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

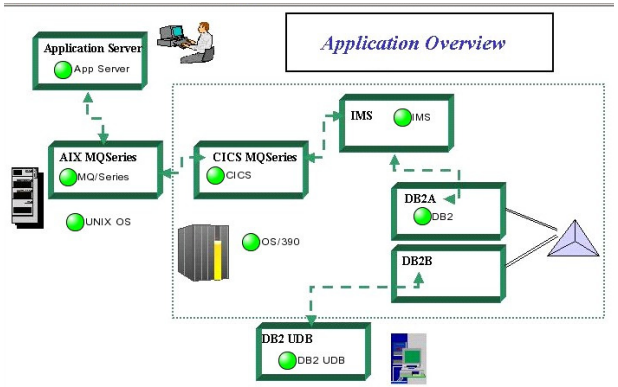
@business on demand.

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)

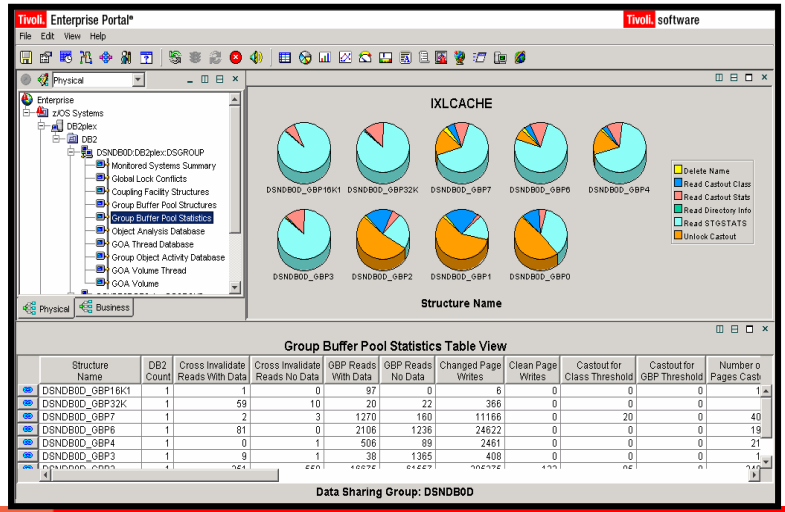
Buffer Pool Analysis (PE only)
DB2 Connect Monitoring
zIIP Engine utilization
Automation capabilities
Locking & Lock Conflicts
DB2Plex Monitoring View

- ✔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 DSNC 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
================================================================================
```

Subsystem Level DDF Monitoring Real Time

To see history

Statistics for DDF activity

Are there any DBATs queued? Active DBATS? What was the HWM?

Message traffic (send and receive)

```
 _________________ ZDFST     VTM      O2        V410./I DSNC 03/12/08 10:39:08   2
>         Help PF1           Back PF3            Up PF7          Down PF8
> D.A
>    DISTRIBUTED DATA FACILITY:  Enter a selection letter on the top line.

>  *-DDF STATISTICS    B-DDF VTAM SUMMARY    C-DDF VTAM DETAIL    H-HISTORICAL
================================================================================
>                  DISTRIBUTED DATA FACILITY STATISTICS
 DFST
+ Collection Interval:  REALTIME                          Start:  03/12 10:38:56
+ Report Interval:      11 sec                              End:  03/12 10:39:08
+
+ Location Name          =     NDCDB203    DDF Status              =   ACTIVE
+ DDF CPU Rate           =    00.0%        Dist Allied Threads     =        0
+ Active DBATs           =        7        Inactive DBATs          =        0
+ DDF Send Rate          =   13K/sec       DDF Receive Rate        =   0K/sec
+ Resync Attempts        =        0        Resync Successes        =        0
+ Cold Start Connections =        0        Warm Start Connections  =        0
+ DBAT Queued            =        0        Conversations Dealloc   =        0
+ HWM All DBATs          =       17        HWM Active DBATs        =       21
+ Max DB Access (MAXDBAT)=      500        HWM Inactive DBATs      =        0
+
+ Remote Location Name   = DRDA REMOTE LOCS
+ Conversations Queued   =        0        Binds for Remote Access =        0
+ Message Buffer Rows    =   295349        Block Mode Switches     =        0
+ Commits/Remote         =        5        Rollbacks/Remote        =        4
+ Indoubts/Remote        =        0
+
+         Tran     SQL     Row Message     Byte  Commit   Abort    Conv   Blocks
+       ------- ------- ------- ------- -------- ------- ------- ------- -------
+ Sent       4      27  295606  108257 1088675K       0       0       4   10517
+ Recv     226   46950      25  108253 51726859   23808   12296     226       4
+
+                                  Last  2-Phase                   Commit Backout
+ 2-PHASE COMMIT:      Prepare    Agent   Commit Backout  Forget     Resp   Resp
+                      ------- ------- -------- ------- ------- ------- -------
+           Sent             5       4        0       0       5       0       0
+           Recv             5       4        0       0       5       0       0
```

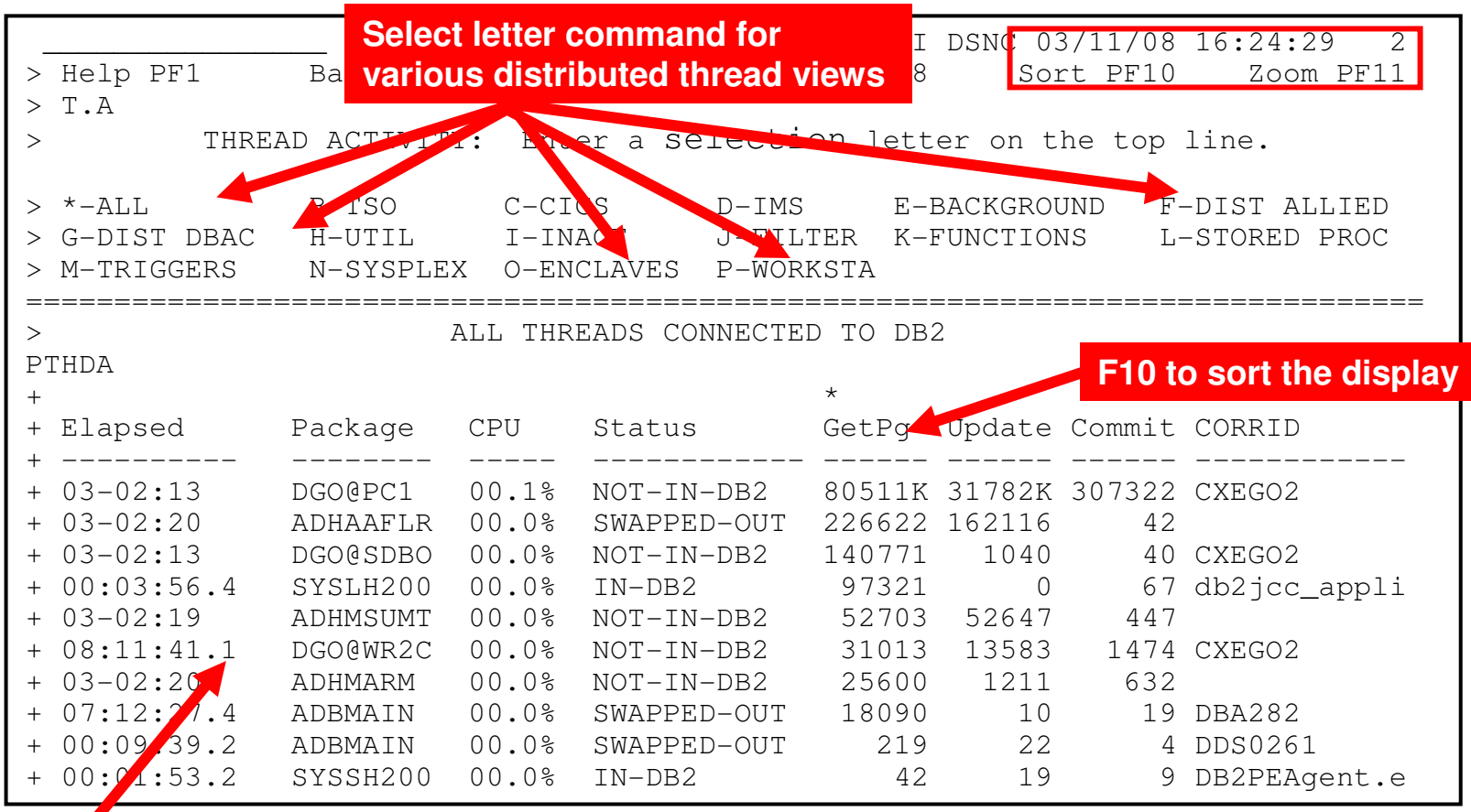
Near Term History
DDF Activity Statistics By Time Interval

```
 _________________ 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 SUM
 HDFS
+ Collection Interval:  15 min
+ Report Interval:      15 min   Combine Level:  NONE       End:  03/12 10:41
+
+             # of  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



Various Distributed Thread Views

```
 _________________ ZICLI    VTM     O2       V410./I DSNC 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 DSNC 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
+                                                          *
+                                                      Remote          SQL  Rows
+ Elapsed    WrkSta or Pln/Ath   CPU   Status         Luname   GetPg  Recv Sent
+ ---------  ------------------  ----- ------------ -------- ------ ---- -----
+ 00:00:17   IBM-1E47754C52F     00.0% IN-DB2       G94C1C2D   7230   15  2880
            IBM-2A1C47HHT       00.0% IN-DB2       G94155A7    446   12    20
            IBM-2A1C47HHT       00.0% IN-DB2       G94155A7    409   18    74
            IBM-TRTL08U8STG     00.0% IN-DB2       G9307328     42   18     0
            IBM-TRTL08U8STG     00.0% IN-DB2       G9307328     22    8     0
            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 DSNC 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 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   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   =
```

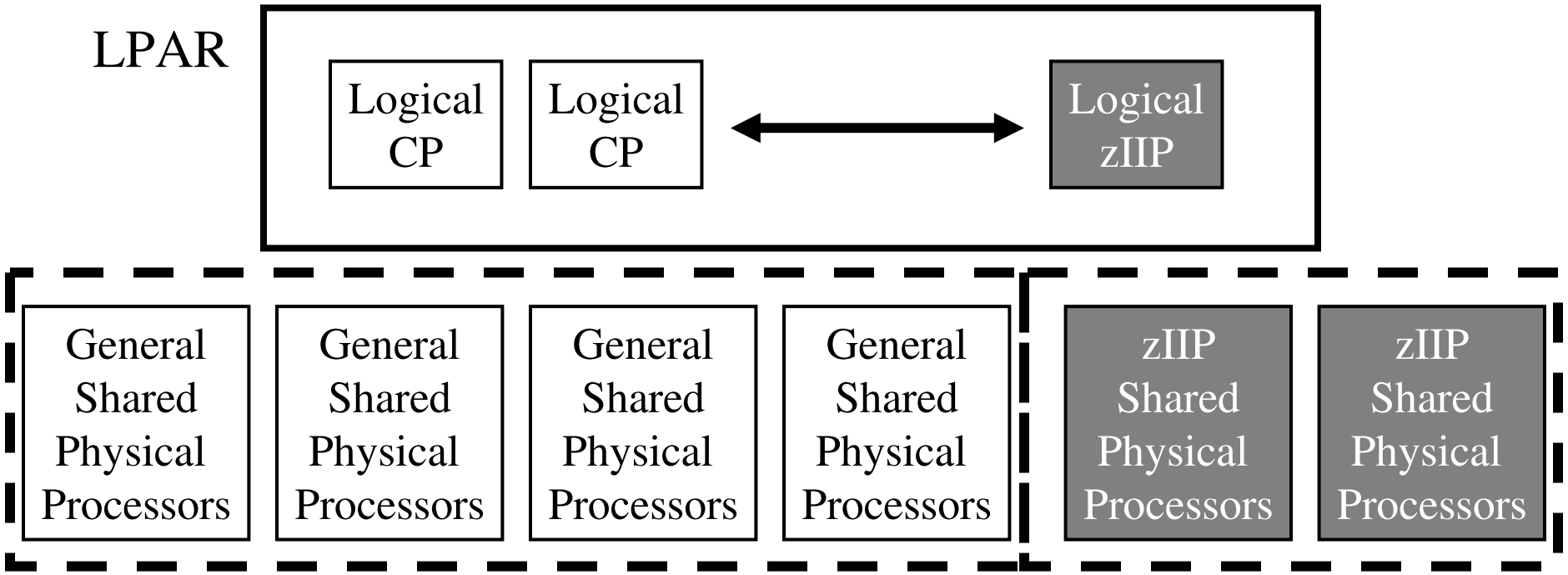
Letter commands to see additional thread detail

