IBM Software Group

DB2 Application Analysis using OMEGAMON XE For DB2 UDB On z/OS

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Tivoli software

e business on demand.

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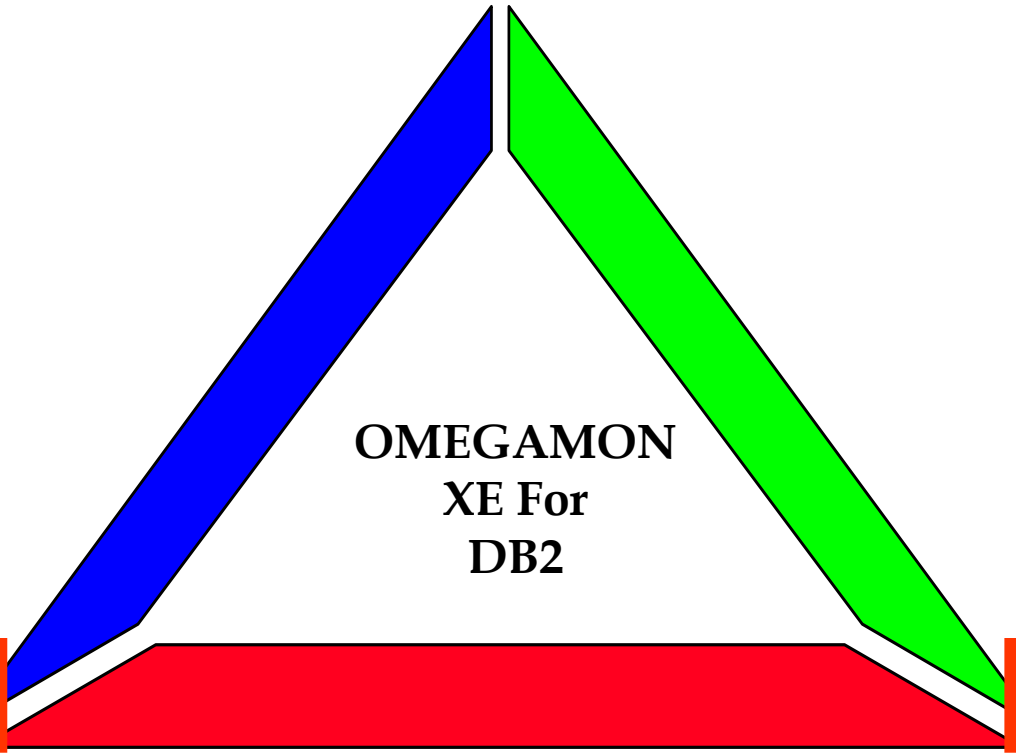
OMEGAMON XE For DB2 UDB On z/OS
Application Analysis Capabilities

- Real Time Monitoring -Threads
  - ✓Thread Detail (In-DB2 elapsed, CPU & wait times, locks, SQL statement counts & text, plan & package information)
  - ✓Monitor Triggers, Procedures, & UDFs
- Application Trace Facility
  - ✓Detailed performance tracing
- Choice Of Interfaces (XE Interface, 3270 interface)
- Object Analysis
  - ✓I/O & getpage analysis
  - ✓Correlate activity by object & applications
- Lock Conflict Analysis
- Near-Term Historical
  - ✓Near-term history online

Triangle

OMEGAMON DE – Dashboard Edition

High level monitoring
Multi-system view
Cross Platform View



3270 Interface

Subsystem details
3270 Interface
Historical details

OMEGAMON XE

Subsystem level monitoring
Browser And GUI interface
Proactive Alerting & Automation

OMEGAMON DB2
Classic 3270 Interface Main Menu

```
 _________________ ZMENU    VTM     O2       V520./C D81G 02/22/05  6:51:28   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
_ 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 .......... Online historical information
_ I  IFCID TRACE ......... Start an IFCID Trace
_ Z  OTHER DB2 ........... Redirect monitoring t
```

Select option T to see real time thread activity

Thread Activity Overview

```
                    ZALLT     VTM      O2        V520./C D81G 02/22/05  7:12:19   2
> Help PF1       Back PF3        Up PF7       Down PF8      Sort PF10     Zoom PF11
> T.A
>          THREAD ACTIVITY:  Enter a selection letter on the top line.

> *-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
> O-ENCLAVES
=============================================================
>                        ALL THREADS CONNECTED TO DB2
 THDA
+ *
+ Elapsed       Planname   CPU     Status        GetPg    Update   Commit   Jobname
+ ----------    --------   -----   ------------ ------   ------   ------   --------
+ 02-01:29      KO2520IF   00.0%   NOT-IN-DB2        0        0        0   CXEGA03
+ 02-01:29      KO2520HP   00.0%   NOT-IN-DB2        0        0        0   CXEGA03
+ 02-01:23      KO2520IF   00.0%   NOT-IN-DB2        0        0        0   CXEGA03
+ 02-01:23      KO2520IF   00.0%   NOT-IN-DB2        0        0        0   CXEGA03
+ 01:52:49.6    KO2520IF   00.0%   NOT-IN-DB2        0        0        0   CXEGA03
+ 00:38:44.9    TRANSPLX   00.0%   NOT-IN-DB2     1230      300        0   CCCDS18
+ 00:00:05.7    DEMO1      00.0%   NOT-IN-DB2        4        0        0   DEMOENCL
=============================================================
```

Note high Getpage counts and high CPU%

The thread display may be sorted
To view a specific thread position the cursor and press F11

