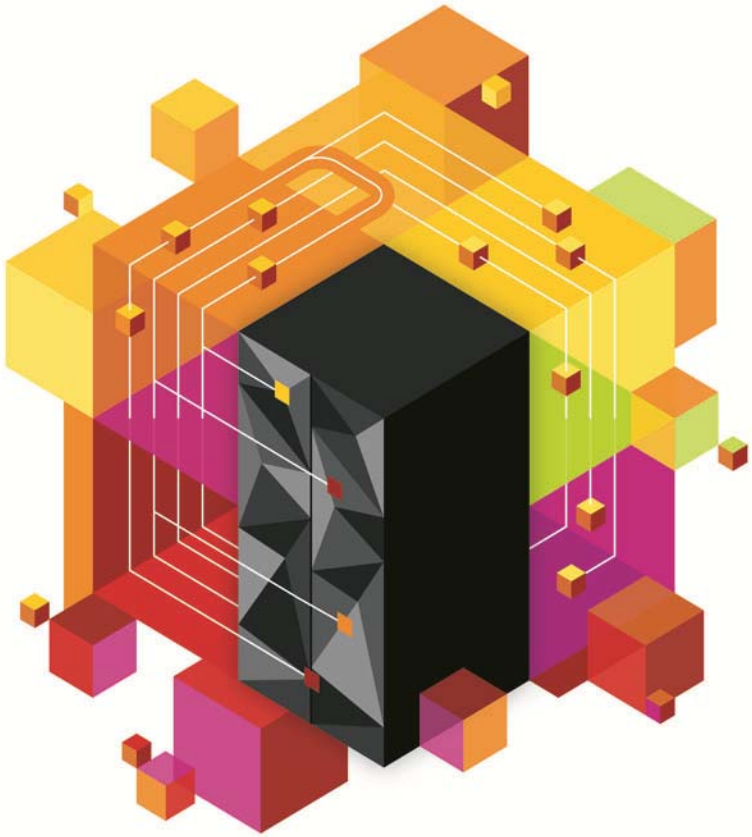
IBM zEnterprise Technology Summit



Manage IMS/IMSplex with IMS Sysplex Manager

Agenda

- IMS in a Sysplex challenges
- Product Highlights
- Problem Scenarios
- Q & A

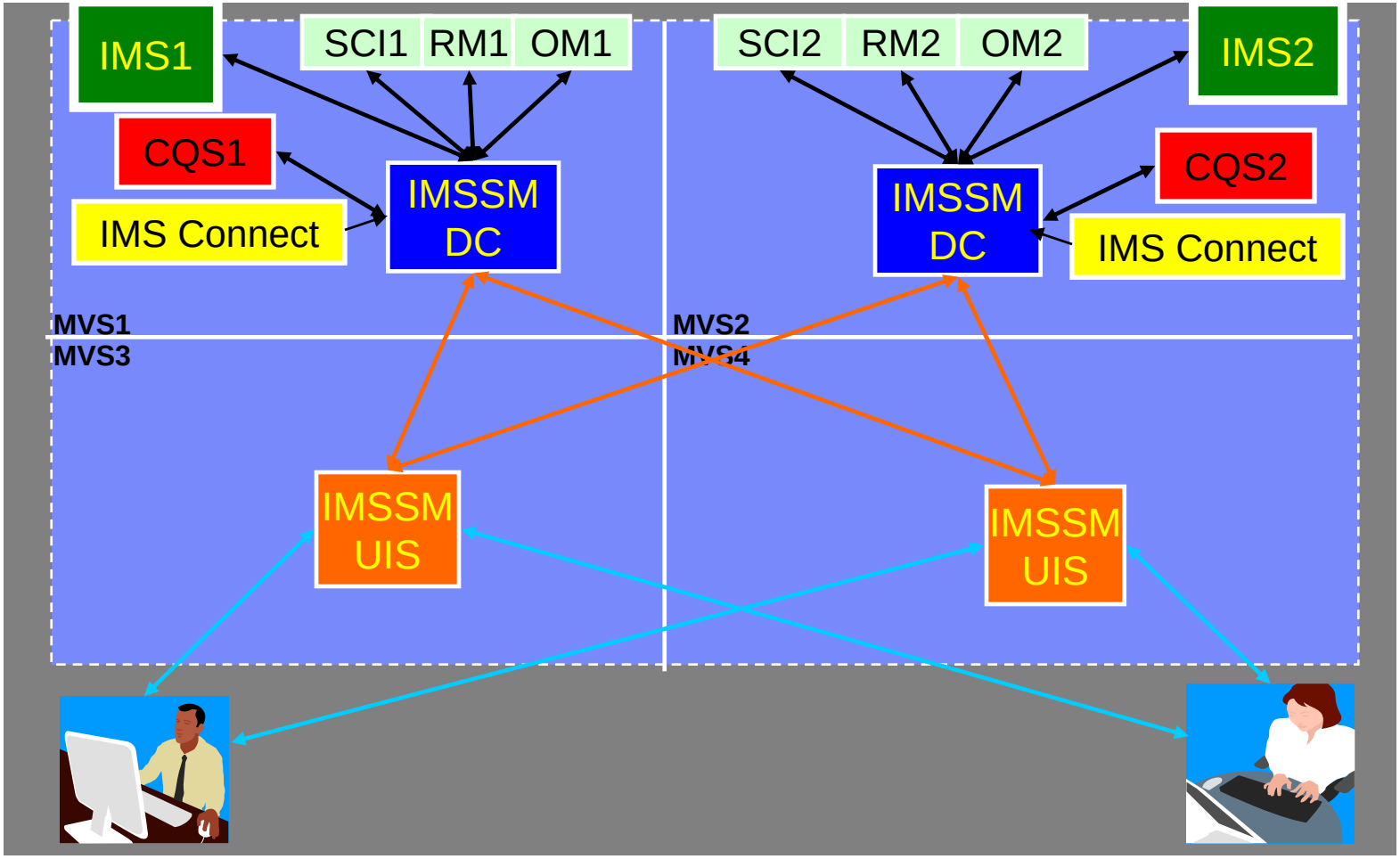
IMS in a Sysplex Challenges

- **More CF structures to configure and monitor**
  - Message queue structures
  - Lock structure
  - OSAM/VSAM cache structures
  - RM structure
- **Shared Queue**
  - Difficult to maintain transaction affinities
  - Monitor and manage queue structures utilization
  - Manage CQS log stream for queue recovery
  - Monitor queue depth and take actions as needed
  - Local buffer overflow
- **Data Sharing**
  - Long locks and deadlocks if applications are not taking sync point timely
  - Lock problems are difficult to debug without tools
  - Poor OSAM, VSAM and Shared VSO structures cache hit ratio
- **Global Resource Lockout**
  - Lterms, nodes and users can be locked by RM
  - Sysplex serial programs can be locked by RM causing bottleneck
- **Single point of Control**
  - Sysplex view of all IMS components
  - Global command capability and audit trail
  - Time consuming to capture diagnostics