CPU time with zIIP CPU breakout

```
+
+ 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
================================================================================
```

CPU time with zIIP CPU breakout

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

Thread Detail Distributed Thread Information

See IP address, user information, WLM service class, workstation information

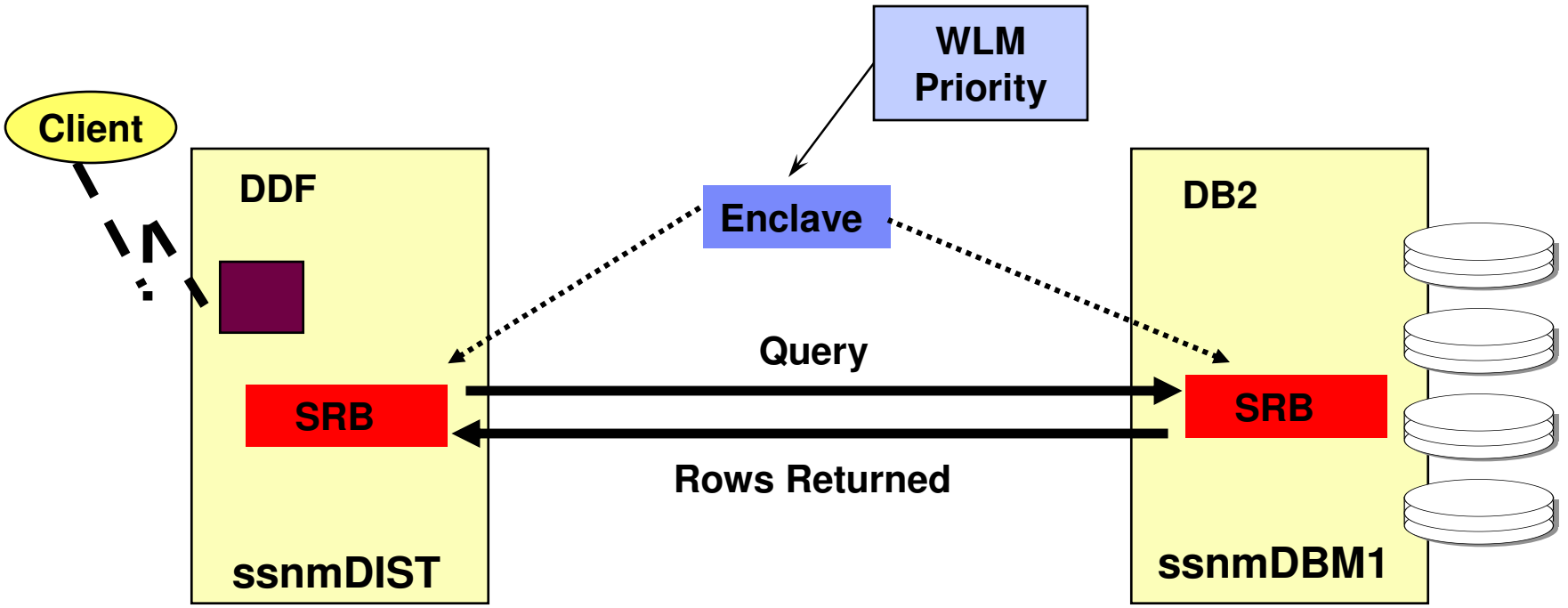
See distributed thread send and receive information

```
 _______________ ZTDIST   VTM     O2       V410./I DSNC 03/12/08 10:45:02   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  *-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   T-ENCLAVE
> U-LONG NAMES    V-DB2 CON SRV
===============================================================================
>                         DISTRIBUTED THREAD DETAIL
 PLAN
+ Thread:  Plan=DISTSERV  Connid=SERVER   Corrid=db2jcc_appli Authid=DNET581
+ Dist   :  Type=DATABASE ACCESS, Luwid=G94C1C2D.GB3B.C214F9B0EFE2=812813
+ Location   :  NDCDB203
 rsm
+                         Distributed TCP/IP Data
+Location          IP Addr  Port Ctbuser  Srvclsnam  Prod ID  Workstation Name
+----------------- -------- ---- -------- ---------- -------- ------------------
+9.76.28.45        094C1C2D  448 dnet581  DDFDEF      JCC02100 IBM-1E47754C52F
+
+ Transaction name: db2jcc_application
+ TCP/IP Userid:    dnet581
+
+                          Distributed SQL Statistics
+
+ Remote Location Name = 9.76.28.45       Remote Location Luname = G94C1C2D
+
+ Protocol Used        =                  Conversations Queued    =          0
+ Block Mode Switches  =            0     Message Buffer Rows     =       6336
+ Bind Remote Access   =            0     Max Allocated Conv      =          0
+ Conv Allocated       =            0     Conv Deallocated        =          0
+ Indoubt/Remote       =            0     Commit/Remote           =          0
+ Rollback/Remote      =            0
+
+            Tran      SQL     Row Message     Byte  Commit   Abort    Conv  Blocks
+         -------- ------- ------- ------- --------- ------- ------- ------- -------
+ Sent           0       0    6336      48   554787       0       0       0      33
+ Recv           1      33       0      48     4468      11       0       1       0
+
+                                      Last  2-Phase                  Commit Backout
+ 2-PHASE COMMIT:        Prepare   Agent   Commit Backout  Forget    Resp    Resp
+                        ------- ------- -------- ------- ------- ------- -------
+            Sent              0       0        0       0       0       0       0
+            Recv              0       0        0       0       0       0       0
```

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 DSNC 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
================================================================================
```

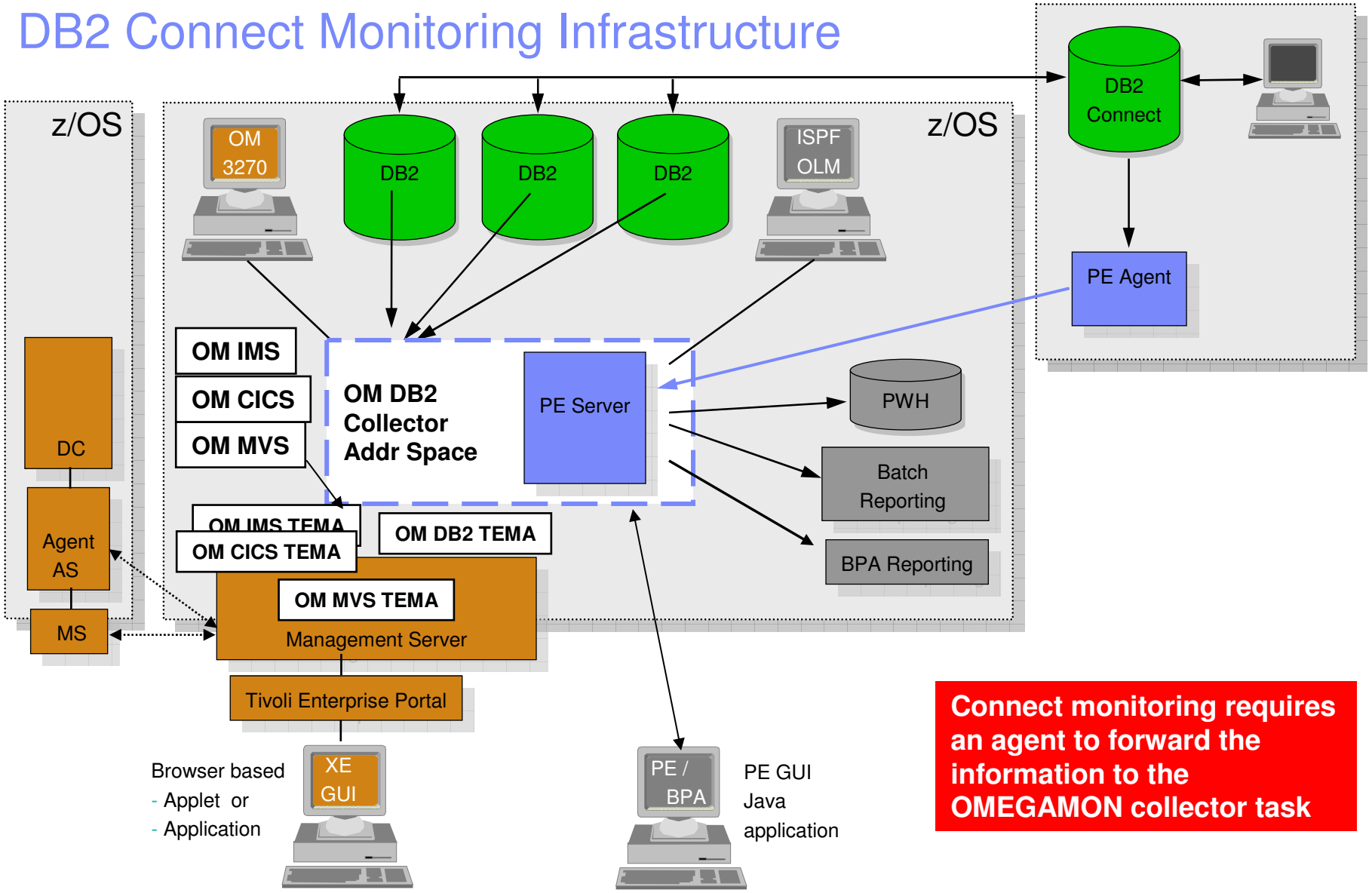
```
 _________________ ZENCLD   VTM     O2       V410./I DSNC 03/11/08 16:31:56   2
> Help PF1                                                          Back PF3
>       THREAD INFORMATION:  Enter a selection letter on the top line.