Thread Detail

```
 _______________ ZTDTL    VTM     O2       V520./C D81G 02/22/05  6:36:01   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
=============================================================================
>                                THREAD DETAIL
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 act
+ Thread Activity                          User Defined Functions
+ ---------------------------------------  ---------------------------------------
+ DB2 Status            =    NOT-IN-DB2   TCB Time (SQL)          = 00:00:00.000
+ MVS Status            =     WAIT-MISC   Wait for TCB Time       = 00:00:00.000
+ Total Elapsed Time    =  00:00:26.600   Elapsed Time            = 00:00:00.000
+ CPU Utilization       =         00.0%   Elapsed Time (SQL)      = 00:00:00.000
+ Total CPU Time        =  00:00:02.186   SQL Events              =            0
+ Total Parallel Tasks  =             0
```

Press F8 to scroll down and see more detail

Thread detail shows current thread activity, including thread elapsed, in-DB2, and CPU time

Thread Detail - continued

```
                    ZTDTL     VTM      O2        V520./C D81G 02/22/05  6:36:01  25
+ 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       =                0
+ Release Savepoints       =                0
+ Rollback Savepoints      =                0
+
+ In-DB2 Times                                        Total         Current
+ ----------------------------                       ------------  ------------
+ Elapsed Time                                       00:00:02.131  00:00:00.000
+ CPU Time                                           00:00:00.820  00:00:00.000
+ Stored Procedure CPU Time                          00:00:00.000  00:00:00.000
```

Note the in-DB2 time and compare it to the thread elapsed time shown on the prior screen

Press F8 to scroll down and see more detail

Thread Detail - continued

```
 ________________ ZTDTL    VTM     O2       V520 /C D81G 02/22/05  6:36:01  48
+ Waits                                  Count    Total           Current
+ ------------------------------    ----------    ------------    ------------
+ Synchronous I/O Wait                      20    00:00:00.125    00:00:00.000
+ Asynchronous Read I/O Wait                 1    00:00:00.009    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                            4    00:00:00.002    00:00:00.000
+ Drain of Claims Wait                       0    00:00:00.000    00:00:00.000
+ Archive Log Mode(Quiesce) Wait             0    00:00:00.000    00:00:00.000
+ Archive Read from Tape Wait                0    00:00:00.000    00:00:00.000
+ Switch to Open/Close Wait                  4    00:00:00.348    00:00:00.000
+ Switch to SYSLGRNG Service Wait            1    00:00:00.032    00:00:00.000
+ Switch to DMS Waits                        4    00:00:00.200    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
```

Note thread wait time information. This shows the number of wait events, and the duration of the thread waits. This corresponds to the Accounting class 3 wait times.

Thread Detail
Lock Analysis

```
 _________________ ZTLOCT   VTM     O2       V520./C D81G 02/22/05  6:38:01   2
> Help PF1                                                          Back PF3

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

> A-THREAD DETAIL *-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
================================================================================
>                    THREAD LOCK/CLAIM/DRAIN ACTIVITY
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 loct
+ Lock Requests          =         65   Deadlocks Detected          =         0
+ Unlock Requests        =         53   Timeouts Detected           =         0
+ Query Requests         =          0   Suspends - Lock Only        =         0
+ Change Requests        =          0   Suspends - Latch Only       =         0
+ Other IRLM Requests    =          0   Suspends - Other            =         0
+ Escalations to Shared  =          0   Escalations to Exclusive    =         0
+ Maximum Page/Row Locks =          1
```

Select option B to see lock counts. Note counts for deadlocks and timeouts (if any)

Show Lock Detail

```
 _________________ ZLOCKO   VTM     O2       V520./C D81G 02/22/05  6:39:37   2
> Help PF1               Back PF3              Up PF7               Down PF8

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

> A-THREAD DETAIL B-LOCK COUNTS C-LOCK WAITS     *-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
================================================================================
>                        LOCKS/CLAIMS OWNED BY A THREAD
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 own
+                         Lock Ownership Information
+      Percent NUMLKUS       = .00        Total  Locks Owned        = 5
+      Total Catalog Locks   = 1          Pageset and Dataset Locks = 1
+      Catalog Pageset Locks = 1          Page/Row Locks            = 0
+      Catalog Page/Row Locks= 0          Directory and Other Locks = 3
+      Bind ACQUIRE option   = USE        Bind RELEASE option       = COMMIT
+      ISOLATION option      = Cursor Stability
```

Look at number and type of locks owned

Thread Lock Detail

```
 _______________ ZLOCKO   VTM     O2       V520./C D81G 02/22/05  6:39:37  25
+      Type    Level        Resource                                Number
+      ----    -----        ---------------------------------- ------
+      DTBS        S        DB=DSNDG07                                 1
+      PSET        S        DB=DSNDG07        PS=DSN4K01               1
+                 IS        DB=DSNDB06        PS=SYSDBASE              1
+                 IS        DB=DSNDB01        PS=SCT02                 1
+      SKCT        S        Plan=TRANSPLX                              1
+                                                                 ------
+                                                        Total =       5
+                         Claim Information
+      Type       Class     Resource
+      -------    -----     ------------------------------------------
+      IX         CS        DB=DSNDB06        PS=DSNDCX01
+      IX         CS        DB=DSNDB06        PS=DSNDKX01
+      IX         CS        DB=DSNDB06        PS=DSNDXX03
+      TS         CS        DB=DSNDB06        PS=SYSDBASE
+      IX         CS        DB=DSNDB01        PS=DSNSCT02
+      TS         CS        DB=DSNDB01        PS=SCT02
=========================================================================
```

Press F8 to see additional lock detail

See locks held, lock level, and on what resources

Look At Thread SQL Counts

```
 _________________ ZTSCNT    VTM      O2        V520./C D81G 02/22/05  6:40:49    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   *-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
================================================================================
>                                CURRENT SQL COUNTS
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 sqls
+ Commit          =       0  Abort           =       0  Select          =       0
+ Open Cursor     =      14  Close Cursor     =      14  Fetch           =  140000
+ Insert          =       0  Delete          =       0  Update          =       0
+ Describe        =       0  Lock Table       =       0  Prepare         =       0
+ Grant           =       0  Revoke          =       0  Set Rules       =       0
+ Increm Bind     =       0  Label/Comm On    =       0  Set SQLID       =       0
+ Set Host Var    =       0  Set Connection  =       0  Set Degree      =       0
+ Connect Type 1 =
```

Look at SQL counts to get a better understanding of what the application is doing. Look for patterns in the numbers. Look for potential problem indicators.