IMS Sysplex Manager Highlights

- **Real-time management of the IMS Sysplex Environment**
  - Single point of control
    - Single system image thru local and aggregate view of data
    - Simplified User Interface (TSO/ISPF)
    - Structured displays of IMS resources and CF structures
    - Global Type-1 command, OM Type-2 and IMS SPOC
    - Basic z/OS performance information and SVC dump capture
    - Statistics for CSL (OM, RM and SCI), IRLM and CQS
    - Dashboard with key system indicators and threshold monitoring
  - Management functions
    - Intercept System exceptions and generate Console alerts
    - Produce real-time IRLM Long Lock Report
    - Browse, delete and recover messages on Shared Queues
    - Delete RM resource structure entries
    - Assign affinity for transactions in Shared Queues environment
  - Support IMS DB/TM, DBCTL, and DCCTL for IMS v8 and later

IMS Sysplex Manager Sample Configuration



Scenarios

- **IMS**
  - Scenario 1 – Taking Inventory and capture diagnostic data
  - Scenario 2 – Managing IMS System Parameters
  - Scenario 3 – Verifying IMS Resource Definitions
  - Scenario 4– Issuing IMS Commands
  - Scenario 5 – Maintaining Command Audit Trail
  - Scenario 6 – Managing Dependent Regions
  - Scenario 7 – Viewing IMS CF Structures
- **IMSplex**
  - Scenario 8 – Managing CSL RM Structure
  - Scenario 9 – Viewing Aggregate SCI, RM, OM Statistics
- **Data Sharing**
  - Scenario 10 – Resolving Data Sharing Long Locks
  - Scenario 11 - Viewing Real-time IRLM / PI Locking Status
  - Scenario 12 - Viewing Aggregated IRLM Statistics
- **Shared Queue and CQS**
  - Scenario 13 - Set transaction affinity and view local buffer utilization
  - Scenario 14 – Managing Destination Queue Depth
  - Scenario 15 – Viewing CQS Structures
- **Dashboard**
  - Scenario 16 – Dashboard and Thresholds

Scenario 1 – Taking Inventory and Capture Diagnostics

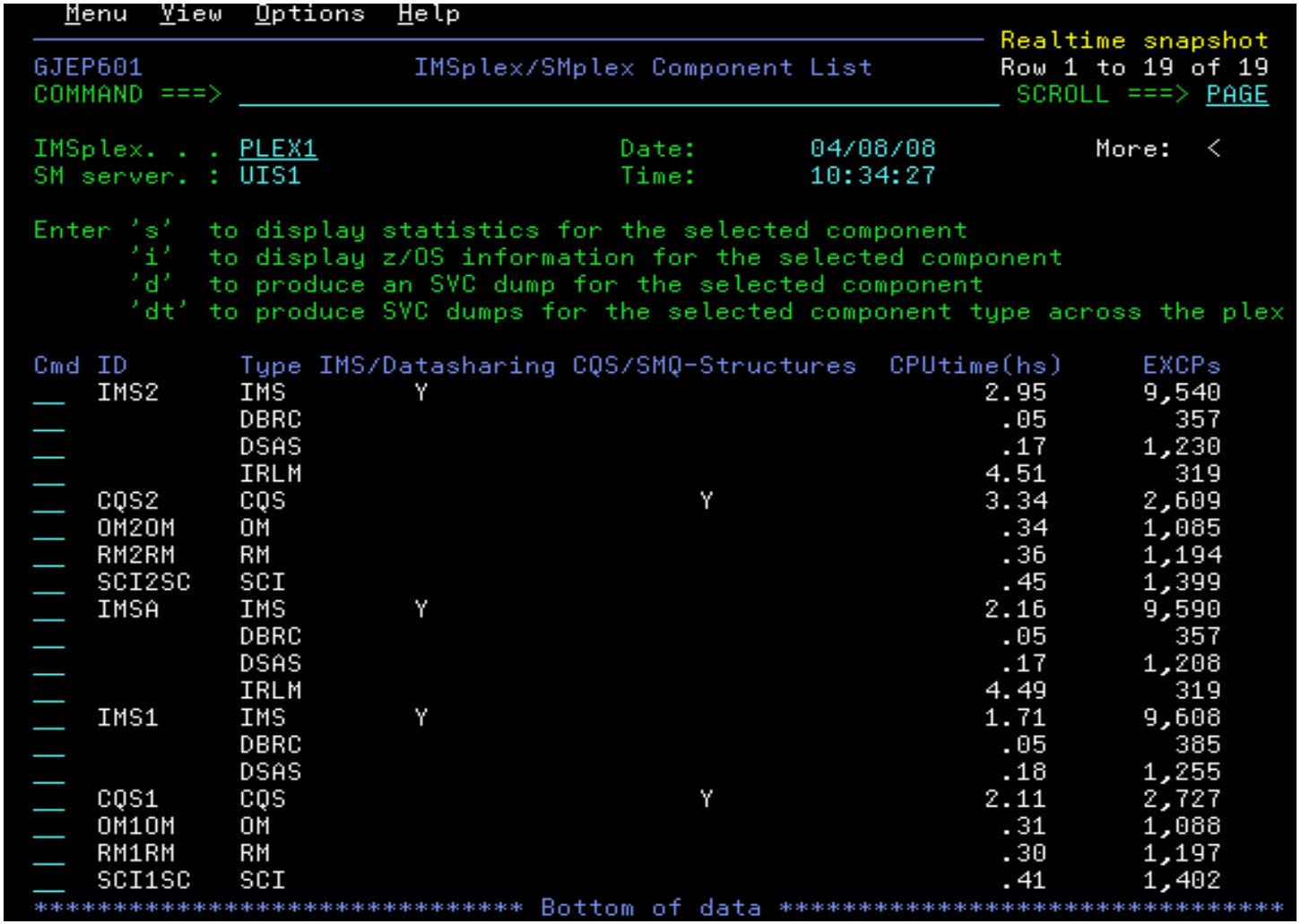
- **Many address spaces – IMS Control Region, IMS DLI/SAS, IMS DBRC, IRLM, CQS, RM, OM, SCI, etc..**
  - How do you identify related IMS components across the Sysplex?
  - What is the status of these components?
  - What version of IMS components are involved?
  - How much resource are they using from z/OS perspective?
  - How do you collect diagnostic data to debug sysplex problem?

