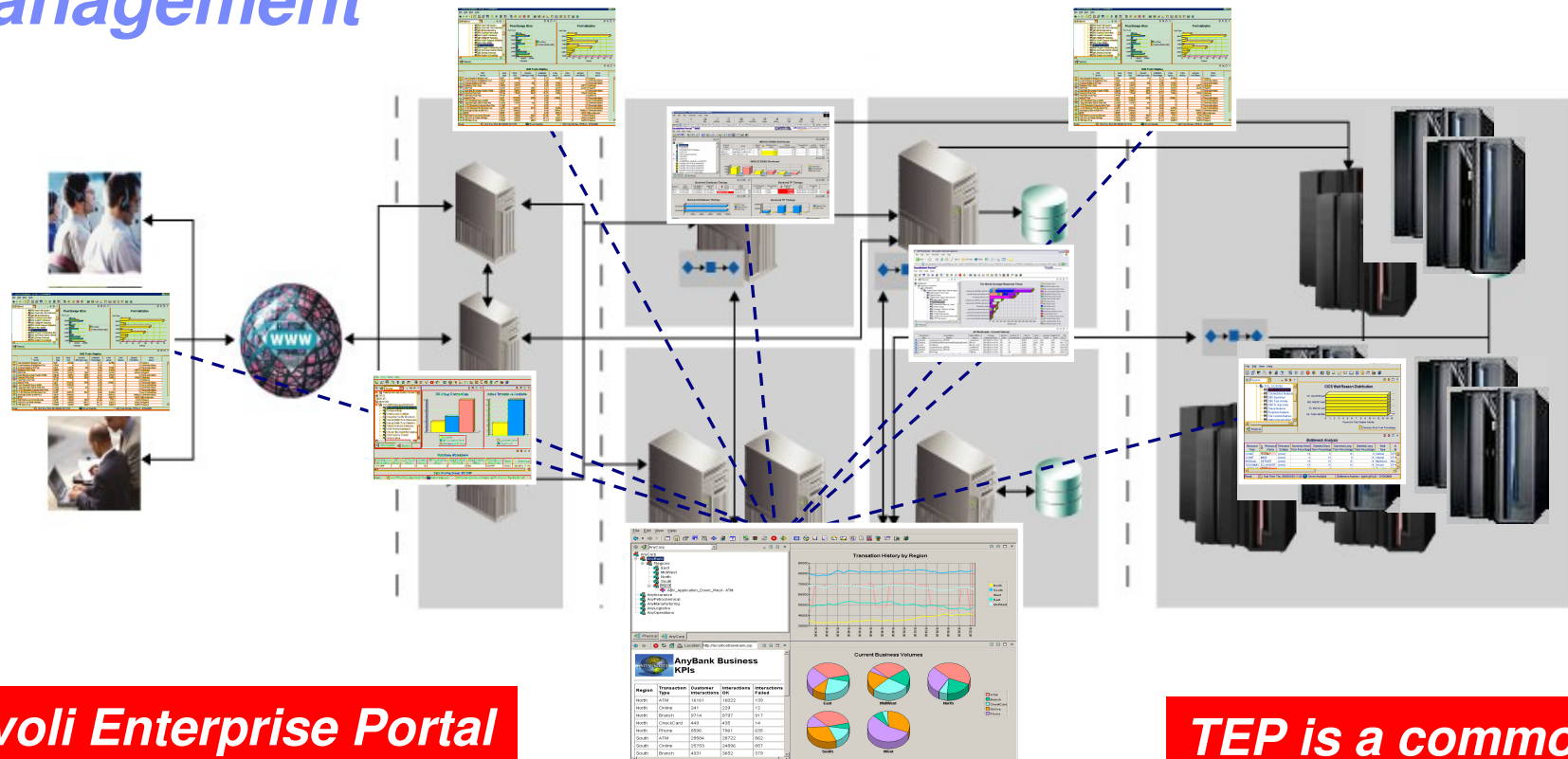
_____ ZBCBP      VTM      O2      V410./I DSN 03/12/08 10:53:06 2
>      Help PF1      Back PF3      Up PF7      Down PF8
>
> DB2 Connect/Gateway: Enter a selection letter on the top line.
>
> A-DB2 Connect/Gateway Statistics  B-Tasks List  *-Performance
> D-Package Statistics
=====
>
>          DB2 Connect/Gateway Performance
>
> DBCS
+ Name: IBM-TRTL08U8STG IP Addr: 9.48.115.40      Srv Inst Name:DB2
+ Gateway Snapshot Time:2008-03-12-10.52.15.624000
> dbc
+
+ Times for Sample SQL Statement
+ -----
+ Total Statement Time          =00:00:00.494260
+ Time in DB2 Connect           =00:00:00.000455
+ Time on DB2 Host              =00:00:00.000787
+ Time in Network Connection    =00:00:00.493018
=====

```

**Is the problem in the network?
Is the problem in DB2?