Look At SQL Counts To Understand The Application

Look at Parallelism, SPs, Triggers, etc.

```
                  ZTSCNT    VTM      O2        V520./C D81G 02/22/05  6:40:49  36
+  Alias          =       0   Alias          =       0
+  Function       =       0   Function       =       0   Function       =       0
+  Procedure      =       0   Procedure      =       0   Procedure      =       0
+  Trigger        =       0   Trigger        =       0
+  Dist Type      =       0   Dist Type      =       0
+  Aux Table      =       0
+
+ RID Pool Used           =     154   RID Pool Use Failed-No Storage  =       0
+                                     RID Pool Use Failed-Max Limit   =       0
+
+ Max Parallel Degree     =       0   Parallel Groups Executed        =       0
+ Parallel Failed-Cursor  =       0   Parallel Failed-No ESA Sort     =       0
+ Parallel Failed-Buffers =       0   Parallel Failed-No Enclaves     =       0
+ Parallelism Disabled    =      No   Parallel Degree Reduced-Buffers =       0
+ Single DB2 (Coord=NO)   =       0   Parallel Degree Executed        =       0
+ Single DB2 (Cursor)     =       0   Sysplex Int
+ Bypass DB2 (Buffers)    =       0
+
+ Maximum LOB Storage     =       0
+
+ SQL Call Statements     =       0   SQL Calls Timed Out             =       0
+ Stored Proc SQL Reqs    =       0   SQL Calls Rejected              =       0
+                                     Stored Procedures Abended       =       0
```

Lock for problem indicators (failed, timed out, etc.)

Press F8 to see additional SQL detail

SQL Counts - continued

```
 _________________ ZTSCNT   VTM     O2       V520./C D81G 02/22/05  6:40:49  59
+
+ UDFs Executed            =       0   UDFs ABENDed                    =       0
+ UDFs Timed Out           =       0   UDFs Rejected                   =       0
+
+ Stmt Triggers Activated  =       0   Row Triggers Activated          =       0
+ SQL Error in Trigger     =       0   Maximum Nested SQL              =       0
+
+ Prepare Statistics:
+  Copied from Cache       =       0    Implicit - KEEPDYNAMIC(YES)     =       0
+  No Match                =       0    Avoided - KEEPDYNAMIC(YES)      =       0
+  Discarded - MAXKEEPD    =       0    Purged - DROP/ALTER/REVOKE      =       0
+
+ Direct Row Access
+ Successful               =       0   Revert to Index                 =       0
+                                      Revert to Tablespace Scan       =       0
=================================================================================
```

Note trigger ad UDF activity

Press F8 to see additional SQL detail

View The Currently Executing SQL

```
 _________________ ZSQL     VTM     O2       V520./C D81G 02/22/05  6:47:38   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
> *-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
================================================================================
>                            SQL CALL BEING EXECUTED
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 call
+      SQL call is active, call information is as follows :
+
+      Thread Status  = WAIT-REMREQ    SQL Request Type     = STATIC
+      Total SQL Reqs =   274910       SQL Call Type        = FETCH
+      SQL DBRM Name  = CICSDB21       SQL Statement Number = 00073
+
+      DECLARE CUR1 CURSOR FOR SELECT I . DBNAME , I . TBCREATOR , I . TBNAME ,
+       I . NAME , I . CLUSTERING , I . CLUSTERRATIO , I . UNIQUERULE , I . FIR
```

Hit enter to watch screen refresh

Press F8 to see additional SQL text detail

Thread Buffer & I/O Analysis

```
 _________________ ZBUF      VTM      O2        V520./C D81G 02/22/05  6:48:16    2
> Help PF1              Back PF3                   Up PF7                  Down PF8

>       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    *-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
================================================================================
>                          THREAD BUFFER POOL ACTIVITY
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 buf
+ Buffer Pool: BP0
+
+ Getpage Requests       =        494   Failed Getpage Requests    =          0
+ Synchronous Read I/O   =         21   Getpage/Read I/O           =      23.52
+ Page Updates           =        116   Seq Prefetch Requests      =         29
+ List Prefetch Requests =         29   Dynamic Prefetch Requests  =          0
+ Prefetch Pages Read    =          9   Pr
+ Hiperpool Reads        =          0   Fa
```

Look at getpage and I/O counts for threads showing high I/O wait times

Real time views of thread getpage activity broken out by buffer pool

Object Information

Object Analysis Option Shows Thread Getpage & I/O

```
 _________________ ZTOBJ    VTM     O2       V520./C D81G 02/22/05  6:49:24   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      *-OBJECTS
> P-CANCEL THREAD Q-DB2 CONSOLE R-DSN ACTIVITY   S-APPL TRACE   T-ENCLAVE
================================================================================
>                              OBJECTS USED BY THREAD
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOL
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=0012
+ Package: CICSDB21       Collection=
 tobj
+                                                    Sync      ------ Prefetch I/O -----
+ Database  Spacenam  Dsn  Volume   Getpage          Read        Seq       List   Dynamic
+ --------  --------  ---  ------   -------          -------   -------   -------   -------
+ DSNDB06   DSNDCX01  001             117               0         0         0         0
+ DSNDB06   SYSDBASE  001              13               0         0         0         0
+ DSNDG07   DSN4K01   001              78               0         0         0         0
================================================================================
```