- **IMS Sysplex Manger structured TSO/ISPF interface**
  - Guided display of IMS components
  - Provides component id, task or job name, version, status and basic z/OS information such as CPU time and EXCP counts
  - Drill-down to detailed component information
  - Easily capture console dumps for IMS components across the plex
  - Check DBRC RECON datasets placement and VSAM stats

Component List

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP600                 IMSplex/SMplex Component List     Row 1 to 19 of 19
COMMAND ===> _____________________________________________ SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date:      04/08/08          More:  >
SM server. . : UIS1                     Time:      14:50:23

Enter 's'  to display statistics for the selected component
      'i'  to display z/OS information for the selected component
      'd'  to produce an SVC dump for the selected component
      'dt' to produce SVC dumps for the selected component type across the plex

Cmd ID       Type Version z/OSname Jobname  DBRCname DLIname  IRLMname Status
__  IMS2     IMS  9.1.0   ECTST22  IMS2     DBREASAJ DLIEASAJ IRLME2N  READY
__           DBRC 9.1.0   ECTST22  DBREASAJ                            READY
__           DSAS 9.1.0   ECTST22  DLIEASAJ                           READY
__           IRLM 2.1.0   ECTST22  IRLME2N                            READY
__  CQS2     CQS  1.4.0   ECTST22  CQSEJ2                             READY
__  OM2OM    OM   1.2.0   ECTST22  OM2                                READY
__  RM2RM    RM   1.2.0   ECTST22  RM2                                READY
__  SCI2SC   SCI  1.2.0   ECTST22  SCI2                               READY
__  IMSA     IMS  9.1.0   ECTST21  IMSA     DBREASBJ DLIEASBJ IRLME2N  READY
__           DBRC 9.1.0   ECTST21  DBREASBJ                            READY
__           DSAS 9.1.0   ECTST21  DLIEASBJ                           READY
__           IRLM 2.1.0   ECTST21  IRLME2N                            READY
__  IMS1     IMS  9.1.0   ECTST21  IMS1     DBREASAJ DLIEASAJ IRLME2N  READY
__           DBRC 9.1.0   ECTST21  DBREASAJ                            READY
__           DSAS 9.1.0   ECTST21  DLIEASAJ                           READY
__  CQS1     CQS  1.4.0   ECTST21  CQSEJ1                             READY
__  OM1OM    OM   1.2.0   ECTST21  OM1                                READY
__  RM1RM    RM   1.2.0   ECTST21  RM1                                READY
__  SCI1SC   SCI  1.2.0   ECTST21  SCI1                               READY
****************************** Bottom of data ********************************
```

Component List (cont)

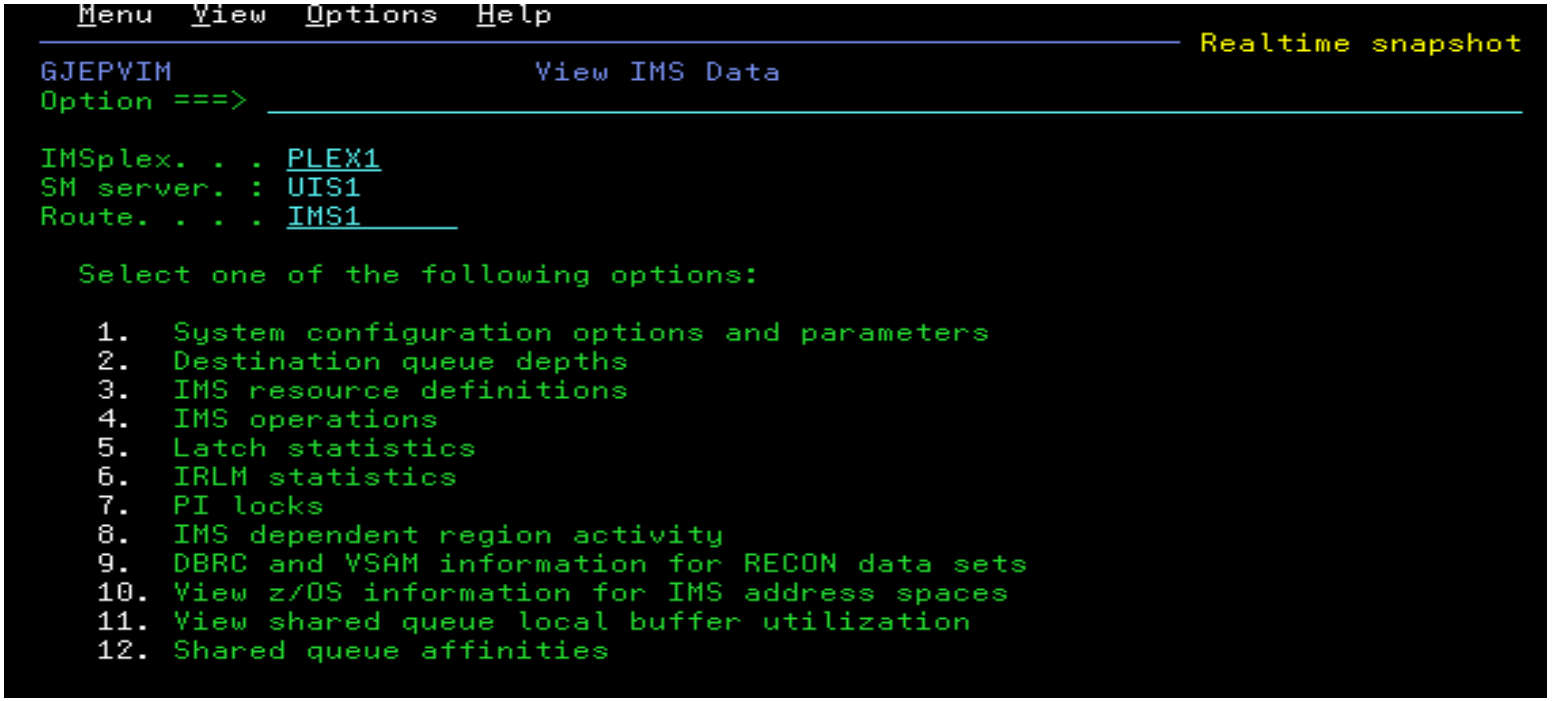