Is the problem in the gateway?**



Tivoli Enterprise Portal (The TEP) Integrated Performance, Availability, And Systems Management

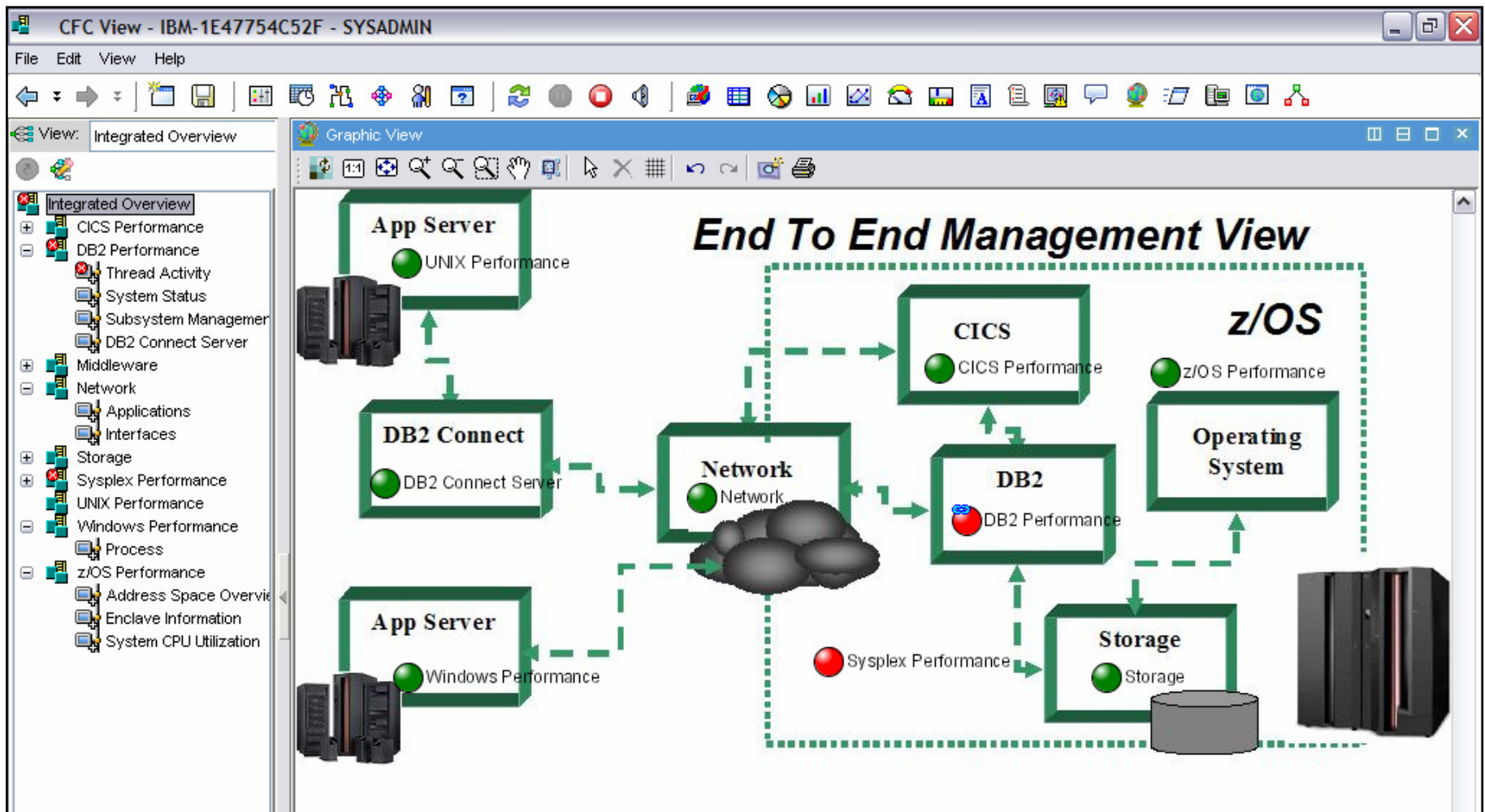


Tivoli Enterprise Portal enables integrated alert and automation capabilities

Tivoli Enterprise Portal (TEP)

TEP is a common user interface for a variety of Tivoli solutions

Tivoli Enterprise Portal Provides An Integrated Monitoring In Breadth Capability



Benefits Of An Integrated Approach Using The TEP

- **Reduce time to problem resolution**
 - ▶ Identify and isolate issues more rapidly
- **Improved event management and problem isolation**
 - ▶ More meaningful and useful problem alerts
- **Improved ability to manage composite applications**
 - ▶ An integrated view of subsystems, platforms, and application components
- **Superior performance analysis capabilities**



Tivoli Enterprise Portal Problem Isolation

OMEGAMON has detected an issue with the network

The TEP With OMEGAMON Dashboard Edition enables integrated multi-component views and enhances the ability to perform problem isolation

The screenshot displays the Tivoli Enterprise Portal interface. On the left is a navigation tree with categories like CICS Performance, DB2 Performance, Network, and z/OS Performance. The main area features an 'End To End Management View' diagram with components: App Server (UNIX Performance), DB2 Connect (DB2 Connect Server), Network (Network), CICS (CICS Performance), DB2 (DB2 Performance), and z/OS (z/OS Performance, Operating System). A red arrow points from the 'Network' component to a 'CRITICAL' alert box. The alert details are: `EW_Demo_Thread_Alert D81L:SYSL:DB2 03/11/08 13:56:45`. Below the alert, a link symbol is visible with the text: 'Select workspace link button to view situation event results for: EW_Demo_Thread_Alert'.