Note Getpage and I/O information for the thread

Getpages

I/Os

I/O Analysis

```
 _________________ ZIIO     VTM     O2       V520./C D81G 02/22/05  6:49:53   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 *-DSN ACTIVITY   S-APPL TRACE   T-ENCLAVE
================================================================================
>                                  THREAD DETAIL
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=

>    place a 'T' in front of command to view by tablespace, 'D' by database

 iio
+                                                  --Synch I/O--  -Asynch I/O--
+ Dataset Name                                     Delay  Count   Delay  Count
+ ----------------------------------------------   ------ ------  ------ ------
+ DB2C71.DSNDBC.DSNDB01.DSNSCT02.I0001.A001          4.5      6      .0      0
+ DB2C71.DSNDBC.DSNDB01.SCT02.I0001.A001           11.0      8      .0      0
```

Looking For Additional Detail
Package Level Detail

```
 _________________ ZPKG      VTM      O2        V520./C D81G 02/22/05  6:48:46   2
> Help PF1          Back PF3          Up PF7           Down PF8          Zoom PF11

>        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
> *-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
================================================================================
>                             THREAD PACKAGE SUMMARY
 PLAN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS   JOB=CCCDS18   Tran=DB21  Task#=00127  Term=M485  Type=POOL
+ Package: CICSDB21       Collection=
 pkl

 pkg
+
+ Package/          SQL        In-DB2        In-DB2                    In-DB2
+     DBRM       Requests  Elapsed Time      CPU Time     Waits      Wait Time
+ --------     ----------  ------------  ------------  --------  ------------
+ CICSDB21   *     300060  00:00:08.039  00:00:04.900        49  00:00:00.738
================================================================================
```

Analysis may be by package level, as well as plan level

Application Trace Facility
Detailed Application Analysis

```
 _________________ ZATRQ2    VTM      O2        V520./C D81G 02/22/05  6:50:41    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   *-APPL TRACE   T-ENCLAVE
================================================================================
>                             SPECIFY APPLICATION TRACE
 ATRQ
+ Type DB2 Plan name to be traced. Also, provide additio
+ selection information to limit trace output. To save t
+ for later viewing you must specify a data set name for DSN
+
:      DSN=_____________________________________________      Data set name
:      TIME=005              Number of mins to trace (001-060)
:      PLANNAME=TRANSPLX     Plan name or ALL for all active threads
:      AUTHID=MHANS          DB2 authorization identifier
:      TSOUSER=________      TSO USERID (TSO foreground app)
:      JOBNAME=________      Jobname (TSO batch app)
:      CICSTRAN=____         CICS tran
:      CICSCONN=________     CICS conn
```

Specify filter options to reduce trace overhead

Uses DB2 performance traces to capture and analyze application activity

Application Trace Facility

To see more detail position the cursor and press F11 to zoom

```
 _________________ ZATVC     VTM      O2        V520./C D81G 02/22/05  6:55:10    2
> Help PF1          Back PF3          Up PF7          Down PF8          Zoom PF11
================================================================================
>                      APPLICATION TRACE UNIT OF WORK SUMMARY
 ATVC
+ Planname=TRANSPLX    Connid=CCCDS18     Corrid=POOLDB210001    Authid=MHANS
+
+ Start Time    Progname   InDB2 Time    InDB2 CPU   SQL     Sorts    Locks    Rows
+ ------------ --------  ------------ ---------  ------ ------  ------  -------
+ 06:51:14.954 CICSDB21   00:00.28034      .13600     8205       2        4      114
================================================================================
```

Application trace uses DB2 performance traces

Traces may be sent to a file or to memory within Omegamon. Send trace to a file for reporting or later analysis

Application Trace Facility
SQL Index

```
 _________________ ZATSI    VTM     O2       V520./C D81G 02/22/05  6:56:06   2
> Help PF1          Back PF3         Up PF7          Down PF8          Zoom PF11

>          APPLICATION TRACE:  Enter a selection letter on the top line.

> A-PROGRAM     *-SQL INDEX     C-SQL DETAIL     D-LOCK DETAIL     E-EVENT DETAIL
================================================================================
>                         APPLICATION TRACE SQL INDEX
 ATSI
+ Planname=TRANSPLX    Connid=CCCDS18     Corrid=POOLDB210001    Authid=MHANS
+
+ Call Type         Stm#  Program  Count InDB2 Time    MRet Rws Pc Rws DM Rws RD
+ ---------------- ----- -------- ----- ------------ ---- ------ ------ ------
+ OPEN CURSOR          70 CICSDB21     1 00:00.00084    0      24     12     12
+ FETCH               73 CICSDB21  3806 00:00.13718  100      33     22     22
+ CLOSE CURSOR        75 CICSDB21     1 00:00.00010    0       0      0      0
+ OPEN CURSOR          70 CICSDB21     1 00:00.00082    0      24     12     12
+ FETCH               73 CICSDB21  4396 00:00.14140  100      33     22     22
================================================================================
```

Note statement #, count of times executed, In-DB2 time

Maximum return code, rows processed by data manager, rows processed by RDS

Application Trace Facility
Event Detail

```
 _________________ ZATD3     VTM      O2        V520./C D81G 02/22/05  7:02:02   2
> Help PF1                Back PF3                 Up PF7                  Down PF8

>          APPLICATION TRACE:  Enter a selection letter on the top line.

> A-PROGRAM     B-SQL INDEX     C-SQL DETAIL     D-LOCK DETAIL     *-EVENT DETAIL
================================================================================
>                          APPLICATION TRACE EVENT DETAIL
 ATD3
+ Planname=TRANSPLX    Connid=CCCDS18     Corrid=POOLDB2
+
: Control=NEXT     (FIRST/LAST/NEXT/PREV/+nnnn/-nnnn/Sr
+ Current=000001  Total Number of SQL Calls=008207
+
+ Event Time    TN Event Type             Event Resource Information
+ ------------ -- --------------------- ---------------------------------------
+ 06:51:14.954    START OPEN CURSOR      PGM=CICSDB21 STMT=00070
+ 06:51:14.954    START OF SORT
+ 06:51:14.955    START INDEX SCAN       DB=DSNDB06   PS=DSNDXX03
+ 06:51:14.955    LOCK ACQUIRE           DB=DSNDB06   PS=SYSDBASE DPAG S   D=MNL
+                                        PAGE=0000FD
+ 06:51:14.955    START INDEX SCAN       DB=DSNDB06   PS=DSNDKX01
+ 06:51:14.955    END OF INDEX SCAN      DB=DSNDB06   PS=DSNDKX01
+                                        ROWS=0000022 PAGES=0000000
```