> 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
+ Owning System:     DEMOMVS             Owning 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
+
+ +---------------------------- Period Number
+ | +-------------------------- Importance
+ | | +------------------------ Duration in Service Units
+ | | |     +------------------ Percentile
+ | | |     |    +------------- Response Time Goal or Velocity
+ | | |     |    |     +------- Response Time Unit
+ | | |     |    |     |        Goal Description
+ - - +---- +--- +---- +-------- ------------------
+ 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:      RDDFDEF             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:     DSNC
+ 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 DSNC 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

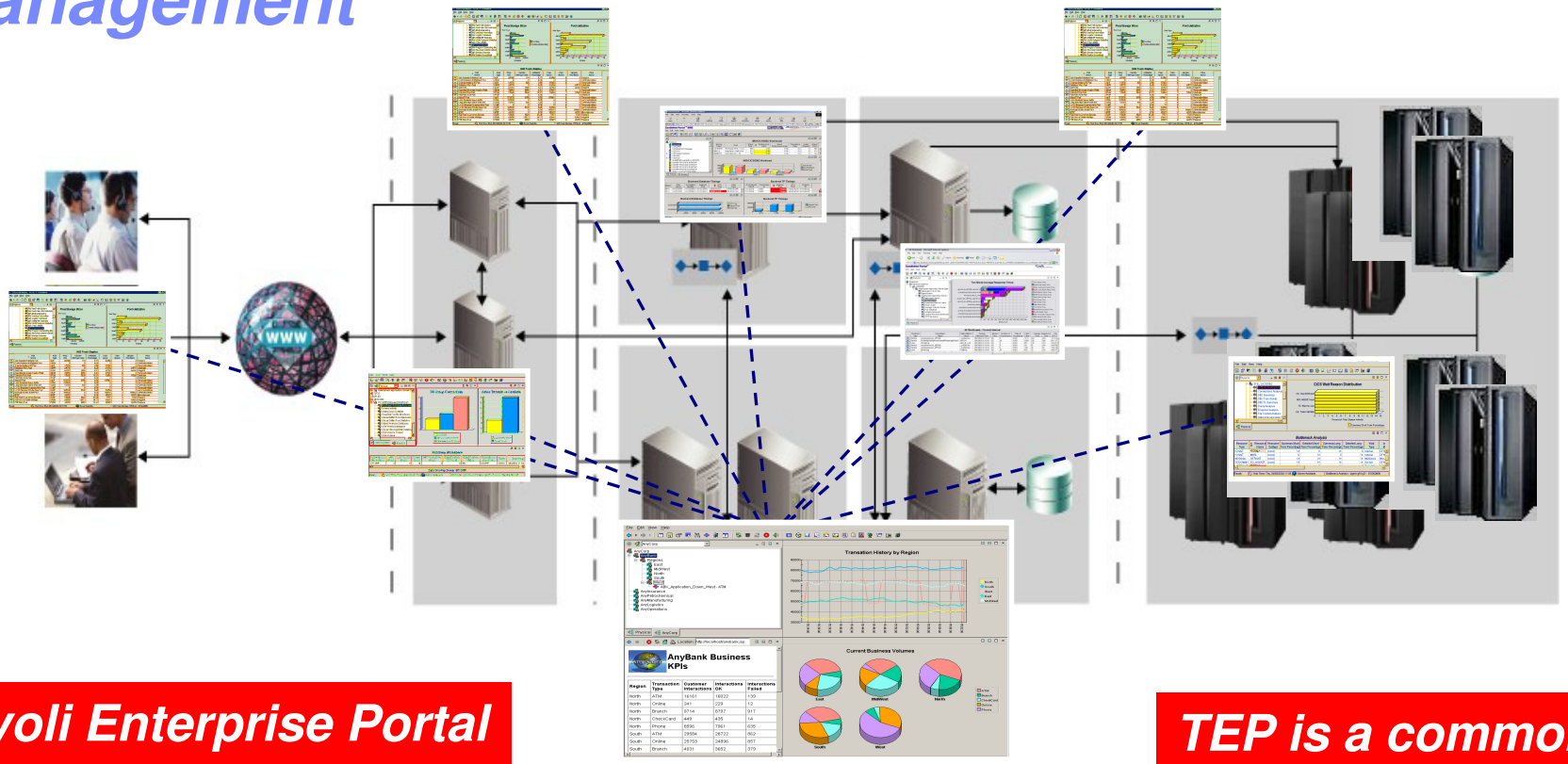
```
 _________________ ZDBCD    VTM     O2       V410./I DSNC 03/12/08 10:52:26   2
>       Help PF1      Back PF3      Up PF7      Down PF8
>
> DB2 Connect/Gateway: Enter a selection letter on the top line.
>
> *-DB2 Connect/Gateway Statistics  B-Tasks List   C-Performance
> D-Package Statistics
================================================================================
>                        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
>
 dbcd
+
+ 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

```
 _________________ ZDBCP    VTM     O2       V410./I DSNC 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
 dbcp
+
+ 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

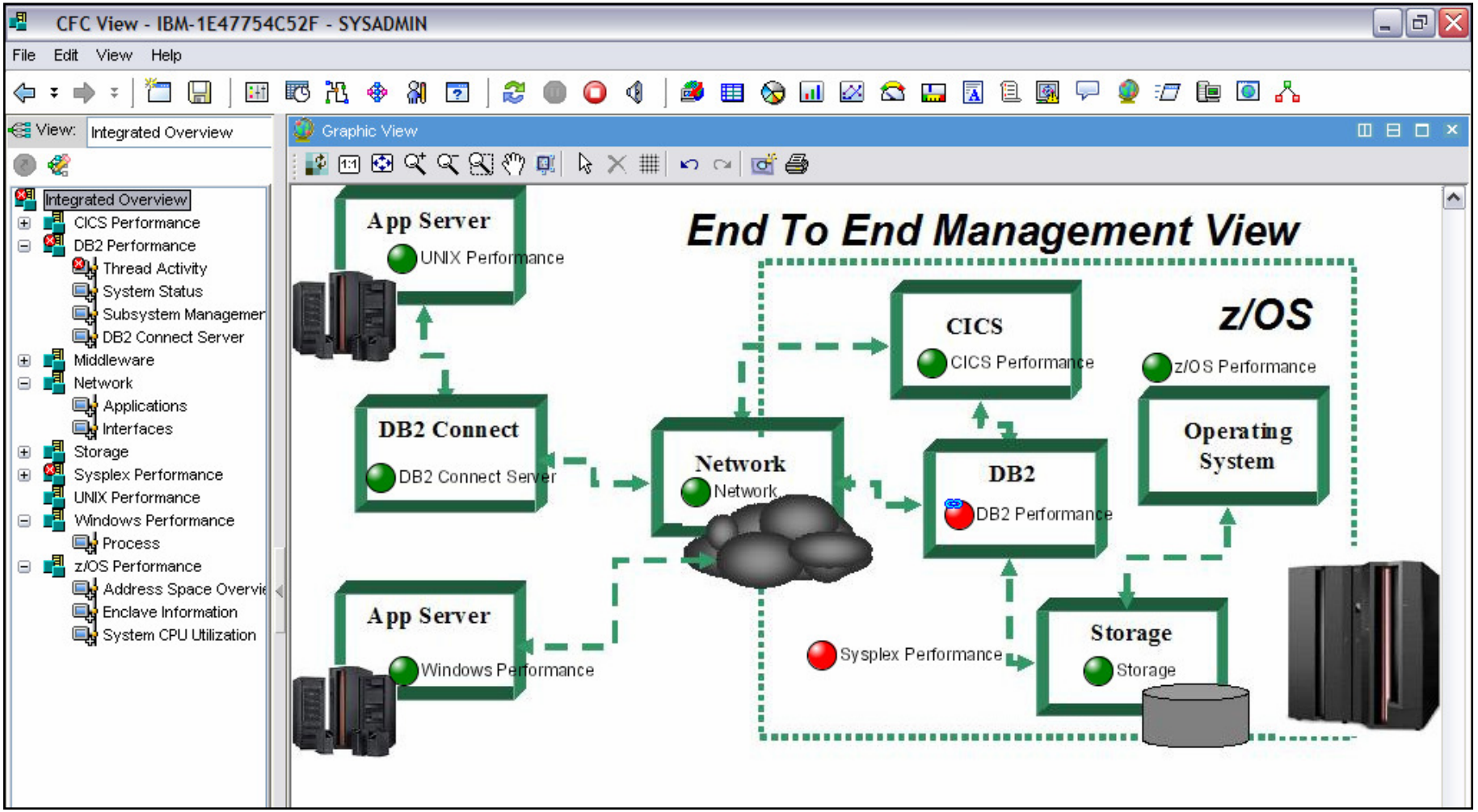


Tivoli Enterprise Portal (TEP)

Tivoli Enterprise Portal enables integrated alert and automation capabilities

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

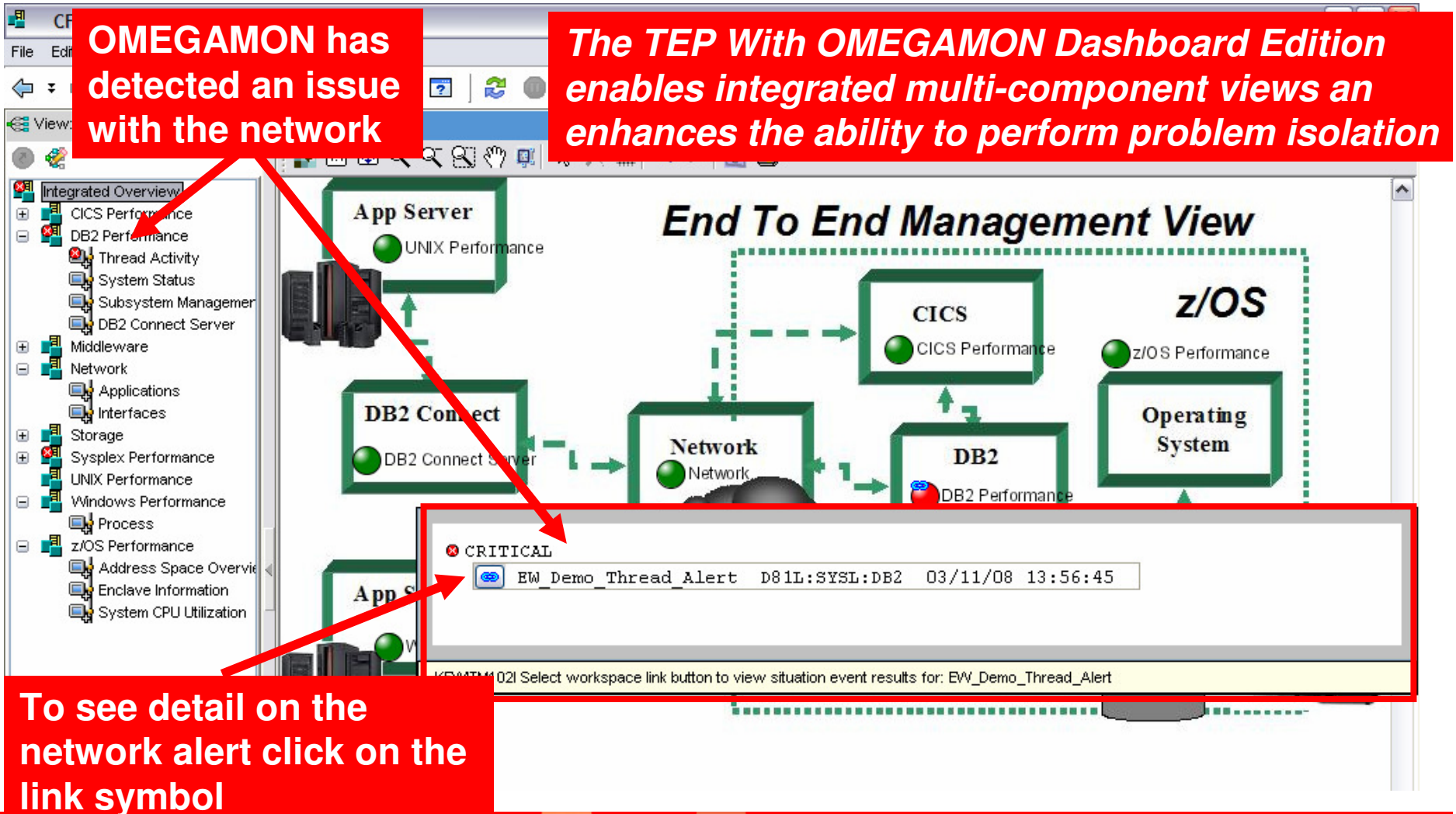
Tivoli Enterprise Portal Provides An Integrated Monitoring In Breadth Capability