To see detail on the network alert click on the link symbol

Integrated Performance Management Typical Scenarios

- Creating an integrated performance management workspace using the Tivoli Enterprise Portal (TEP)
- Integration and cross product navigation using the capabilities of the TEP
 - ▶ Customization of navigation
 - ▶ Links and Dynamic workspace linking
- Alerts, alert correlation, and corrective actions using the TEP
- History integrated with real time performance information



A Complete Suite Of OMEGAMON Monitoring Components

The screenshot displays the Tivoli Enterprise Portal (TEP) interface. On the left, a tree view shows the 'Physical' view of the system, including components like MVSA, CICS, DB2, IMS, Mainframe Networks, MQSERIES, OS/390 Unix (USS), Partition MVSA Production, QI Agent, Services Management Agent, Storage Subsystem, WebSphere Application Server OS/390, and z/OS Management Console. A red arrow points from the text 'Each monitoring tool includes product provided 'workspaces'' to the tree view. Another red arrow points from the text 'Network performance data may be included in monitoring views' to the 'Mainframe Networks' section.

On the right, a bar chart titled 'Applications' shows performance data for five applications: CXEGRAD5, CXEGRAT8, OSNMPD, TWSS8E, and VTAM. The OSNMPD application has the highest value, represented by a tall yellow bar. The chart is titled 'Current Datagram Rate > 0'.

At the bottom, there are several status indicators: 'Total Bytes > 0', 'Total Retransmissions > 0', and 'Applications Summary Table'. The status bar at the very bottom shows 'Hub Time: Mon, 06/12/2006 11:34 AM', 'Server Available', and 'Applications - hqdnt2.demopkq.ibm.com - DNET581'.

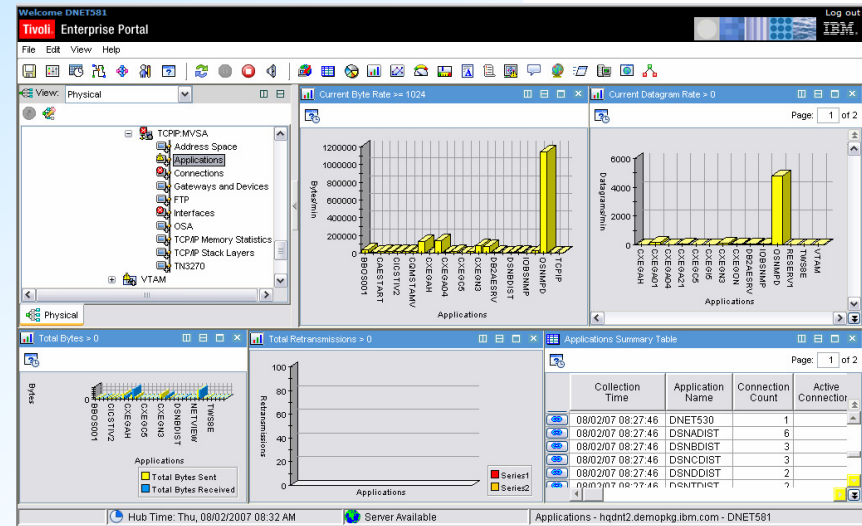
IBM provides a suite of OMEGAMON monitoring tools that integrate into the TEP

Each monitoring tool includes product provided 'workspaces'

Network performance data may be included in monitoring views

OMEGAMON XE for Mainframe Networks V4.1 Components And Capabilities

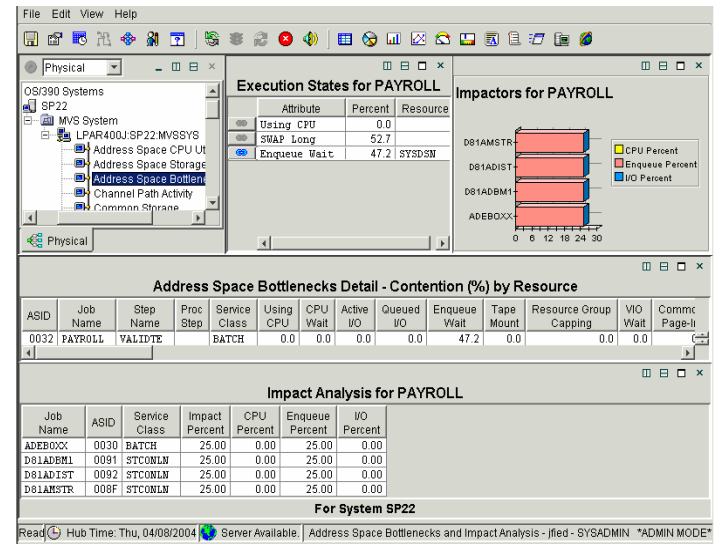
- **Powerful monitoring and management**
 - ▶ Monitor TCP/IP and SNA network resources from a common interface
 - ▶ Real time and historical monitoring capabilities
- **Out of the box alerts and automation**
 - ▶ Product provided situations
- **Common user interface** – Tivoli Enterprise Portal (TEP)
 - ▶ Manage all z/OS resources from a single user interface.