Note individual event detail. Start/Stop trace records, with elapsed time

Looking At Enclave Thread Activity

```
 _________________ ZALLT    VTM     O2       V520./C D81G 02/22/05  7:12:19   2
> Help PF1      Back PF3       Up PF7      Down PF8     Sort PF10    Zoom PF11
> T.A
>         THREAD ACTIVITY:  Enter a selection letter on the top line.

> *-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
> O-ENCLAVES
================================================================================
>                        ALL THREADS CONNECTED TO DB2
 THDA
+ *
+ Elapsed      Planname  CPU    Status       GetPg   Update  Commit  Jobname
+ ----------   --------  -----  ------------ ------  ------  ------  --------
+ 02-01:29     KO2520IF  00.0%  NOT-IN-DB2        0       0       0  CXEGA03
+ 02-01:29     KO2520HP  00.0%  NOT-IN-DB2        0       0       0  CXEGA03
+ 02-01:23     KO2520IF  00.0%  NOT-IN-DB2        0       0       0  CXEGA03
+ 02-01:23     KO2520IF  00.0%  NOT-IN-DB2        0       0       0  CXEGA03
+ 01:52:49.6   KO2520IF  00.0%  NOT-IN-DB2        0       0       0  CXEGA03
+ 00:38:44.9   TRANSPLX  00.0%  NOT-IN-DB2     1230     300       0  CCCDS18
+ 00:00:05.7   DEMO1     00.0%  NOT-IN-DB2        4       0       0  DEMOENCL
================================
```

Option O for enclaves may be used to display enclave threads

Enclave Thread Overview

```
 _________________ ZENCL     VTM      O2        V520./C D81G 02/22/05  7:13:01   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  F-DIST ALLIED  G-DIST DBAC
> H-UTIL   I-INACT J-FILTER K-FUNCTIONS L-STORED PROC M-TRIGGERS      N-SYSPLEX
> *-ENCLAVES
================================================================================
>                            ENCLAVE THREAD SUMMARY
 THDE
+ *
+ Elapsed       Plan      Jobname   AuthID    CPU    P/I    SvcClass Pd# Status
+ ----------    --------  --------  --------  -----  -----  -------- --- ------------
+ 00:00:48.8    DEMO1     DEMOENCL  CXE12AUR  00.0%    .20  BATCH    1   NOT-IN-DB2
================================================================================
```

F11 zoom to see more thread detail

Thread Enclave Detail

```
 _________________ ZENCLD    VTM      O2        V520./C D81G 02/22/05  7:13:42   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
================================================================================
>                          ENCLAVE DETAIL INFORMATION
 PLAN
+ Thread:   Plan=DEMO1     Connid=DB2CALL  Corrid=DEMOENCL     Authid=CXE12AUR
+ Attach:   BATCH          JOB Name=DEMOENCL                   JOB Asid=  49
+ Package: DEMO1           Collection=
 enc
+ ENCLAVE TOKEN:      2000000001          Enclave Type:       Dependent
+ Owning System:     SP12                Owning Job:         DEMOENCL
+ WLM Mode:          Goal                Enclave CPU Time    00:00:00.000
+
+ SERVICE PERIOD INFORMATION
+ Period(s) for Service Class BATCH:     2
+ Current Period for This Thread:        1
+ Performance Index This Period:
```

Note enclave type, owning job, WLM service class, and enclave CPU

Enclave Detail

```
 _________________ ZENCLD   VTM     O2       V520./C D81G 02/22/05  7:13:42  25
+
+ +---------------------------- Period Number
+ | +--------------------------- Importance
+ | | +------------------------- Duration in Service Units
+ | | | +----------------------- Percentile
+ | | | |    +------------------ Response Time Goal or Velocity
+ | | | |    |     +------------- Response Time Unit
+ | | | |    |     |             Goal Description
+ - - +---- +--- +---- +-------- ------------------
+ 1 3   700        .10           Velocity Goal
+ 2 4              .10           Velocity Goal
+
+ SERVICE CLASS INFORMATION
+ CPU Critical:      No                  Storage Protection: No
+
+                    Name                Description
+                    --------            --------------------------------
+ Service Class:     BATCH               Batch Jobs
+ Workload:          BATCH               Batch Jobs
+ Resource Group:
+ Report Class:      REPORTA             a report class
+
+ WLM APPLICATION ENVIRONMENT
```

Additional enclave WLM service class detail

View Thread History
Near Term Historical

```
 _________________ ZHATACT  VTM      O2        V520./C D81G 02/22/05  7:38:00   3
> Help PF1          Back PF3          Up PF7          Down PF8          Zoom PF11
>
>                    Enter a selection letter on the top line.
>
> *-SUMMARY         B-BUFFER POOL         C-DB2 TIME          D-LOCK/SCAN/SORT
> O-OPTIONS
================================================================================
>                               THREAD HISTORY SUMMARY
 HATH
+ Report Interval:    15 mins                        Start: 02/22 07:15:00.000000
+ Report Filtered:        NO                           End: 02/22 07:29:59.999999
 act
+
+                                    Elapsed  CPU                              Term
+ End Time        Plan     Authid    Time     Time    SQL    Commit Abrt Pkg Status
+ ------------    -------- -------- -------  ------ ------ ------ ---- --- ------
+ 07:25:52.899    TRANSPLX MHANS     3138.42  44.758 1000K      1      0   1
+ 07:22:14.571    DEMO1    CXE12AUR  600.90     .011     11      1      0   1 EOT/AB
================================================================================
```

F11 to see more detail on a thread

Omegamon allows thread history to be captured and reviewed from within the real time monitor. History is captured in VSAM files.