```
  Menu  View  Options  Help
                                                              Realtime snapshot
GJEP601                 IMSplex/SMplex Component List         Row 1 to 19 of 19
COMMAND ===> _____________________________________________  SCROLL ===> PAGE

IMSplex. . . PLEX1                  Date:       04/08/08          More:  <
SM server. : UIS1                   Time:       10:34:27

Enter 's'  to display statistics for the selected component
      'i'  to display z/OS information for the selected component
      'd'  to produce an SVC dump for the selected component
      'dt' to produce SVC dumps for the selected component type across the plex

Cmd ID       Type IMS/Datasharing CQS/SMQ-Structures  CPUtime(hs)     EXCPs
__  IMS2     IMS        Y                                    2.95     9,540
__           DBRC                                            .05       357
__           DSAS                                            .17     1,230
__           IRLM                                           4.51       319
__  CQS2     CQS                       Y                    3.34     2,609
__  OM2OM    OM                                              .34     1,085
__  RM2RM    RM                                              .36     1,194
__  SCI2SC   SCI                                             .45     1,399
__  IMSA     IMS        Y                                    2.16     9,590
__           DBRC                                            .05       357
__           DSAS                                            .17     1,208
__           IRLM                                           4.49       319
__  IMS1     IMS        Y                                    1.71     9,608
__           DBRC                                            .05       385
__           DSAS                                            .18     1,255
__  CQS1     CQS                       Y                    2.11     2,727
__  OM1OM    OM                                              .31     1,088
__  RM1RM    RM                                              .30     1,197
__  SCI1SC   SCI                                             .41     1,402
******************************** Bottom of data ********************************
```

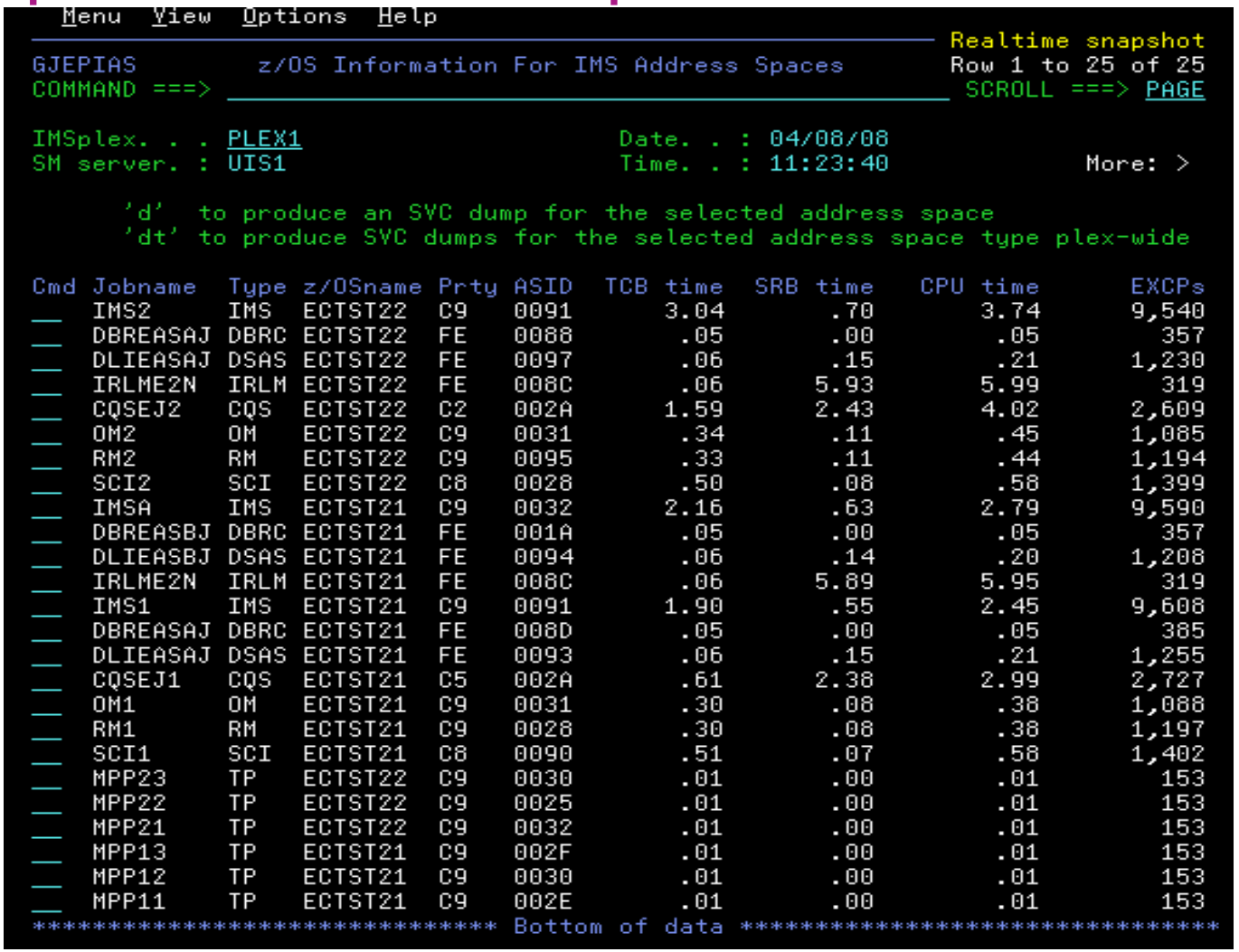
Capture Console Dumps

```
GJEPSVC                                SDUMPX Options
COMMAND ===> ____________________________________________________________

Title . . . IMSSM SDUMPX on 04/08/08 11:14:13_____________________________

Jobname . . . . . : IMS1
Address space type. : IMS
z/OS name . . . . . : ECTST21

Enter Y to include or N to exclude the SDUMPX option.