 - ▶ Display data in graphs, charts and table format
- **Easy to configure**
 - ▶ Customize workspaces, reports, situations
 - ▶ Define thresholds, Filters, Sort
 - ▶ Generate Events
- **Integrated Capabilities**
 - ▶ OMEGAMON integration
 - ▶ NetView for z/OS V5.2 workspaces
 - ▶ ITM 6.1
- **Effective**
 - ▶ Determine the actual service level
 - ▶ Easily automate responses to recurring performance problems



OMEGAMON XE on z/OS V4.1

Alerts and Information

- **Workloads**
- **Address Spaces**
 - ▶ TSO users / Started Tasks / Batch Jobs
- **Bottleneck and Impact Analysis**
- **WLM**
- **IRD (CPU and I/O queuing)**
- **Enqueues/GRS**
- **Operator Alerts**
- **Sysplex**
 - ▶ Coupling Facility Structures and utilization
 - ▶ XCF - status and messages
 - ▶ Device contention for shared DASD
 - ▶ Enqueue contention on DASD both within and outside the Sysplex



- **Manage multiple LPAR's and Sysplex's from one single console**
- **Resources**
 - ▶ CPU
 - ▶ Enclave
 - ▶ Storage (64-bit support)
 - Common
 - Paging
 - ▶ Channels
 - ▶ DASD
 - ▶ Tape Drives

Adding Information From OMEGAMON XE For Mainframe Networks To Create An Integrated Performance Workspace

Welcome DNET581
Tivoli Enterprise Portal Log out

File Edit View Help

Applications Summary Table Page: 1 of 2

Application Name	Active Connections	Transmit Byte Rate	Receive Byte Rate	Byte Rate	Transmit Datagram Rate	Receive Datagram Rate	Datagram Rate	Transmit Segment Rate	Receive Segment Rate	Segment Rate	Total Bytes Sent (in GB)	Total Bytes Sent	Total Bytes Receive (in GB)
BBOS001	9	23285	21178	44463	0	0	0	132	151	283	0	23374943	
BBOS002	0	0	0	0	0	0	0	0	0	0	0	53741	
BBOS003	0	0	0	0	0	0	0	0	0	0	0	0	0
BBOS004	0	0	0	0	0	0	0	0	0	0	0	0	0
BBOS004S	0	17968	2374	20342	0	0	0	0	0	0	0	0	0
BBOS005	0	0	0	0	0	0	0	0	0	0	0	0	0
BBOS005A	0	0	0	0	0	0	0	0	0	0	0	0	0
BBO1DMN	0	0	0	0	0	0	0	0	0	0	0	0	0
BBO2DMN	0	0	0	0	0	0	0	0	0	0	0	0	0
BBO3DMN	0	0	0	0	0	0	0	0	0	0	0	0	0
BBO4DMN	0	0	0	0	0	0	0	0	0	0	0	0	0
BBO5DMN	0	0	0	0	0	0	0	0	0	0	0	0	0
BPXOINIT	0	0	0	0	0	0	0	0	0	0	0	0	0
BZZSMSRV	0	0	0	0	0	0	0	0	0	0	0	0	0
CACCS00	1	0	0	0	0	0	0	0	0	0	0	80480	
CACDS00	3	0	0	0	0	0	0	0	0	0	0	281448	
CAESTART	0	3536	14400	17936	0	0	0	0	0	0	0	25971053	
CBDQDISP	0	0	0	0	0	0	0	0	0	0	0	0	0
CCURUNM	0	0	0	0	0	0	0	0	0	0	0	3904	
CCURUNU	0	0	0	0	0	0	0	0	0	0	0	280	
CICSAOR2	0	0	0	0	0	0	0	0	0	0	0	2637	
CICSAOR3	0	0	0	0	0	0	0	0	0	0	0	212252	
CICSAOR4	0	0	0	0	0	0	0	0	0	0	0	0	0
CICSAOR5	0	0	0	0	0	0	0	0	0	0	0	70568	
CICSAOR6	0	0	0	0	0	0	0	0	0	0	0	0	0

Example – Integrating DB2 network performance information into a workspace

Application and connection level network performance may be integrated into custom workspaces

Detail Available For Network Connection Level Monitoring