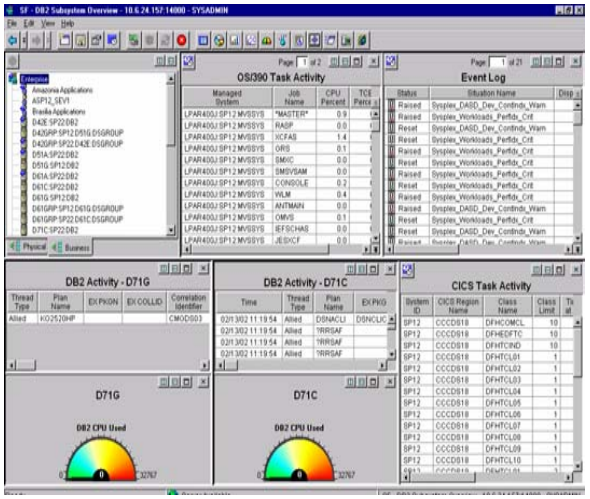
Near Term Thread History

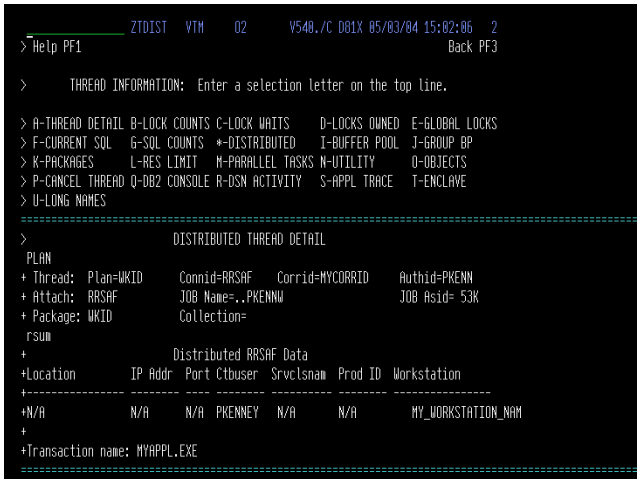
```
 _________________ ZHTACT   VTM     O2       V520./C D81G 02/22/05  7:38:30   2
> Help PF1                Back PF3               Up PF7                  Down PF8

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

> *-THREAD DETAIL   B-LOCK COUNTS  C-LOCK WAITS     D-GLOBAL LOCKS  E-SORT/SCAN
> F-DYNAMIC SQL     G-SQL COUNTS   H-DISTRIBUTED    I-BUFFER POOL   J-GROUP BP
> K-PACKAGE SUMMARY L-RES LIMIT    M-PARALLEL TASKS
================================================================================
>                              THREAD HISTORY DETAIL
 HPLN
+ Thread:  Plan=TRANSPLX  Connid=CCCDS18  Corrid=POOLDB210001 Authid=MHANS
+ Attach:  CICS           DB2=D81G        MVS=SP12
+ Time  :  Start=02/22/2005 06:33:34.474738     End=02/22/2005 07:25:52.899388
 act
+ Termination Status     =         DEALLOC     Commits              =          1
+ Total Elapsed Time     =    00:52:18.425     Aborts               =          0
+ Total CPU Time         =    00:00:44.758     Parallel Tasks       =          0
+ Total Stored Proc CPU =    00:00:00.000
+ Stored Proc Wait       =    00:00:00.000     Stored Proc Wait Cnt =          0
+
+ In-DB2 Times                                      Total
+ ----------------------------
+ Elapsed Time
```