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**

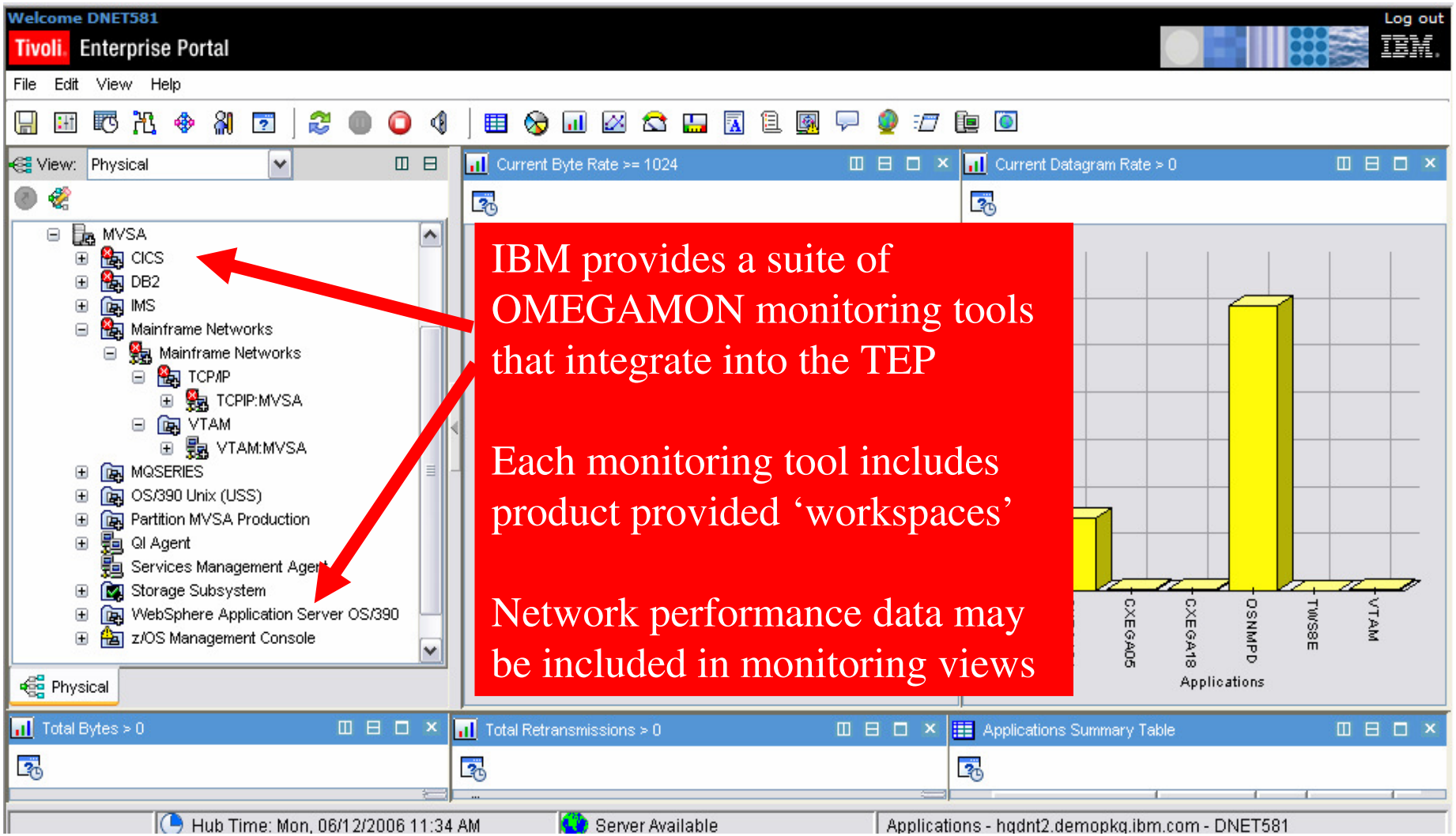
Tivoli Enterprise Portal Problem Isolation



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



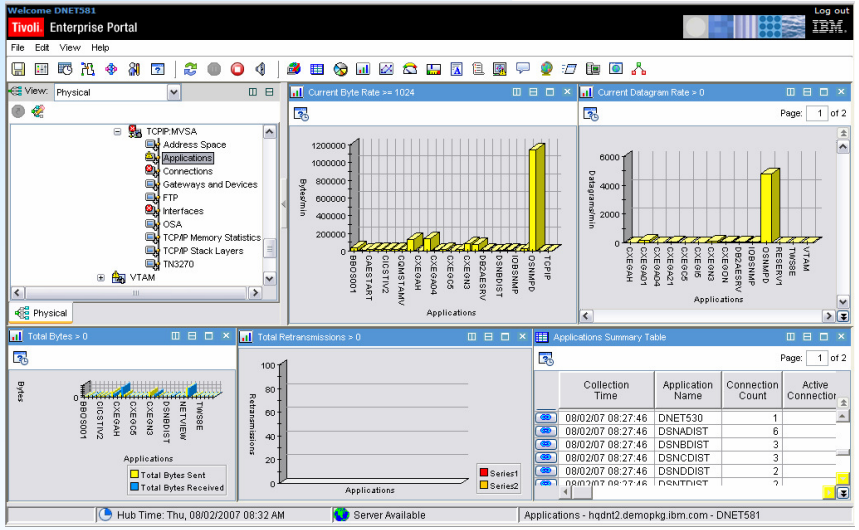
IBM provides a suite of OMEGAMON monitoring tools that integrate into the TEP

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

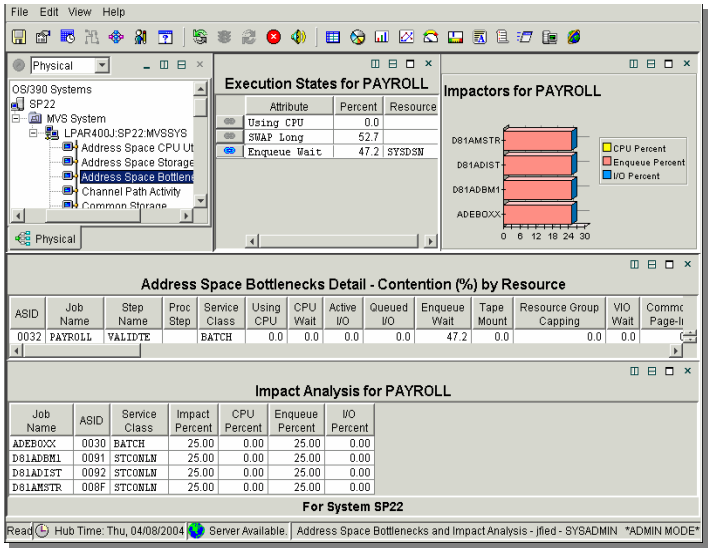
- **Powerful monitoring and management**
  - Monitor TCP/IP and SNA network resources from a common interface
  - Real time and historical monitoring capabilities
- **Out of the box alerts and automation**
  - Product provided situations
- **Common user interface** – Tivoli Enterprise Portal (TEP)
  - 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

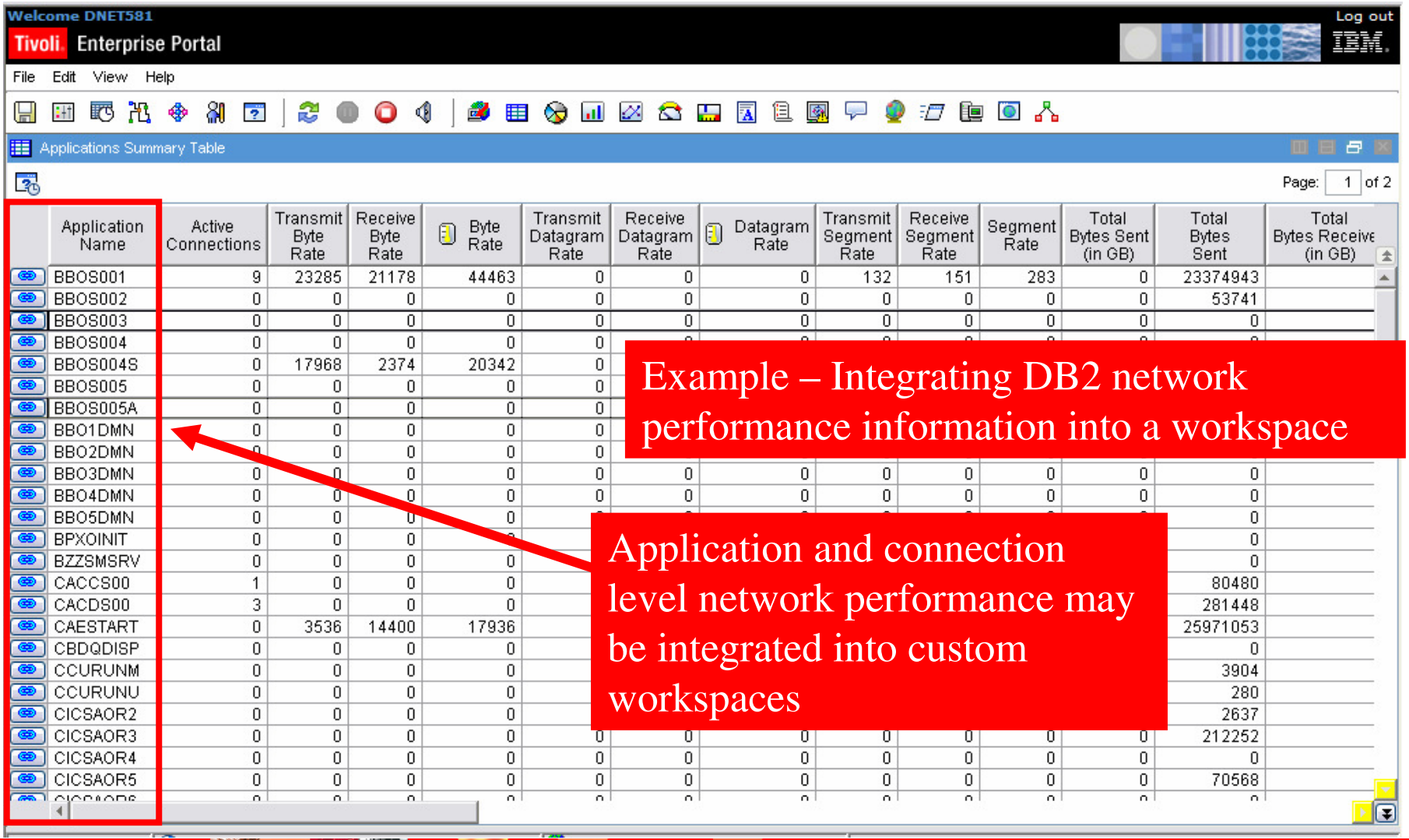
Alerts and Information

- **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



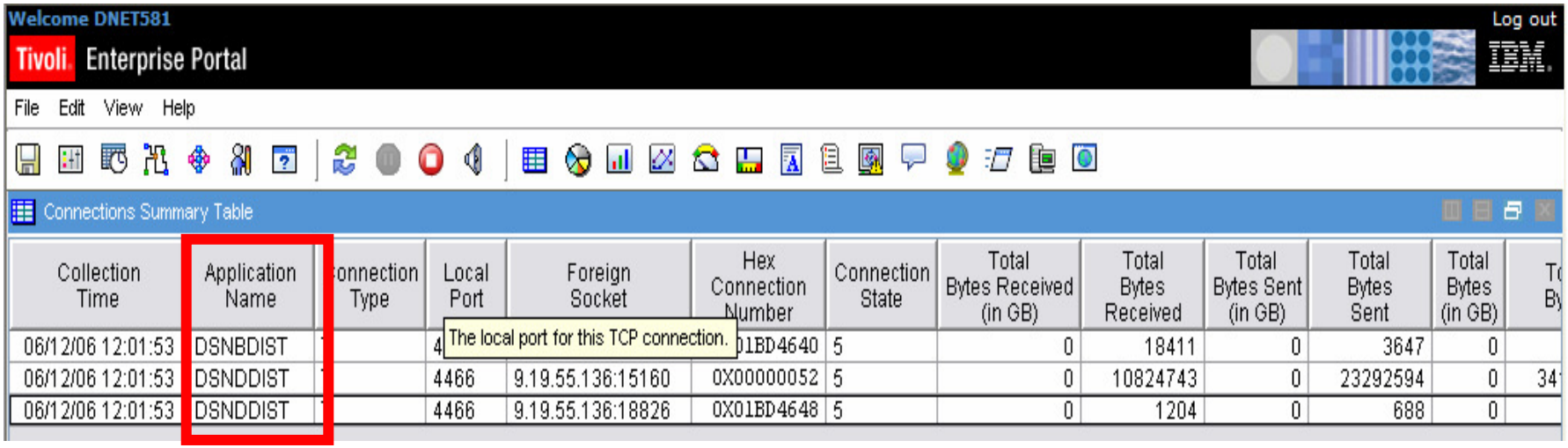
- **Manage multiple LPAR's and Sysplex's from one single console**
- **Resources**
  - CPU
  - Enclave
  - Storage (64-bit support)
    - Common
    - Paging
  - Channels
  - DASD
  - Tape Drives