ALLNUC (All nucleus areas) . . . _    ALLPSA (All PSAs in system). . _
COUPLE (Couple). . . . . _    CSA. . . . . _
GRSQ . . . . . _    IO (I/O areas) . . . . . _
LSQA . . . . . _    LPA (Active LPAs for region) . _
NUC (Nucleus). . . . . _    PSA (Current PSA). . . . . _
RGN (Region private area). . . . _    SQA. . . . . _
SUMDUMP (Summary dump) . . . . . _    SWA (SWA for region) . . . . . _
TRT (Trace tables/GTF buffers) . _    XESDATA. . . . . _


 _  Set SDUMPx option display off
```

IMS Menu Options



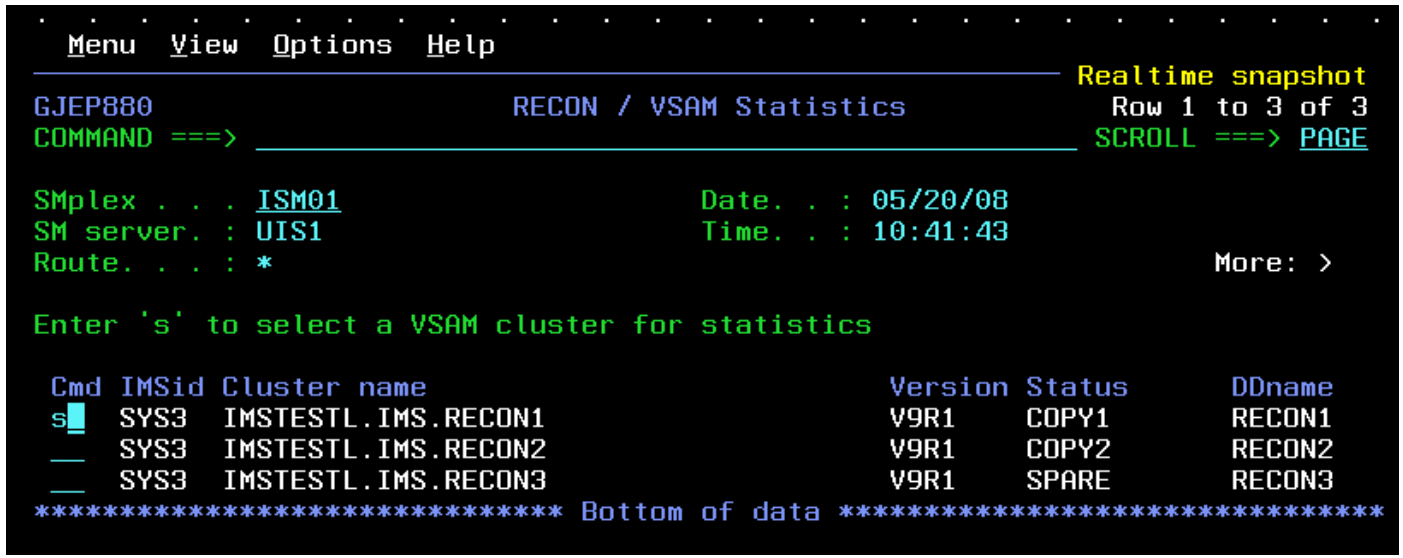
z/OS perspective for IMS address spaces



```
 Menu  View  Options  Help
                                                          Realtime snapshot
GJEPIAS        z/OS Information For IMS Address Spaces    Row 1 to 25 of 25
COMMAND ===>                                               SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date. . : 04/08/08
SM server. : UIS1                       Time. . : 11:23:40          More: >

      'd'  to produce an SVC dump for the selected address space
      'dt' to produce SVC dumps for the selected address space type plex-wide

Cmd Jobname  Type z/OSname Prty ASID  TCB time  SRB time   CPU time      EXCPs
__  IMS2     IMS  ECTST22  C9   0091      3.04       .70       3.74      9,540
__  DBREASAJ DBRC ECTST22  FE   0088       .05       .00        .05        357
__  DLIEASAJ DSAS ECTST22  FE   0097       .06       .15        .21      1,230
__  IRLME2N  IRLM ECTST22  FE   008C       .06      5.93       5.99        319
__  CQSEJ2   CQS  ECTST22  C2   002A      1.59      2.43       4.02      2,609
__  OM2      OM   ECTST22  C9   0031       .34       .11        .45      1,085
__  RM2      RM   ECTST22  C9   0095       .33       .11        .44      1,194
__  SCI2     SCI  ECTST22  C8   0028       .50       .08        .58      1,399
__  IMSA     IMS  ECTST21  C9   0032      2.16       .63       2.79      9,590
__  DBREASBJ DBRC ECTST21  FE   001A       .05       .00        .05        357
__  DLIEASBJ DSAS ECTST21  FE   0094       .06       .14        .20      1,208
__  IRLME2N  IRLM ECTST21  FE   008C       .06      5.89       5.95        319
__  IMS1     IMS  ECTST21  C9   0091      1.90       .55       2.45      9,608
__  DBREASAJ DBRC ECTST21  FE   008D       .05       .00        .05        385
__  DLIEASAJ DSAS ECTST21  FE   0093       .06       .15        .21      1,255
__  CQSEJ1   CQS  ECTST21  C5   002A       .61      2.38       2.99      2,727
__  OM1      OM   ECTST21  C9   0031       .30       .08        .38      1,088
__  RM1      RM   ECTST21  C9   0028       .30       .08        .38      1,197
__  SCI1     SCI  ECTST21  C8   0090       .51       .07        .58      1,402
__  MPP23    TP   ECTST22  C9   0030       .01       .00        .01        153
__  MPP22    TP   ECTST22  C9   0025       .01       .00        .01        153
__  MPP21    TP   ECTST22  C9   0032       .01       .00        .01        153
__  MPP13    TP   ECTST21  C9   002F       .01       .00        .01        153
__  MPP12    TP   ECTST21  C9   0030       .01       .00        .01        153
__  MPP11    TP   ECTST21  C9   002E       .01       .00        .01        153
******************************** Bottom of data ********************************
```

DBRC RECON datasets and VSAM stats

- **Show RECON datasets placement (COPY1, COPY2, SPARE) for all IMS systems**
- **Built-in LISTCAT for RECONs when drill down**



DBRC RECON VSAM stats

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP881                    RECON / VSAM Statistics        Row 1 to 23 of 84
COMMAND ===>                                               SCROLL ===> PAGE

SMplex . . . ISM01                      Date. . : 05/20/08
SM server. : UIS1                       Time. . : 10:41:43
Route. . . : SYS3

IMSid. . . . . . . . . : SYS3
Cluster name . . . . . : IMSTESTL.IMS.RECON1
Catalog name . . . . . : VCATQAV
Version. . . . . . . . : V9R1
Status . . . . . . . . : COPY1
DDname . . . . . . . . : RECON1
Last backup Date/Time. : NONE     / NONE

Description                    Value
Entry data section 1
 Component name . . . . . .: IMSTESTL.IMS.RECON1.DATA
 Comp. Type I=Index,D=Data. .: D
 Creation date (yyyyddd). . .: 2008141
 Key position . . . . . . . .: 0
 Key length. . . . . . . . . .: 32
 Volume serial number . . . .: USER03
 Device type. . . . . . . . .: 3010200F
 Number of extents. . . . . .: 01
 Allocation type. . . . . . .: TRK
 Physical blocks per track. .: 6
 Tracks per allocation unit .: 3
 Number of bytes per track. .: 0
 Bytes per allocation unit. .: 0
 Primary space allocation . .: 000003
 Secondary space allocation .: 000003
Entry data section 2
 CI size. . . . . . . . . . .: 8,192
 Maximum record size. . . . .: 143,360
 Average record size. . . . .: 4,086
 Physical block size. . . . .: 8,192
 Bufferspace. . . . . . . . .: 24,576
 High used RBA. . . . . . . .: 147,456
```