Thread analysis data comparable to real time thread displays

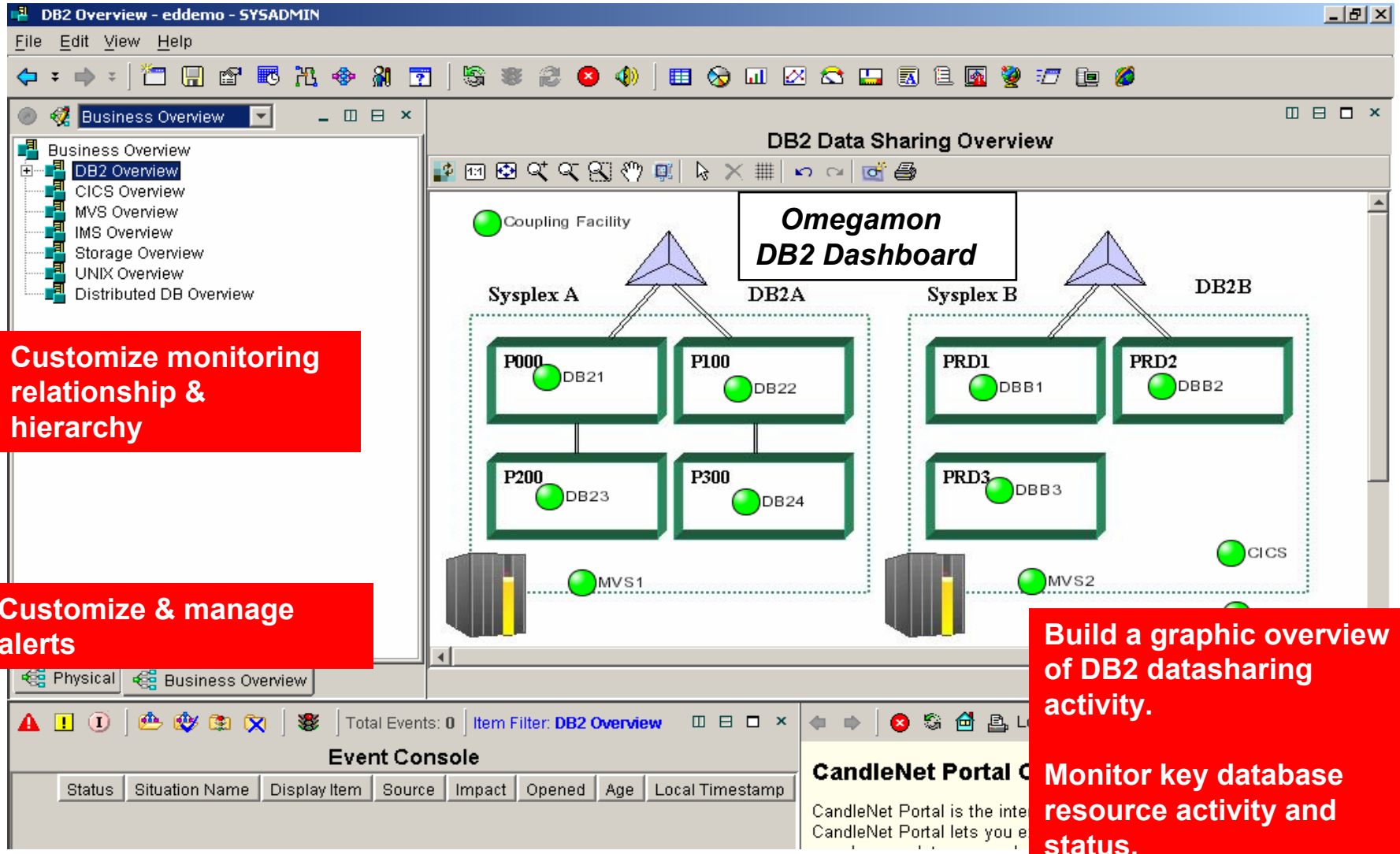
OMEGAMON XE For DB2 Choice Of Interfaces

- **OMEGAMON XE GUI Interface**
  - **Accessible via Java client or web browser**
  - **Real time and historical**
  - **Automation & alerts**
- **OMEGAMON II for DB2**
  - **3270 Interface**
  - **CUA Interface & Classic Interface**
  - **Real Time & Historical**





OMEGAMON DE - Dashboard Edition’



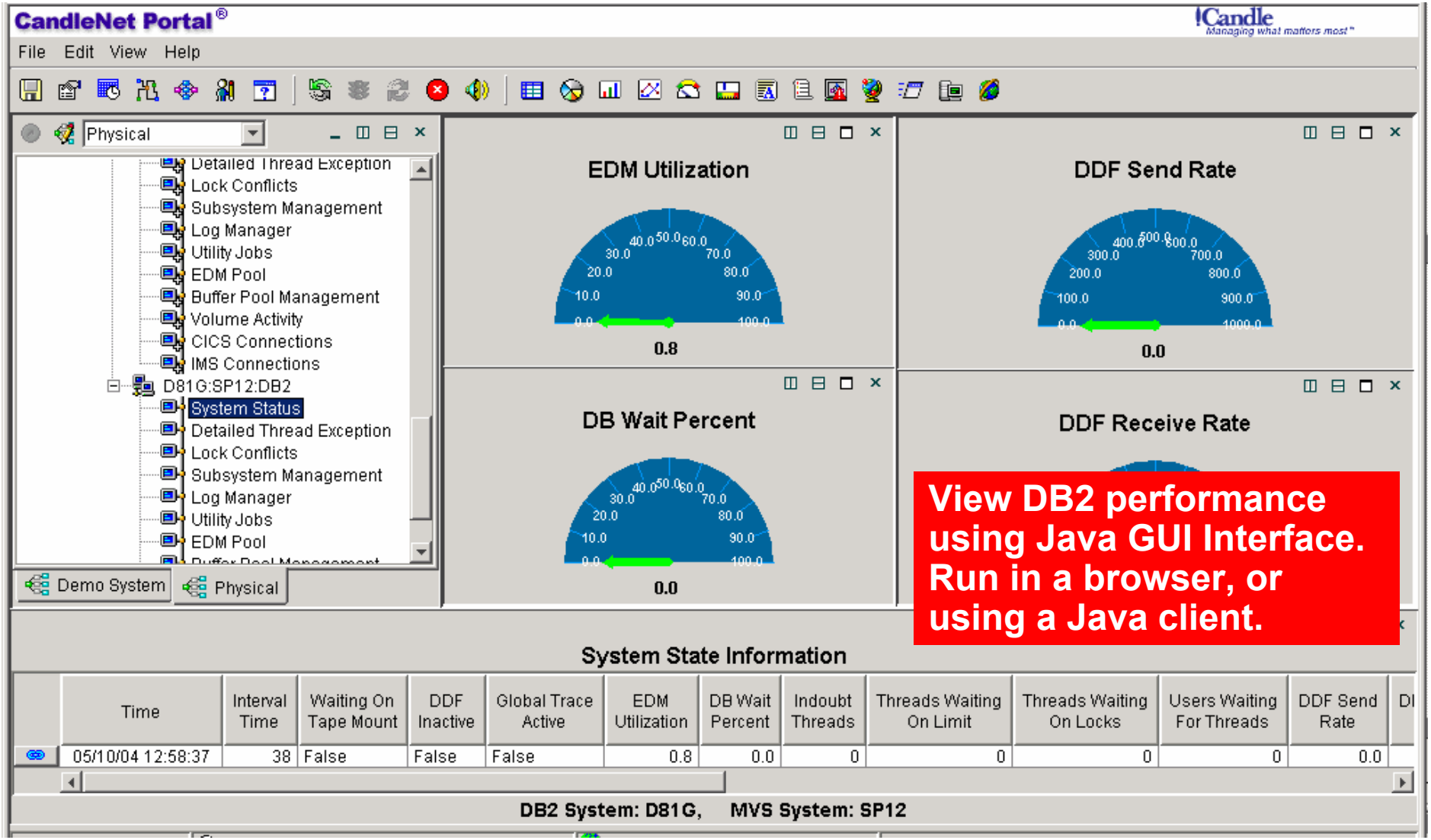
Customize monitoring relationship & hierarchy