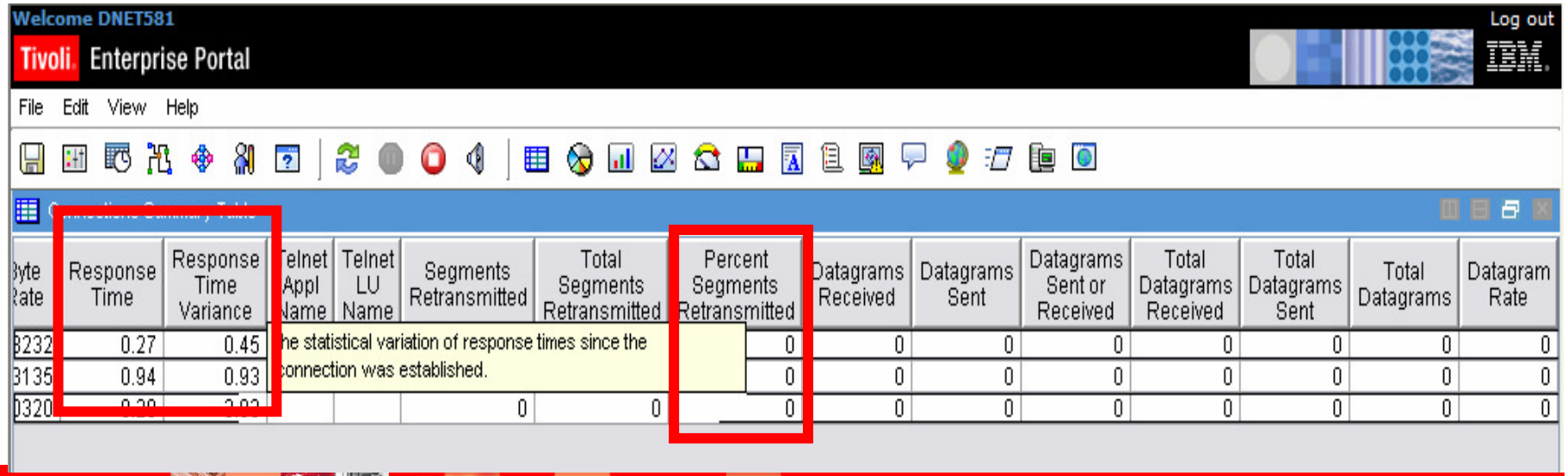
Adding Information From OMEGAMON XE For Mainframe Networks To Create An Integrated Performance Workspace



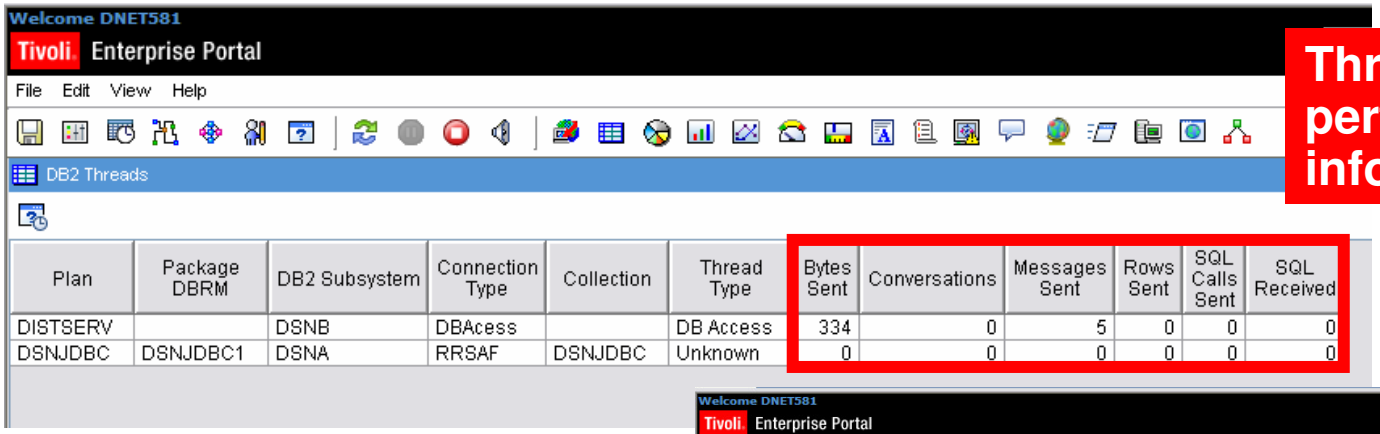
Application Name	Active Connections	Transmit Byte Rate	Receive Byte Rate	Byte Rate	Transmit Datagram Rate	Receive Datagram Rate	Datagram Rate	Transmit Segment Rate	Receive Segment Rate	Segment Rate	Total Bytes Sent (in GB)	Total Bytes Sent	Total Bytes Receive (in GB)
BBOS001	9	23285	21178	44463	0	0	0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

Detail Available For Network Connection Level Monitoring



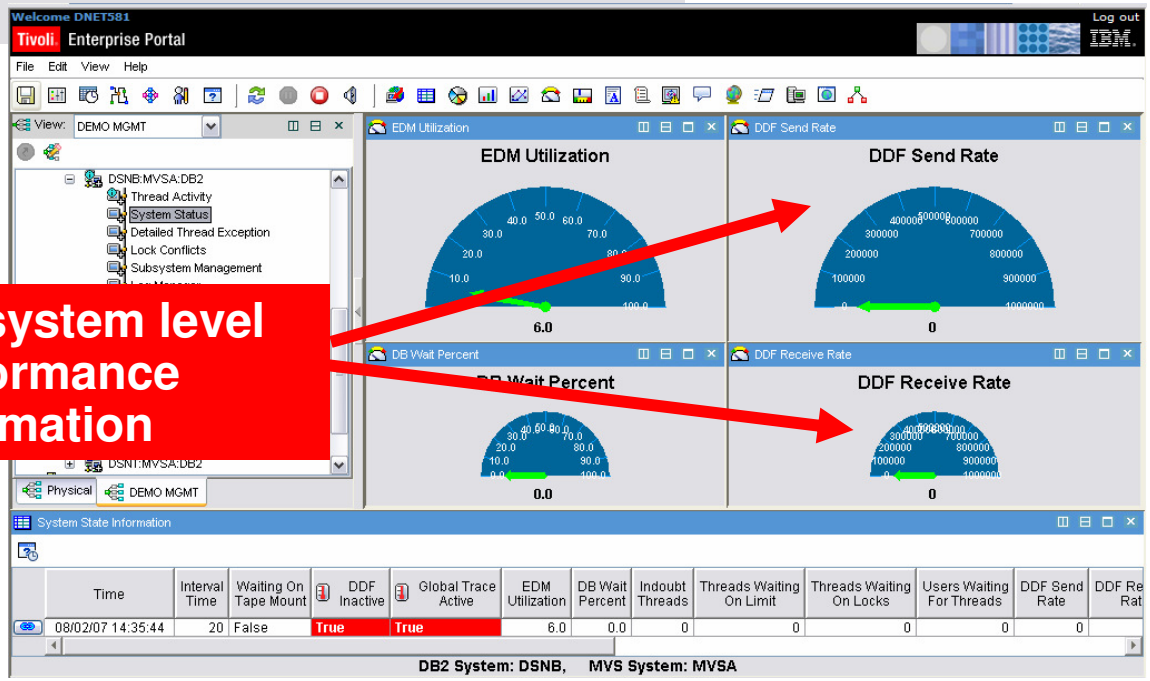


OMEGAMON XE For DB2
Network Related Performance Information



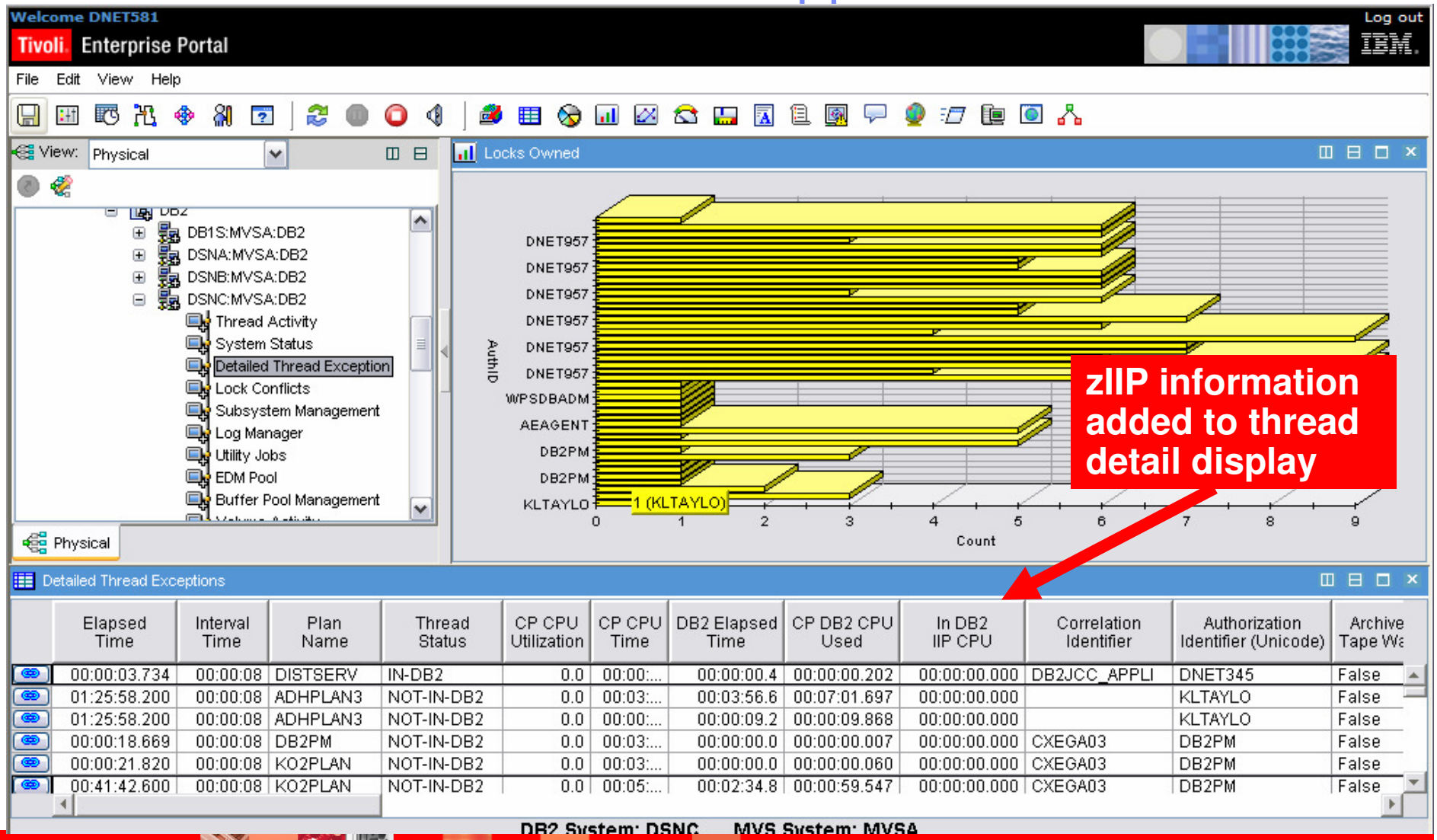
Plan	Package DBRM	DB2 Subsystem	Connection Type	Collection	Thread Type	Bytes Sent	Conversations	Messages Sent	Rows Sent	SQL Calls Sent	SQL Received
DISTSERV		DSNB	DBAcess		DB Access	334	0	5	0	0	0
DSNJDBC	DSNJDBC1	DSNA	RRSAF	DSNJDBC	Unknown	0	0	0	0	0	0