Welcome DNET581 Log out

Tivoli Enterprise Portal

File Edit View Help

Connections Summary Table

Collection Time	Application Name	Connection Type	Local Port	Foreign Socket	Hex Connection Number	Connection State	Total Bytes Received (in GB)	Total Bytes Received	Total Bytes Sent (in GB)	Total Bytes Sent	Total Bytes (in GB)	Total Bytes
06/12/06 12:01:53	DSNBDIST		4	The local port for this TCP connection.	01BD4640	5	0	18411	0	3647	0	
06/12/06 12:01:53	DSNDDIST		4466	9.19.55.136:15160	0X00000052	5	0	10824743	0	23292594	0	34
06/12/06 12:01:53	DSNDDIST		4466	9.19.55.136:18826	0X01BD4648	5	0	1204	0	688	0	

Welcome DNET581 Log out

Tivoli Enterprise Portal

File Edit View Help

Byte Rate	Response Time	Response Time Variance	Telnet Appl Name	Telnet LU Name	Segments Retransmitted	Total Segments Retransmitted	Percent Segments Retransmitted	Datagrams Received	Datagrams Sent	Datagrams Sent or Received	Total Datagrams Received	Total Datagrams Sent	Total Datagrams	Datagram Rate
8232	0.27	0.45	The statistical variation of response times since the connection was established.					0	0	0	0	0	0	0
3135	0.94	0.93						0	0	0	0	0	0	0
0320	0.20	0.02			0	0	0	0	0	0	0	0	0	0

OMEGAMON XE For DB2 Network Related Performance Information

Thread level performance information

Welcome DNET581
Tivoli Enterprise Portal

File Edit View Help

DB2 Threads

Plan	Package DBRM	DB2 Subsystem	Connection Type	Collection	Thread Type	Bytes Sent	Conversations	Messages Sent	Rows Sent	SQL Calls Sent	SQL Received
DISTSERV		DSNB	DBAccess		DB Access	334	0	5	0	0	0
DSNJDBC	DSNJDBC1	DSNA	RRSAF	DSNJDBC	Unknown	0	0	0	0	0	0

Subsystem level performance information

Welcome DNET581
Tivoli Enterprise Portal

View: DEMO MGMT

- DSNB:MVSA:DB2
 - Thread Activity
 - System Status
 - Detailed Thread Exception
 - Lock Conflicts
 - Subsystem Management

Physical DEMO MGMT

System State Information

Time	Interval Time	Waiting On Tape Mount	DDF Inactive	Global Trace Active	EDM Utilization	DB Wait Percent	Indoubt Threads	Threads Waiting On Limit	Threads Waiting On Locks	Users Waiting For Threads	DDF Send Rate	DDF Re Rate
08/02/07 14:35:44	20	False	True	True	6.0	0.0	0	0	0	0	0	0

DB2 System: DSNB, MVS System: MVSA

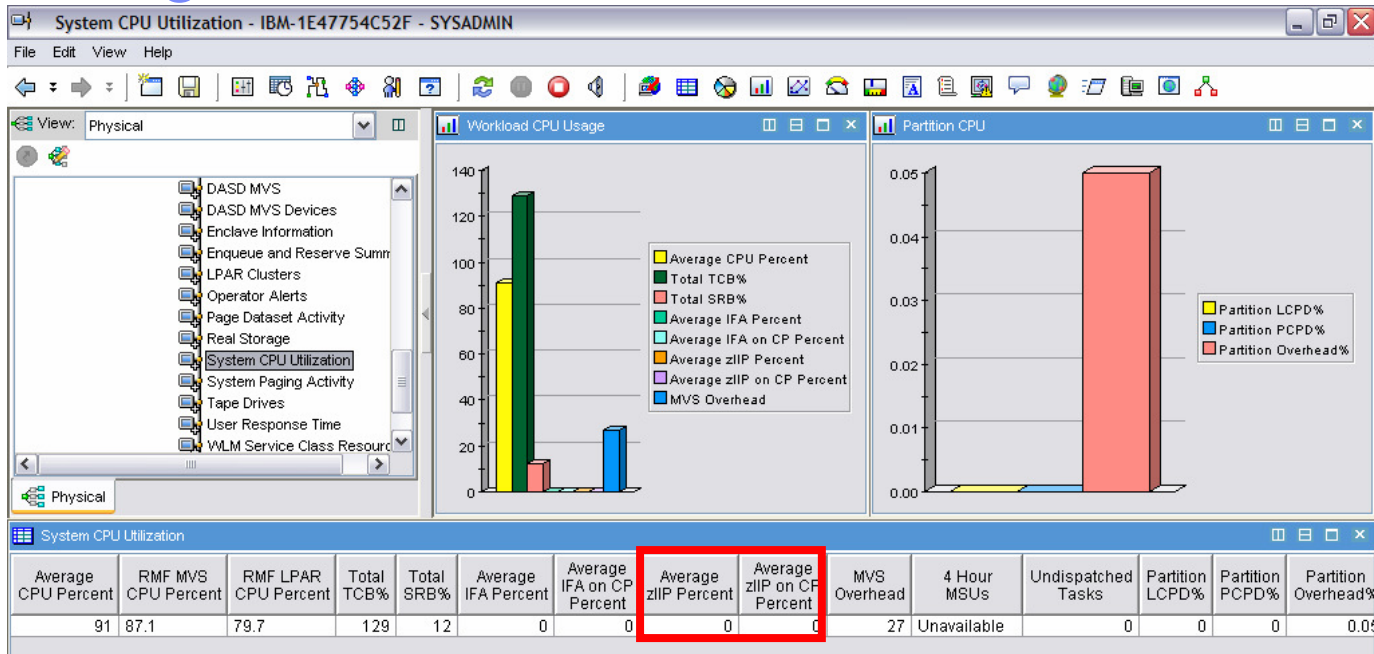
OMEGAMON For DB2 PM/PE TEP Interface Provides zIIP Support

The screenshot displays the Tivoli Enterprise Portal interface. On the left, a tree view shows the database structure under 'DB2'. The main area features a 'Locks Owned' 3D bar chart with 'AuthID' on the vertical axis and 'Count' on the horizontal axis. Below the chart is a 'Detailed Thread Exceptions' table. A red callout box with an arrow points to the 'In DB2 IIP CPU' column in the table, highlighting the addition of zIIP information.