Customize & manage alerts

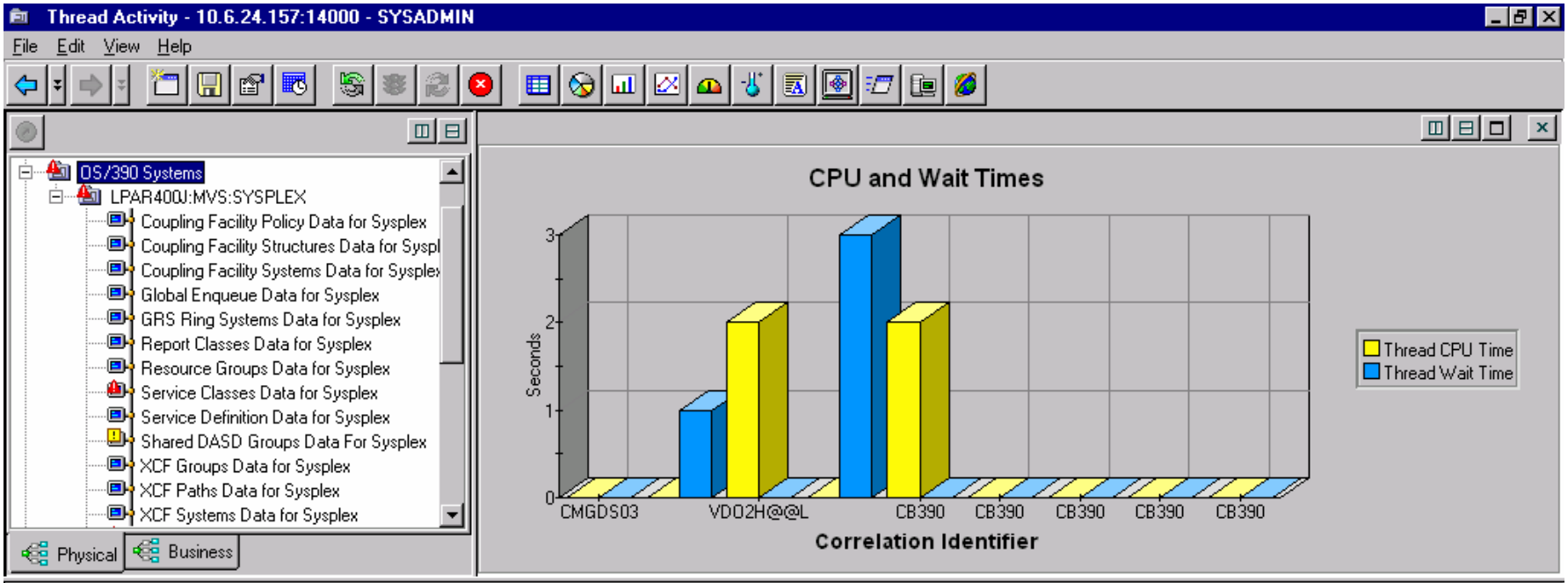
Build a graphic overview of DB2 datasharing activity.

Monitor key database resource activity and status.

OMEGAMON XE For DB2 – XE



OMEGAMON XE For DB2
Global View Of DB2 Thread Activity



Thread Activity

DB2ID	Plan Name	Correlation Identifier	Thread Status	Thread Type	Authorization Identifier	Connection Identifier	Connection Type	Elapsed Time	CPU Time	Wait Time	Thread Stored Proc Name	S
D71G	KO2520HP	CMGDS03	Not_In_DB2	Allied	CMGDS03	DB2CALL	DB2_CAF	00-05:51:39	00:00:00.249	00:00:00.000		SF
D71C	KO2520HP	VDO2H@@L	Not_In_DB2	Allied	VDO2H@@L	DB2CALL	DB2_CAF	01-12:05:33	00:00:00.785	00:00:01.184		SF
D71C	KO2520HP	VDO2H@@L	Not_In_DB2	Allied	VDO2H@							
D71C	DSNACLI	BBOLDAP	Swapped_Out	Allied	BBOLDA							
D71C	?RRSAF	CB390	Not_In_DB2	Allied	CBDMNC							
D71C	?RRSAF	CB390	Not_In_DB2	Allied	CBSYMC							
D71C	?RRSAF	CB390	Not_In_DB2	Allied	CBSYMC							

- **See thread details across all DB2 members**
  - **Thread status, elapsed time, In-DB2 time, Wait time, Getpage counts, and more...**
  - **Number of threads, and from which members**

OMEGAMON DB2 Thread Analysis Summary

- Look at thread elapsed times and In-DB2 times
  - Determine if the problem is ‘In-DB2’ or not
- Look at wait times
  - What is the thread waiting on – locks, I/O or other DB2 events
- Look at SQL activity
  - SQL call text
  - SQL counts – analyze the application activity

Thread Analysis - continued

- Use object analysis and buffer data to analyze I/O and getpage activity
- Use application trace facility to do more detailed thread analysis
- Use near term history to analyze past invocations of thread activity and compare to current application processing
- Use Omegamon XE for graphic overview, analysis, alerts, and automated actions