Thread level performance information

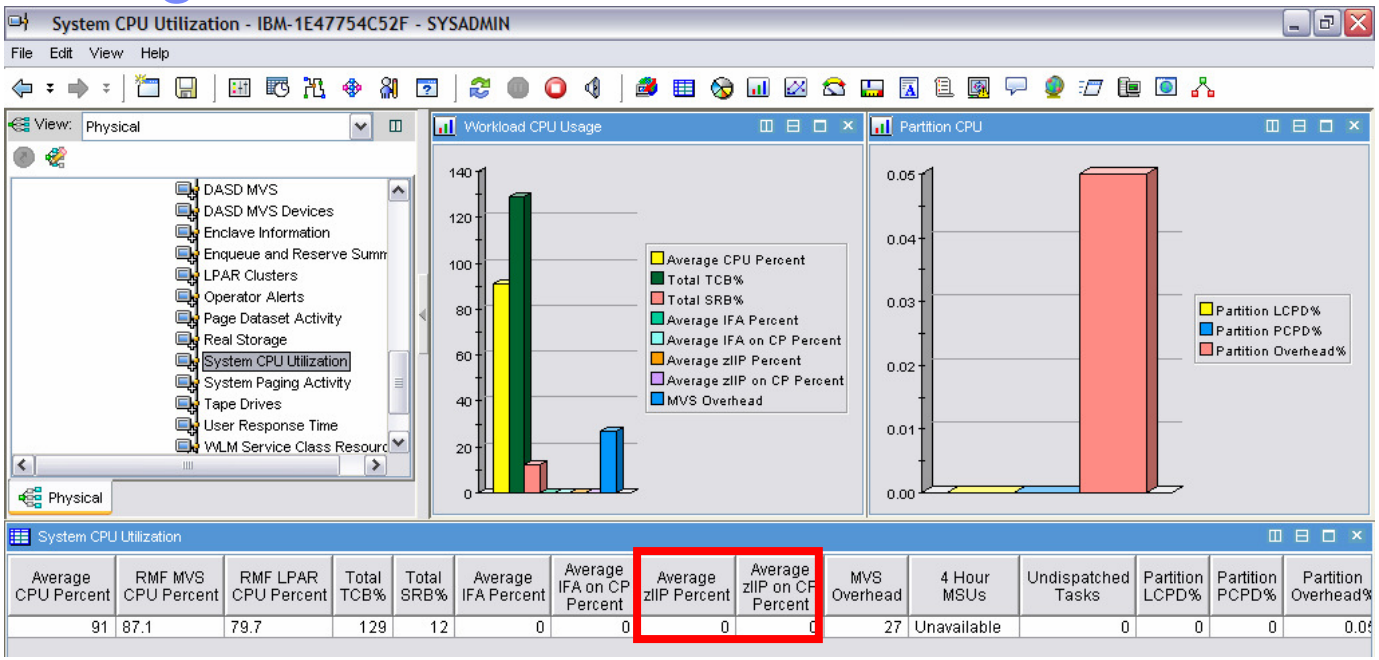


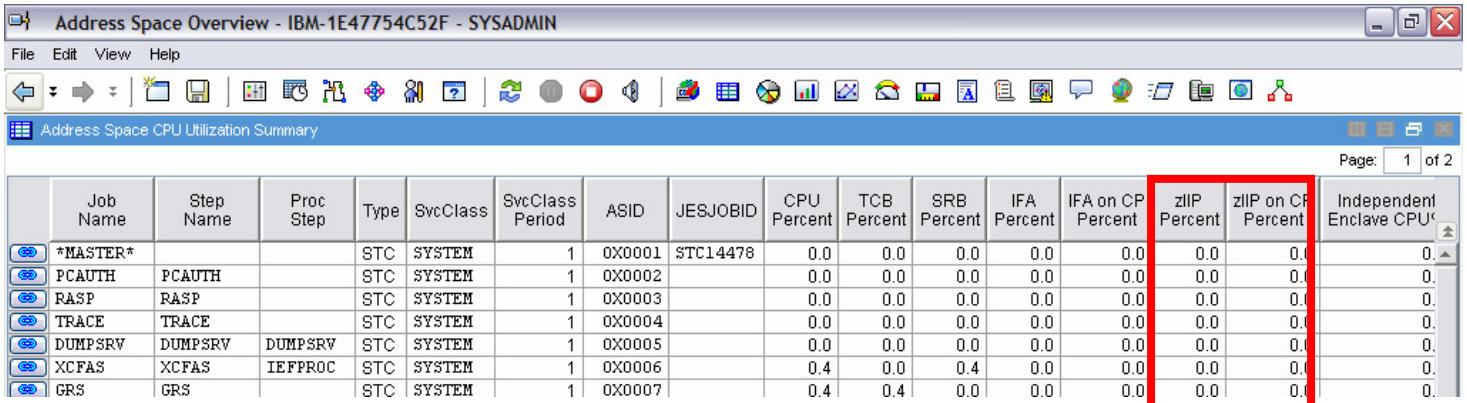
Subsystem level performance information

OMEGAMON For DB2 PM/PE
TEP Interface Provides zIIP Support

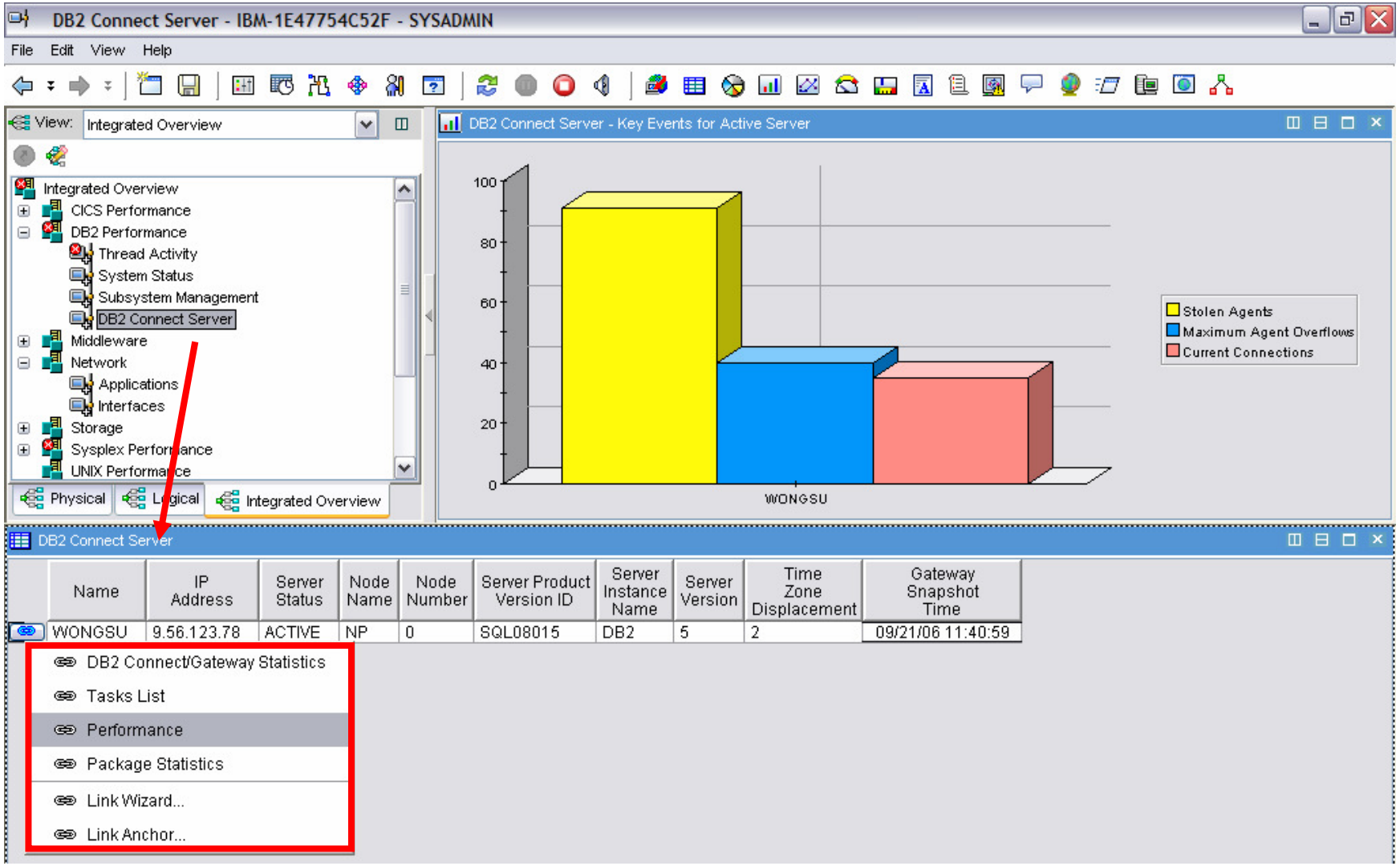


Understanding zIIP Utilization Using OMEGAMON XE For z/OS





DB2 Connect Monitoring

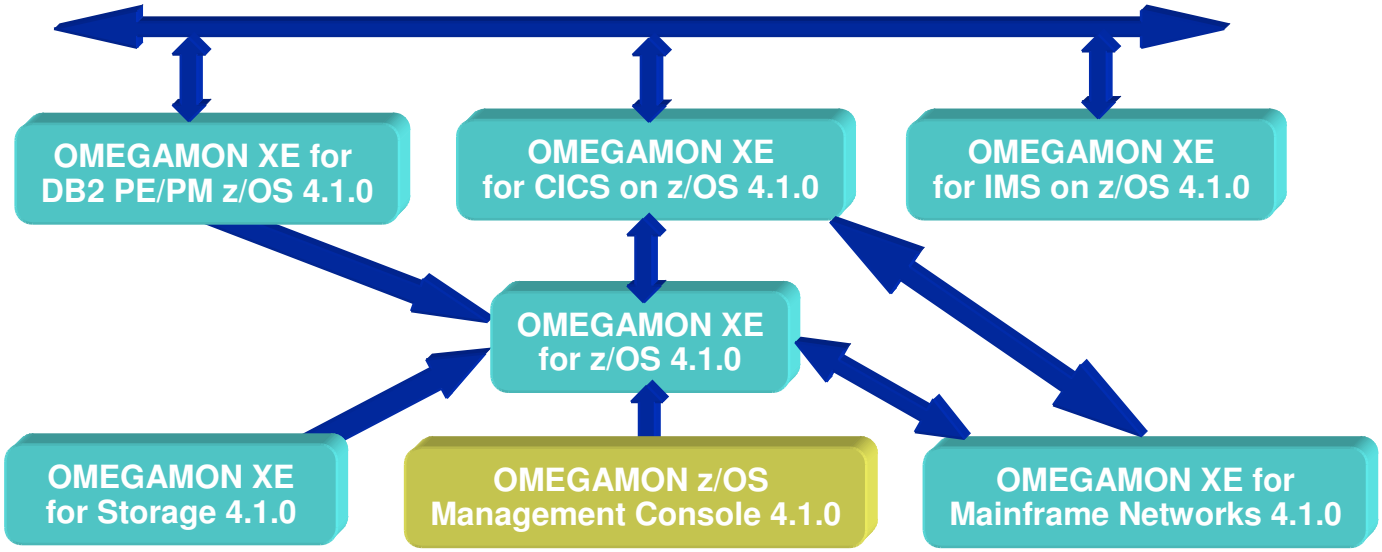


Dynamic Workspace Linking Functionality