	Elapsed Time	Interval Time	Plan Name	Thread Status	CP CPU Utilization	CP CPU Time	DB2 Elapsed Time	CP DB2 CPU Used	In DB2 IIP CPU	Correlation Identifier	Authorization Identifier (Unicode)	Archive Tape Wc
	00:00:03.734	00:00:08	DISTSERV	IN-DB2	0.0	00:00:...	00:00:00.4	00:00:00.202	00:00:00.000	DB2JCC_APPLI	DNET345	False
	01:25:58.200	00:00:08	ADHPLAN3	NOT-IN-DB2	0.0	00:03:...	00:03:56.6	00:07:01.697	00:00:00.000		KL TAYLO	False
	01:25:58.200	00:00:08	ADHPLAN3	NOT-IN-DB2	0.0	00:00:...	00:00:09.2	00:00:09.868	00:00:00.000		KL TAYLO	False
	00:00:18.669	00:00:08	DB2PM	NOT-IN-DB2	0.0	00:03:...	00:00:00.0	00:00:00.007	00:00:00.000	CXEGA03	DB2PM	False
	00:00:21.820	00:00:08	KO2PLAN	NOT-IN-DB2	0.0	00:03:...	00:00:00.0	00:00:00.060	00:00:00.000	CXEGA03	DB2PM	False
	00:41:42.600	00:00:08	KO2PLAN	NOT-IN-DB2	0.0	00:05:...	00:02:34.8	00:00:59.547	00:00:00.000	CXEGA03	DB2PM	False

DB2 System: DSNCL MVS System: MVSA

Understanding zIIP Utilization Using OMEGAMON XE For z/OS



Job Name	Step Name	Proc Step	Type	SvcClass	SvcClass Period	ASID	JESJOBID	CPU Percent	TCB Percent	SRB Percent	IFA Percent	IFA on CP Percent	zIIP Percent	zIIP on CP Percent	Independent Enclave CPU%
MASTER			STC	SYSTEM	1	0X0001	STC14478	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCAUTH	PCAUTH		STC	SYSTEM	1	0X0002		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RASP	RASP		STC	SYSTEM	1	0X0003		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACE	TRACE		STC	SYSTEM	1	0X0004		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DUMPSRV	DUMPSRV	DUMPSRV	STC	SYSTEM	1	0X0005		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XCFAS	XCFAS	IEFPROC	STC	SYSTEM	1	0X0006		0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0
GRS	GRS		STC	SYSTEM	1	0X0007		0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0

DB2 Connect Monitoring

The screenshot displays the 'DB2 Connect Server - IBM-1E47754C52F - SYSADMIN' application window. The interface is divided into several sections:

- Left Panel:** A tree view under 'Integrated Overview' showing various system components. 'DB2 Connect Server' is highlighted, and a red arrow points to it.
- Top Right Panel:** A 3D bar chart titled 'DB2 Connect Server - Key Events for Active Server' for the server 'WONGSU'. The Y-axis represents a count from 0 to 100. The legend indicates:
 - Stolen Agents (Yellow bar): ~95
 - Maximum Agent Overflows (Blue bar): ~45
 - Current Connections (Red bar): ~40
- Bottom Panel:** A table listing server details for 'WONGSU'. Below the table is a context menu with several options, where 'Performance' is highlighted.

Name	IP Address	Server Status	Node Name	Node Number	Server Product Version ID	Server Instance Name	Server Version	Time Zone Displacement	Gateway Snapshot Time
WONGSU	9.56.123.78	ACTIVE	NP	0	SQL08015	DB2	5	2	09/21/06 11:40:59

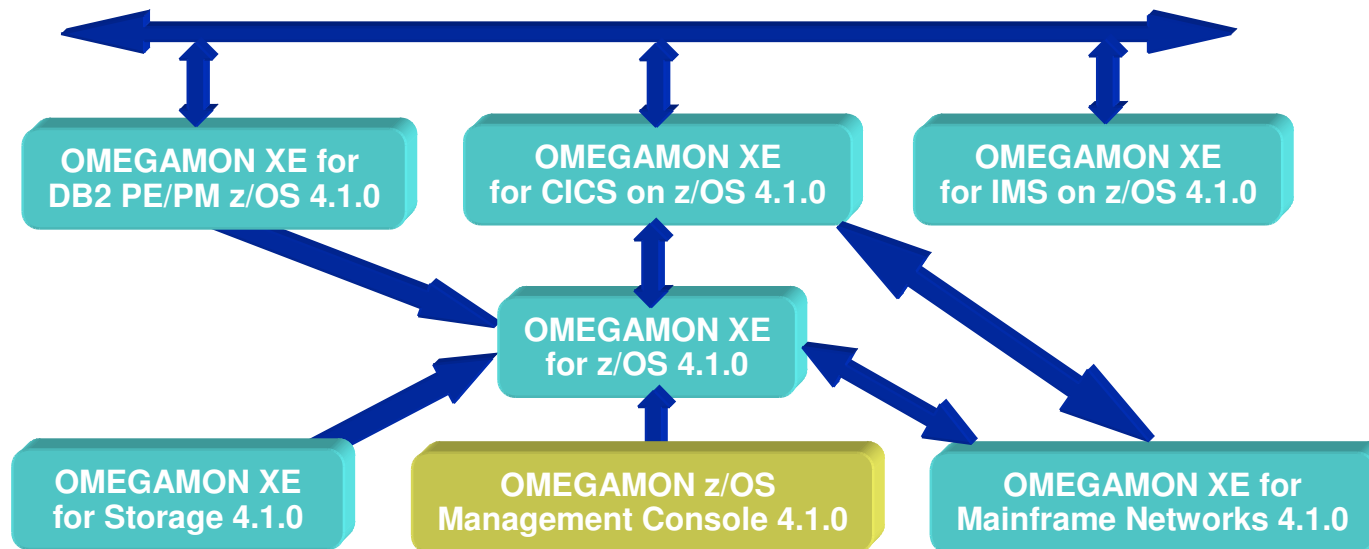
- DB2 Connect/Gateway Statistics
- Tasks List
- Performance**
- Package Statistics
- Link Wizard...
- Link Anchor...

Dynamic Workspace Linking Functionality

Problem: How do I quickly find a potential problem that requires multiple monitoring products?