Scenario 2 – Managing IMS System Parameters

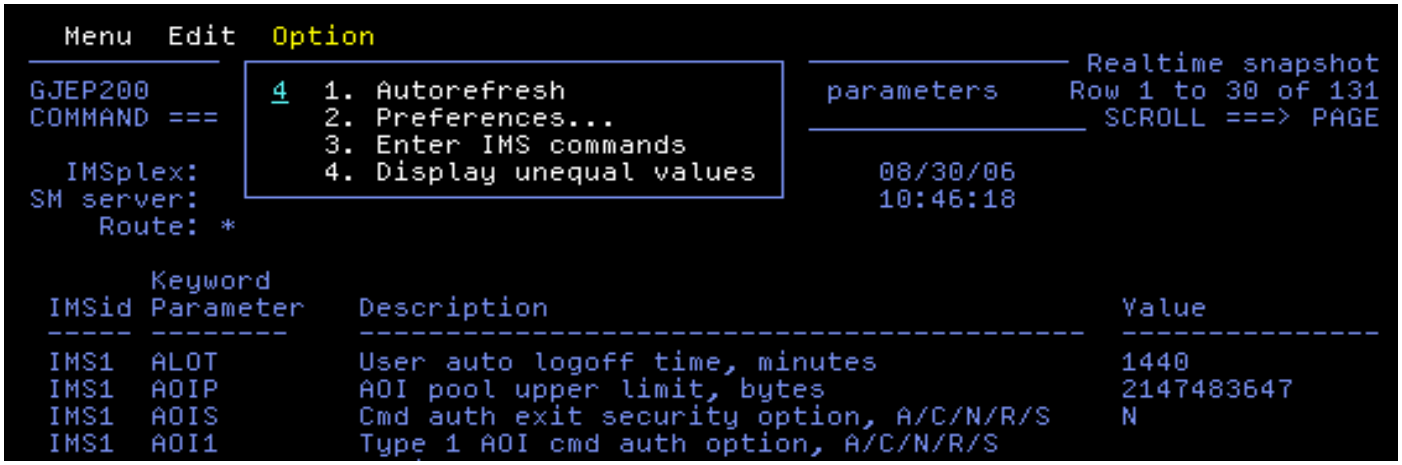
- **Many system run-time parameters**
  - Sources: DFSPBxxx, overrides via Control Region PARM=
  - Which ones are being used?
  - Are the parameters the same across the Sysplex?

- **System parameter display**
  - Real-time scrollable display of “resolved” values
  - Parameter values across all IMS systems for easy comparison
  - New – System Parameter Tutor for instant description

IMS System Parameters

```
  Menu  Edit  Option
                                                                   Realtime snapshot
GJEP200       System configuration options and parameters      Row 1 to 30 of 262
COMMAND ===> _                                                   SCROLL ===> PAGE

  IMSplex: PLEX1                            Date:       08/23/06
SM server: UIS                              Time:       11:55:16
    Route: *

       Keyword
 IMSid Parameter    Description                                  Value
 ----- ---------    -------------------------------------------  ---------------
 IMS1  ALOT         User auto logoff time, minutes               1440
 IMS2  ALOT         User auto logoff time, minutes               1440
 IMS1  AOIP         AOI pool upper limit, bytes                  2147483647
 IMS2  AOIP         AOI pool upper limit, bytes                  2147483647
 IMS1  AOIS         Cmd auth exit security option, A/C/N/R/S     N
 IMS2  AOIS         Cmd auth exit security option, A/C/N/R/S     N
 IMS1  AOI1         Type 1 AOI cmd auth option, A/C/N/R/S
 IMS2  AOI1         Type 1 AOI cmd auth option, A/C/N/R/S
 IMS1  APPC         Activate APPC/IMS LU 6.2 support, Y/N        N
 IMS2  APPC         Activate APPC/IMS LU 6.2 support, Y/N        N
 IMS1  APPCSE       APPC RACF security option, Check/Full/None   F
 IMS2  APPCSE       APPC RACF security option, Check/Full/None   F
 IMS1  APPLID1      VTAM Applid for IMS subsys
 IMS2  APPLID1      VTAM Applid for IMS subsys
 IMS1  APPLID2      VTAM Applid for XRF alternate subsys
 IMS2  APPLID2      VTAM Applid for XRF alternate subsys
 IMS1  APPLID3      VTAM Applid for RSR tracking subsys          APPL7
 IMS2  APPLID3      VTAM Applid for RSR tracking subsys          APPL7
 IMS1  ARC          OLDS automatic archiving interval            01
 IMS2  ARC          OLDS automatic archiving interval            01
 IMS1  ARMRST       MVS ARM to restart IMS after failure, Y/N    N
 IMS2  ARMRST       MVS ARM to restart IMS after failure, Y/N    N
```