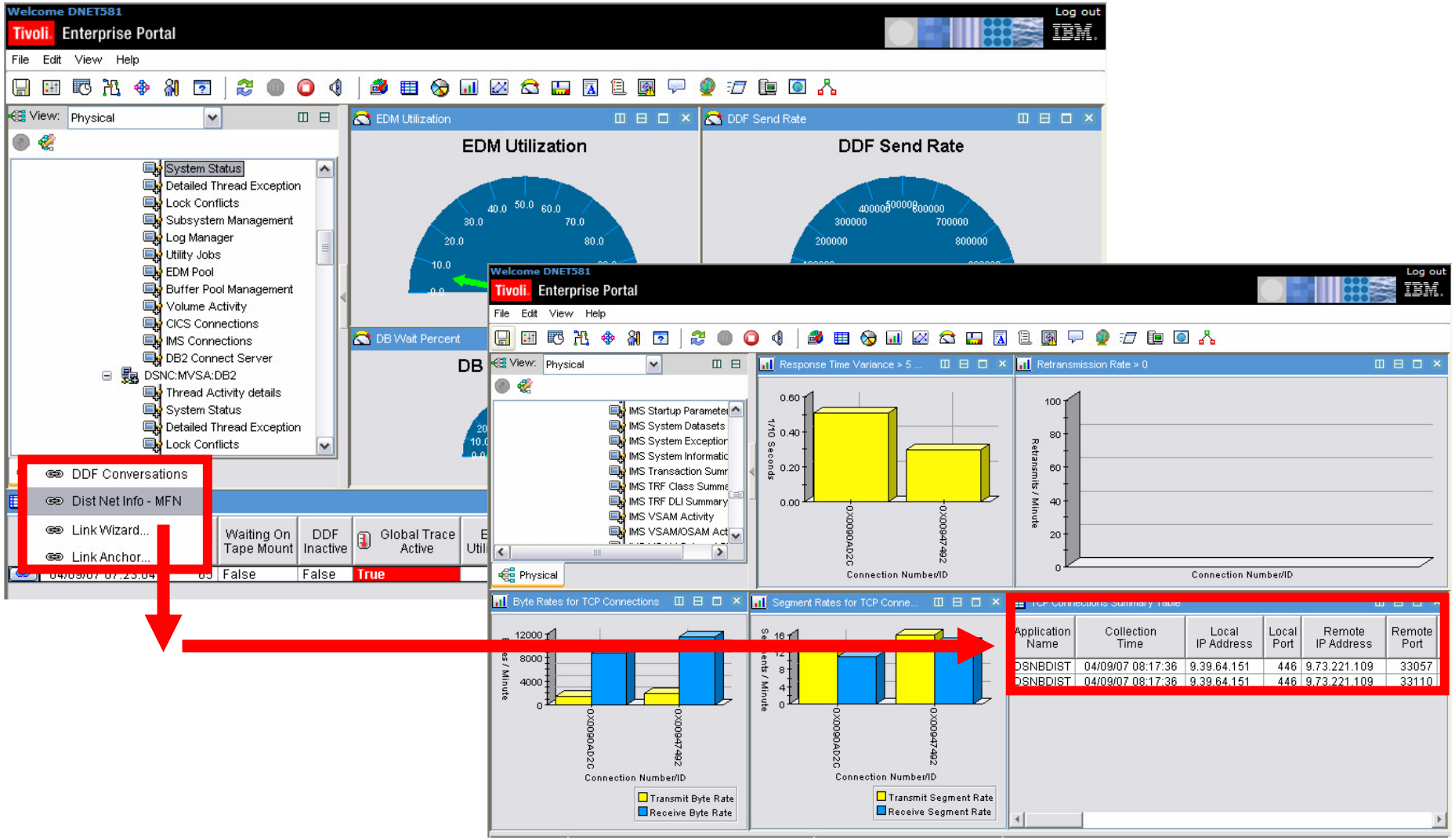
Problem: **How do I quickly find a potential problem that requires multiple monitoring products?**

Scenario: **Dynamically link DB2 to related network information**

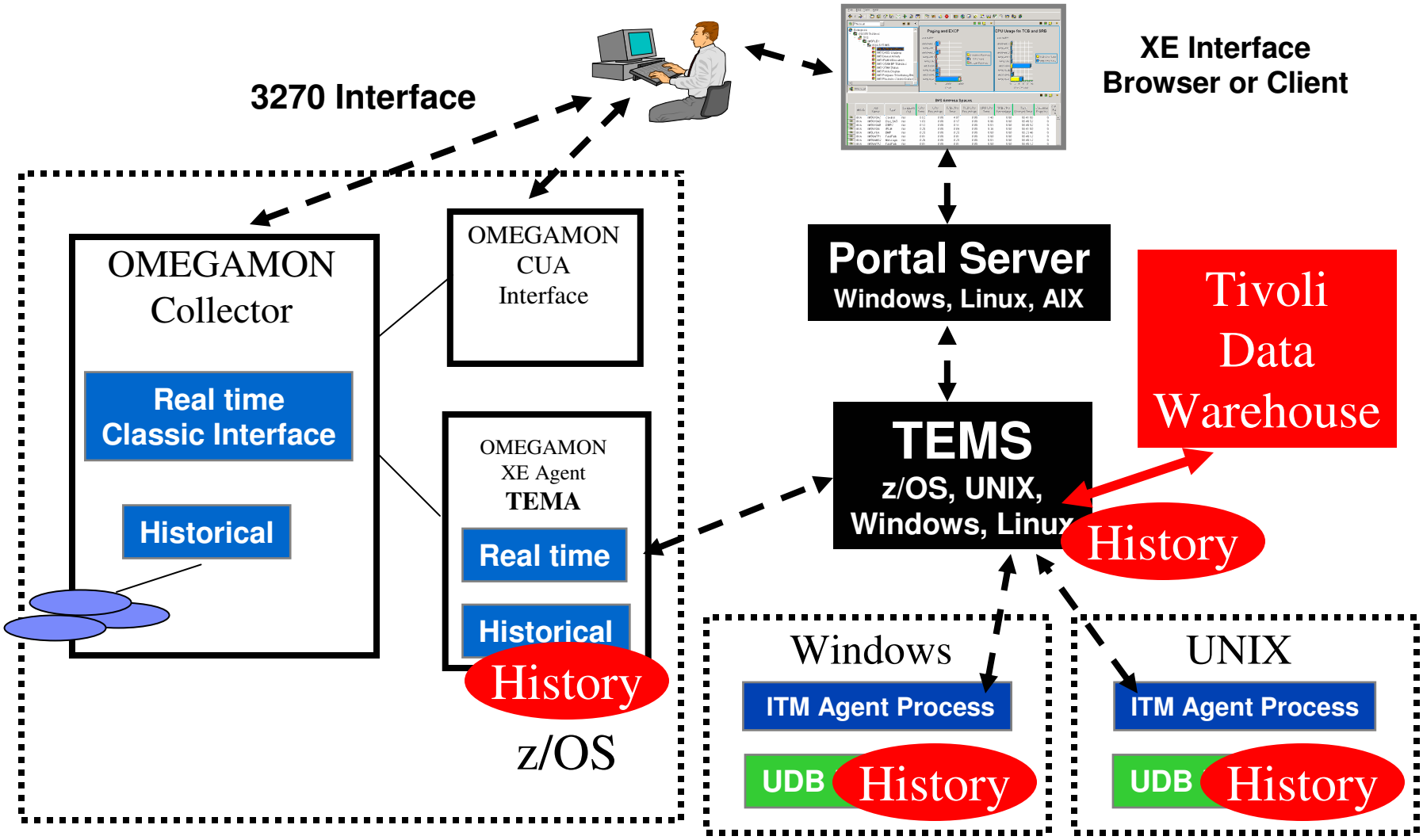
Solution: **Dynamic Workspace Linking**
Product provided links & user customized



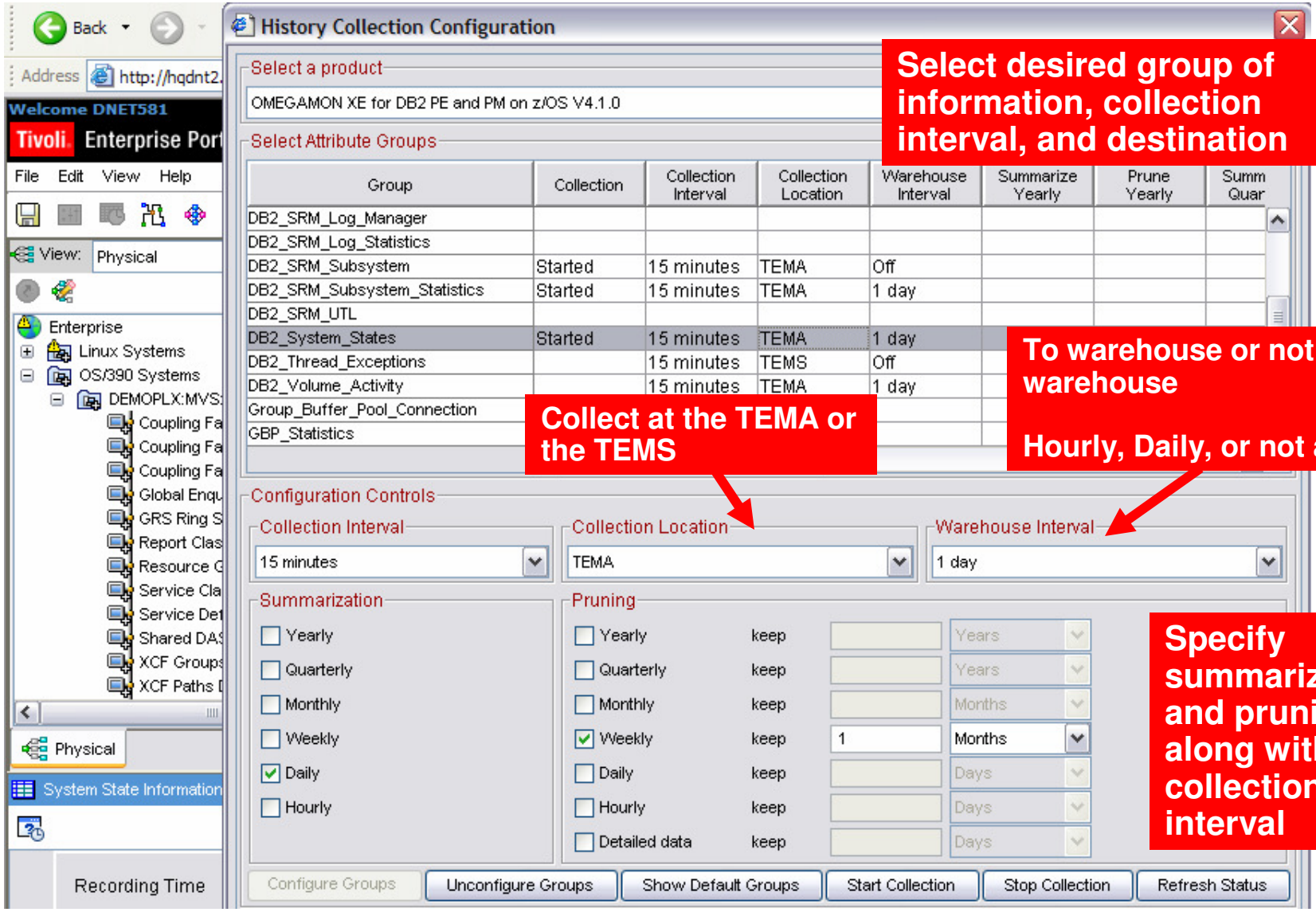
Dynamic Workspace Link
Drill Down In Context To DB2 Network Information