Scenario: Dynamically link DB2 to related network information

Solution: Dynamic Workspace Linking
Product provided links & user customized



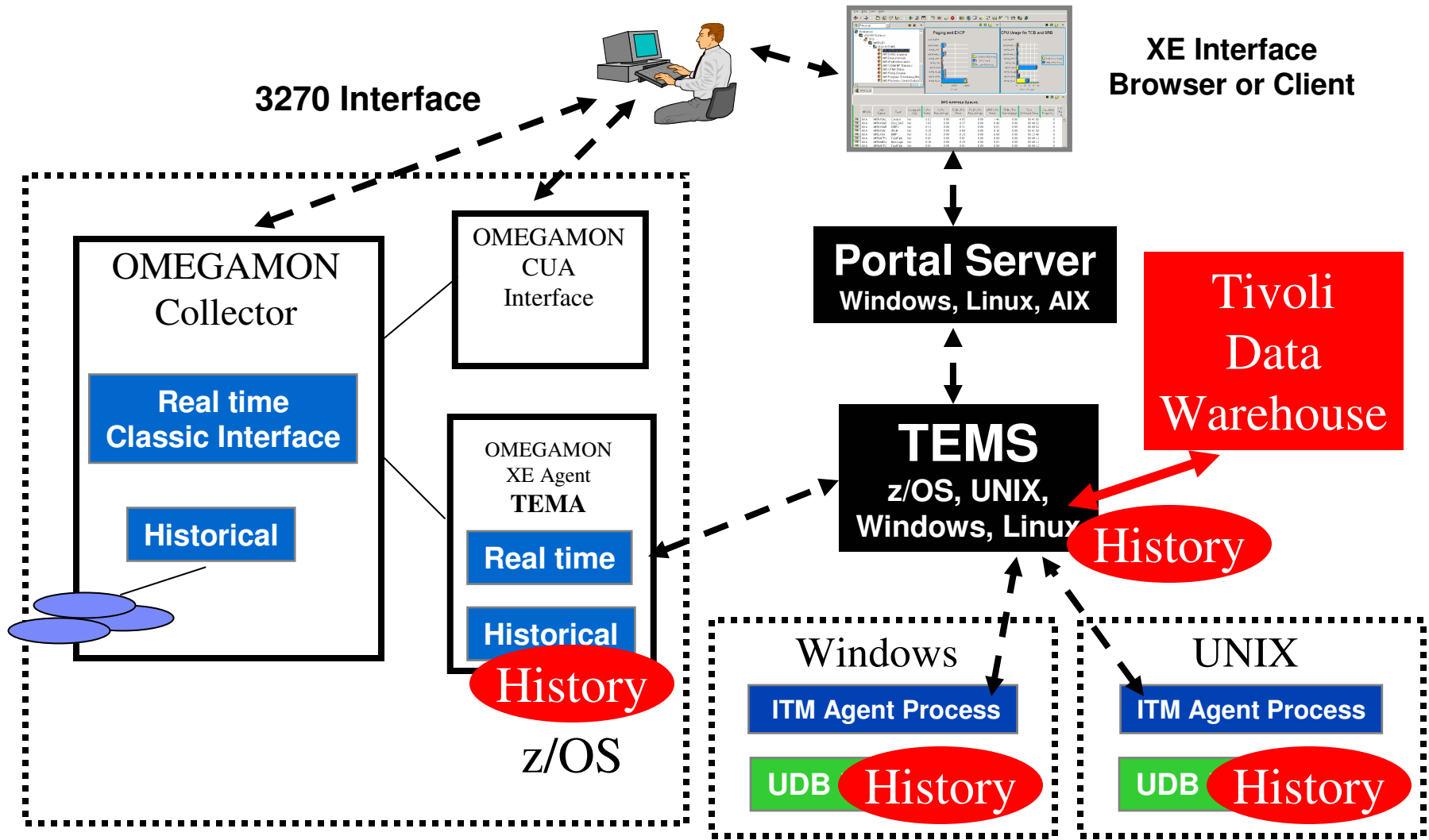
Dynamic Workspace Link Drill Down In Context To DB2 Network Information

The screenshot displays the Tivoli Enterprise Portal interface. On the left, a tree view shows the navigation path: System Status > DB2 Connect Server > DDF Conversations. A red box highlights 'DDF Conversations' and 'Dist Net Info - MFN'. A red arrow points from this box to a table in the bottom right window.