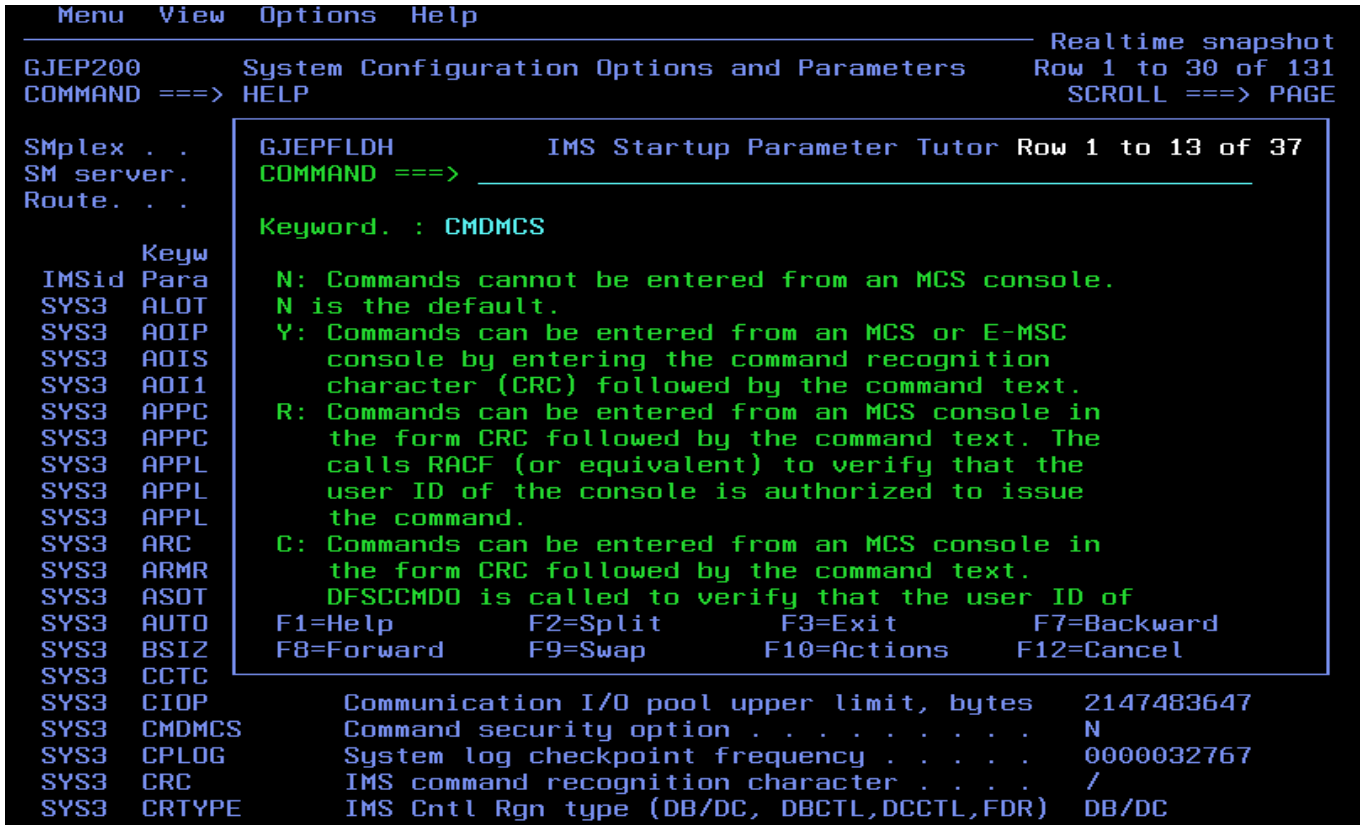
IMS System Parameters



IMS System Parameters – Showing Unequal Parms

```
  Menu  Edit  Option
                                                                Realtime snapshot
GJEP201      System configuration options and parameters          Row 1 to 6 of 6
COMMAND ===>                                                    SCROLL ===> PAGE

  IMSplex: PLEX1                      Date:       08/23/06
SM server: UIS                        Time:       11:55:16
    Route: *

       Keyword
 IMSid Parameter   Description                                    Value
 ----- --------    ---------------------------------------------  ---------------
 IMS1  DC          DC proclib member suffix                       C01
 IMS2  DC          DC proclib member suffix                       C02
 IMS1  IMSID       IMS subsystem identifier                       IMS1
 IMS2  IMSID       IMS subsystem identifier                       IMS2
 IMS1  SHAREDQ     DFSSQxxx shared queues member suffix            EI1
 IMS2  SHAREDQ     DFSSQxxx shared queues member suffix            EI2
********************************** Bottom of data ********************************
```