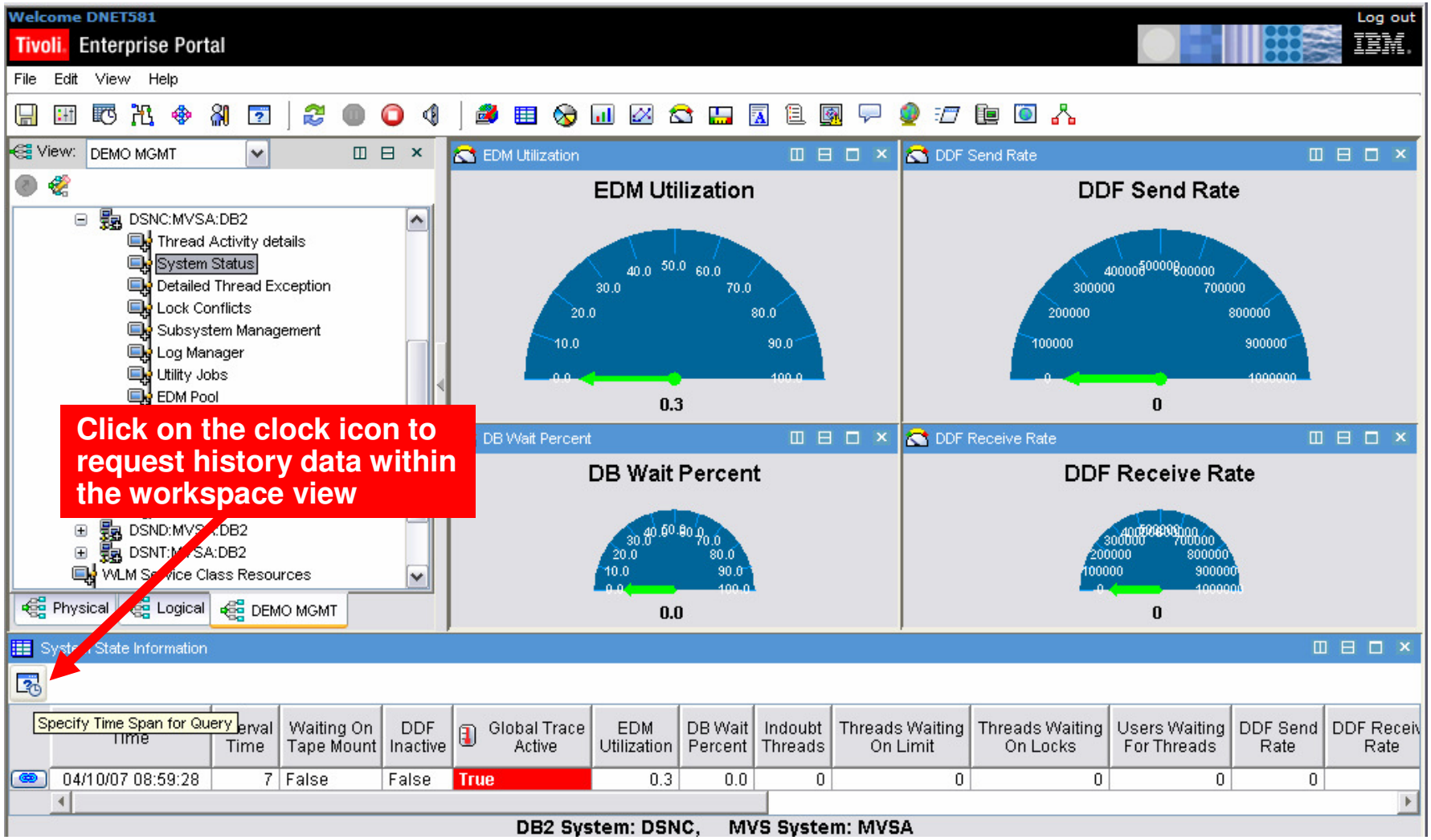
TEP Enables Integrated Multi-Platform Real Time And Historical Monitoring And Management



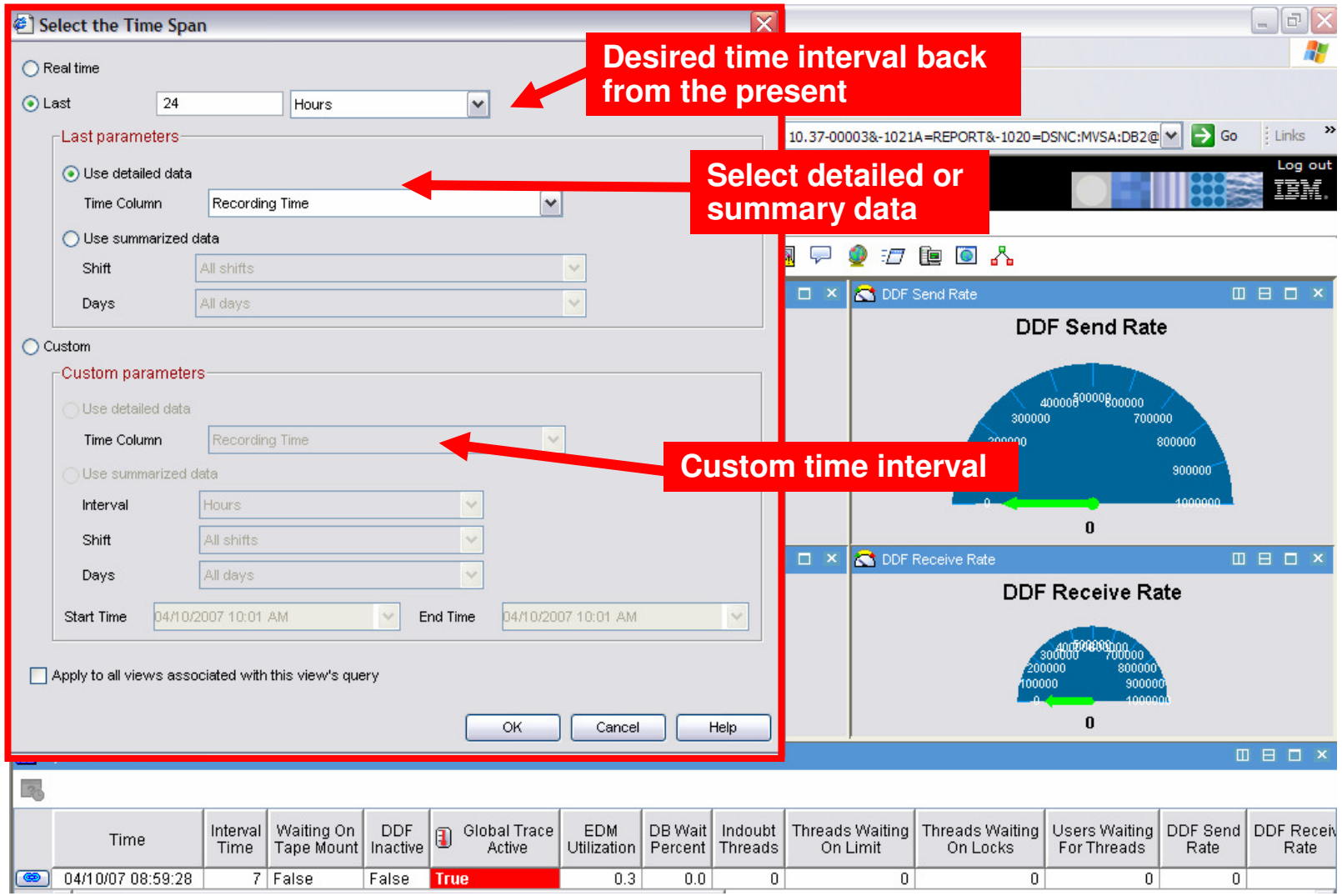
Tivoli Enterprise Portal History Collection Control



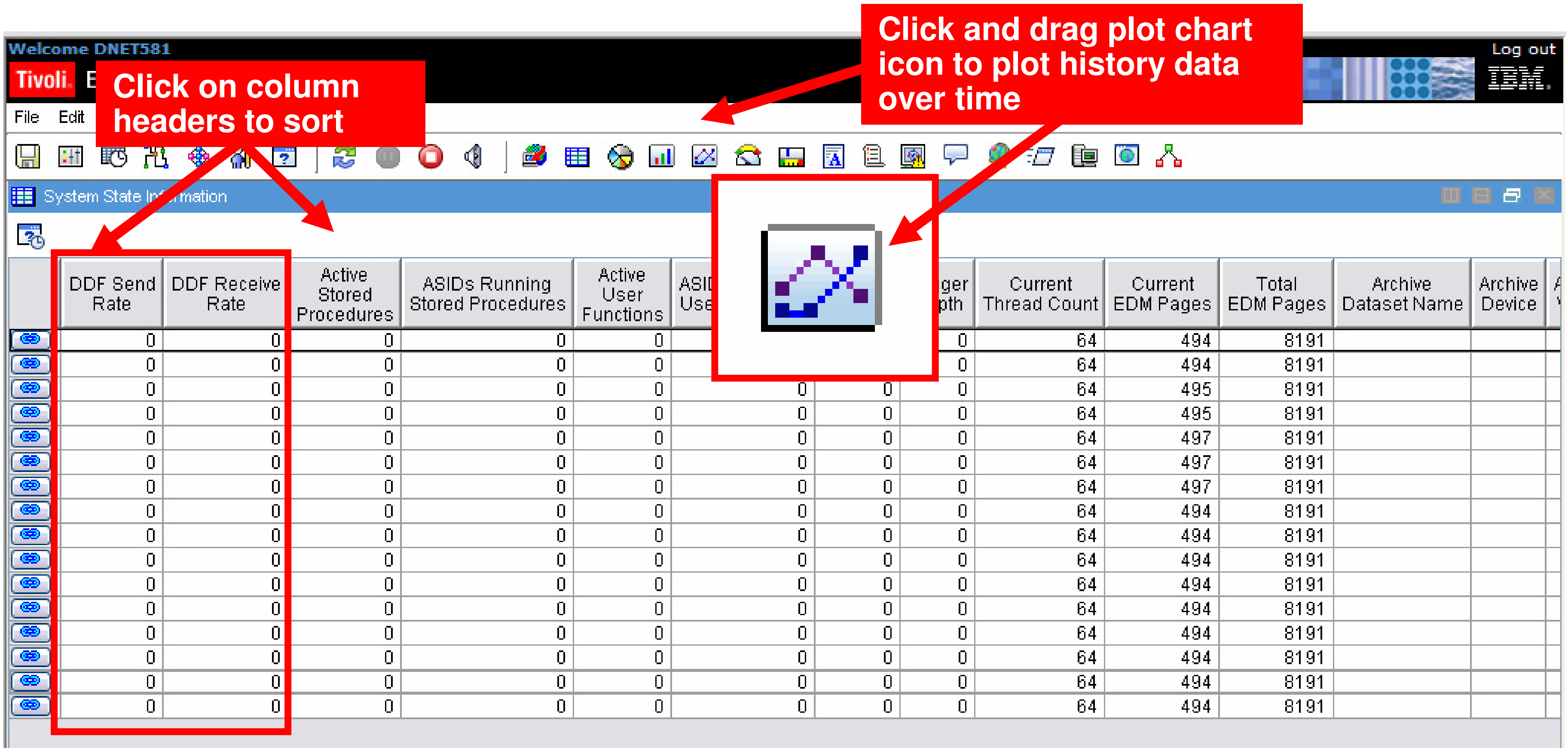
Access History Data Interactively In The TEP



Time Selection Pop-up



Example
History Data For Last 4 Hours



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

Thank You for Joining Us today!

Go to **www.ibm.com/software/systemz** to:

- Replay this teleconference
- Replay previously broadcast teleconferences
- Register for upcoming events