The table, titled 'TCP Connections Summary Table', contains the following data:

Application Name	Collection Time	Local IP Address	Local Port	Remote IP Address	Remote Port
DSNBDIST	04/09/07 08:17:36	9.39.64.151	446	9.73.221.109	33057
DSNBDIST	04/09/07 08:17:36	9.39.64.151	446	9.73.221.109	33110

TEP Enables Integrated Multi-Platform Real Time And Historical Monitoring And Management



Tivoli Enterprise Portal History Collection Control

Select a product
OMEGAMON XE for DB2 PE and PM on z/OS V4.1.0

Select Attribute Groups

Group	Collection	Collection Interval	Collection Location	Warehouse Interval	Summarize Yearly	Prune Yearly	Summ Quar
DB2_SRM_Log_Manager							
DB2_SRM_Log_Statistics							
DB2_SRM_Subsystem	Started	15 minutes	TEMA	Off			
DB2_SRM_Subsystem_Statistics	Started	15 minutes	TEMA	1 day			
DB2_SRM_UTL							
DB2_System_States	Started	15 minutes	TEMA	1 day			
DB2_Thread_Exceptions		15 minutes	TEMS	Off			
DB2_Volume_Activity		15 minutes	TEMA	1 day			
Group_Buffer_Pool_Connection							
GBP_Statistics							

Configuration Controls

Collection Interval: 15 minutes
Collection Location: TEMA
Warehouse Interval: 1 day

Summarization

Yearly
 Quarterly
 Monthly
 Weekly
 Daily
 Hourly

Pruning

Yearly keep [] Years
 Quarterly keep [] Years
 Monthly keep [] Months
 Weekly keep 1 Months
 Daily keep [] Days
 Hourly keep [] Days
 Detailed data keep [] Days

Buttons: Configure Groups, Unconfigure Groups, Show Default Groups, Start Collection, Stop Collection, Refresh Status

Select desired group of information, collection interval, and destination

To warehouse or not to warehouse
Hourly, Daily, or not at all

Collect at the TEMA or the TEMS

Specify summarization and pruning along with collection interval

Access History Data Interactively In The TEP

Click on the clock icon to request history data within the workspace view

Specify Time Span for Query	Interval Time	Waiting On Tape Mount	DDF Inactive	Global Trace Active	EDM Utilization	DB Wait Percent	Indoubt Threads	Threads Waiting On Limit	Threads Waiting On Locks	Users Waiting For Threads	DDF Send Rate	DDF Receive Rate
04/10/07 08:59:28	7	False	False	True	0.3	0.0	0	0	0	0	0	

DB2 System: DSNC, MVS System: MVSA

Time Selection Pop-up

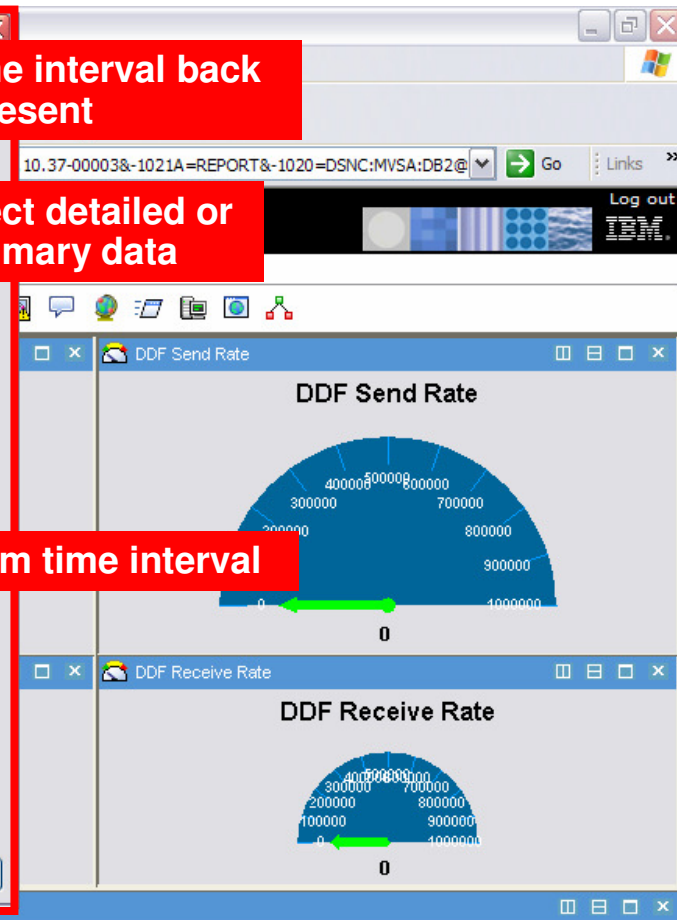
Desired time interval back from the present

Select detailed or summary data

Custom time interval

The dialog box 'Select the Time Span' is shown with the following settings:

- Real time:** (unselected)
- Last:** (selected). Value: 24 Hours.
- Last parameters:**
 - Use detailed data:** (selected). Time Column: Recording Time.
 - Use summarized data:** (unselected). Shift: All shifts. Days: All days.
- Custom:** (unselected).
 - Custom parameters:**
 - Use detailed data:** (unselected). Time Column: Recording Time.
 - Use summarized data:** (unselected). Interval: Hours. Shift: All shifts. Days: All days.
 - Start Time: 04/10/2007 10:01 AM. End Time: 04/10/2007 10:01 AM.



Time	Interval Time	Waiting On Tape Mount	DDF Inactive	Global Trace Active	EDM Utilization	DB Wait Percent	Indoubt Threads	Threads Waiting On Limit	Threads Waiting On Locks	Users Waiting For Threads	DDF Send Rate	DDF Recev Rate
04/10/07 08:59:28	7	False	False	True	0.3	0.0	0	0	0	0	0	0

Example History Data For Last 4 Hours

Click on column headers to sort

Click and drag plot chart icon to plot history data over time

	DDF Send Rate	DDF Receive Rate	Active Stored Procedures	ASIDs Running Stored Procedures	Active User Functions	ASID Use	Depth	Current Thread Count	Current EDM Pages	Total EDM Pages	Archive Dataset Name	Archive Device
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	495	8191		
0	0	0	0	0	0	0	0	64	495	8191		
0	0	0	0	0	0	0	0	64	497	8191		
0	0	0	0	0	0	0	0	64	497	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		
0	0	0	0	0	0	0	0	64	494	8191		

Summary

- DB2 distributed workloads pose challenges in performance and availability management
- OMEGAMON XE For DB2 PM/PE provides powerful monitoring and management capabilities
 - ▶ Using Classic 3270 Interface
 - ▶ OMEGAMON and the Tivoli Enterprise Portal (TEP) may be used to provide an integrated view of performance
- Integration with other OMEGAMON monitoring solutions to provide a more complete monitoring solution



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