IMS System Parameters – Tutor

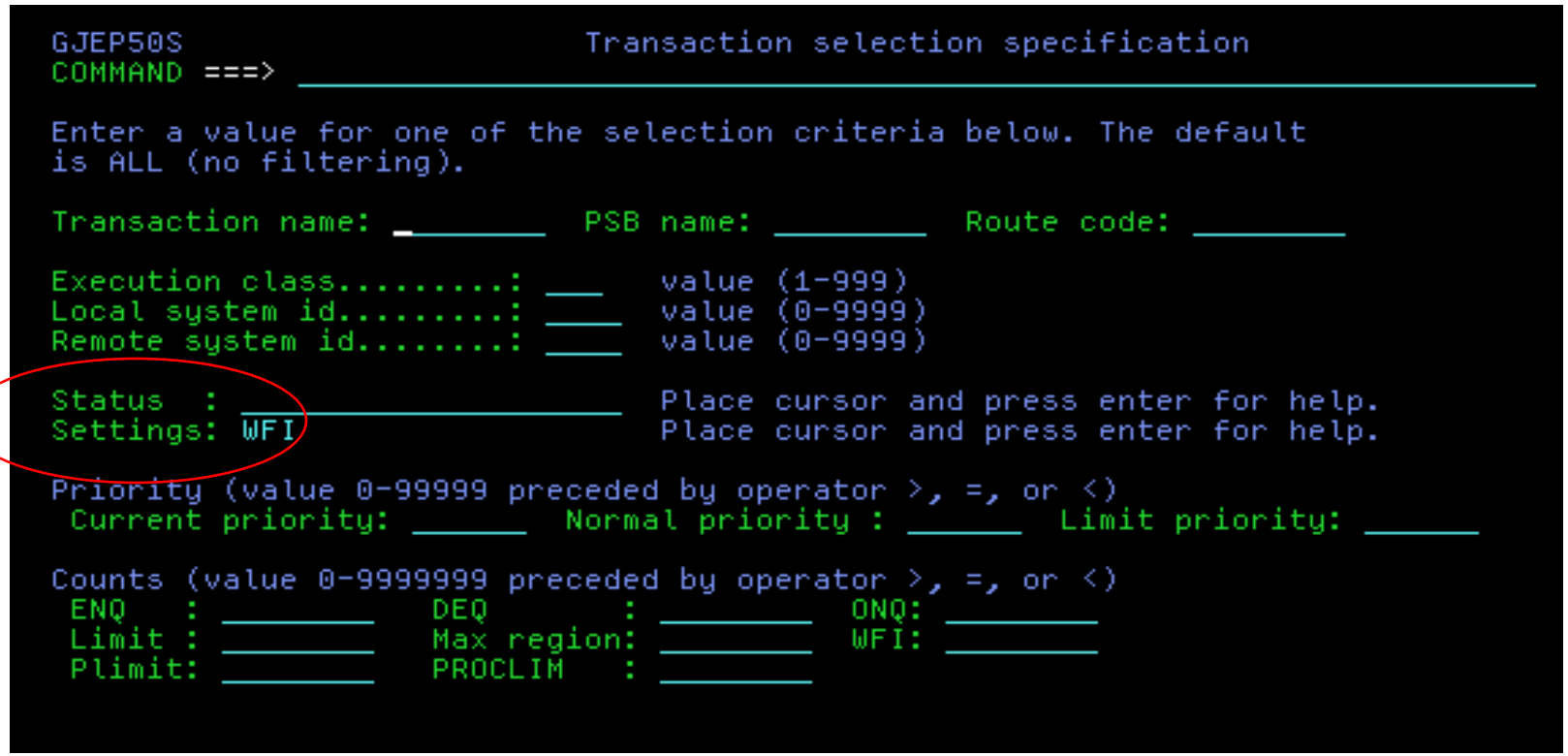


Scenario 3 – Verifying IMS Resource Definitions

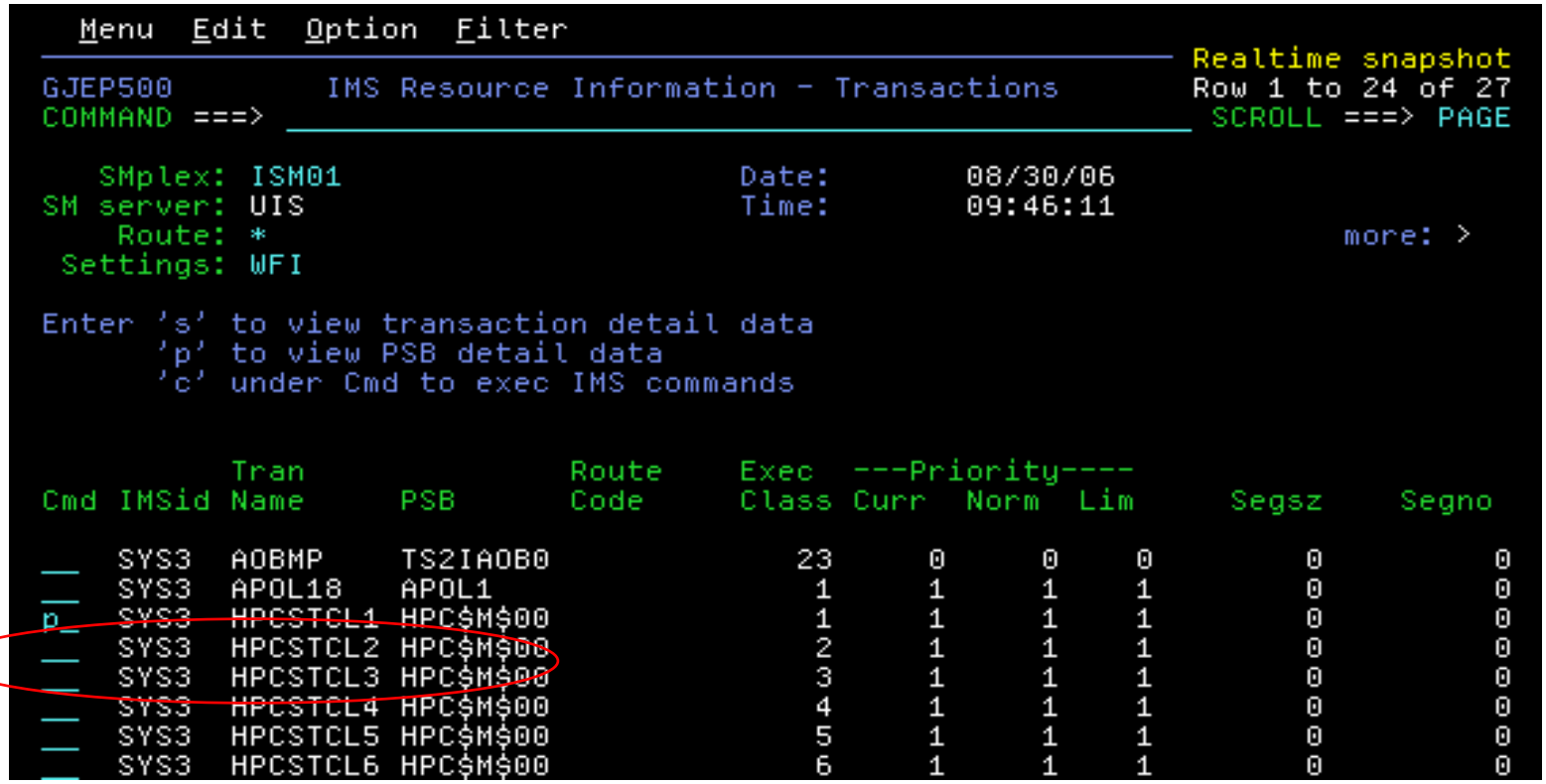
- **Resource definitions**
  - Transactions, Programs, Data Bases, Nodes, LTERMS, etc.
  - Are the definitions the same across the Sysplex?
  - What is the resource status across the Sysplex?
  - How do you alter the status across the Sysplex?

- **Resource definition display**
  - Query resource by status or attribute
  - Real-time scrollable display of resources
  - Resource attributes and status across all IMS systems for easy comparison
  - Integrated IMS Type 1 command interface to alter resource status
  - Ability to drill-down to related resource (from transaction to PSB, from PSB to databases…)

IMS Resource Definitions – Filter Specification



IMS Resource Definitions – Drill-down to PSB



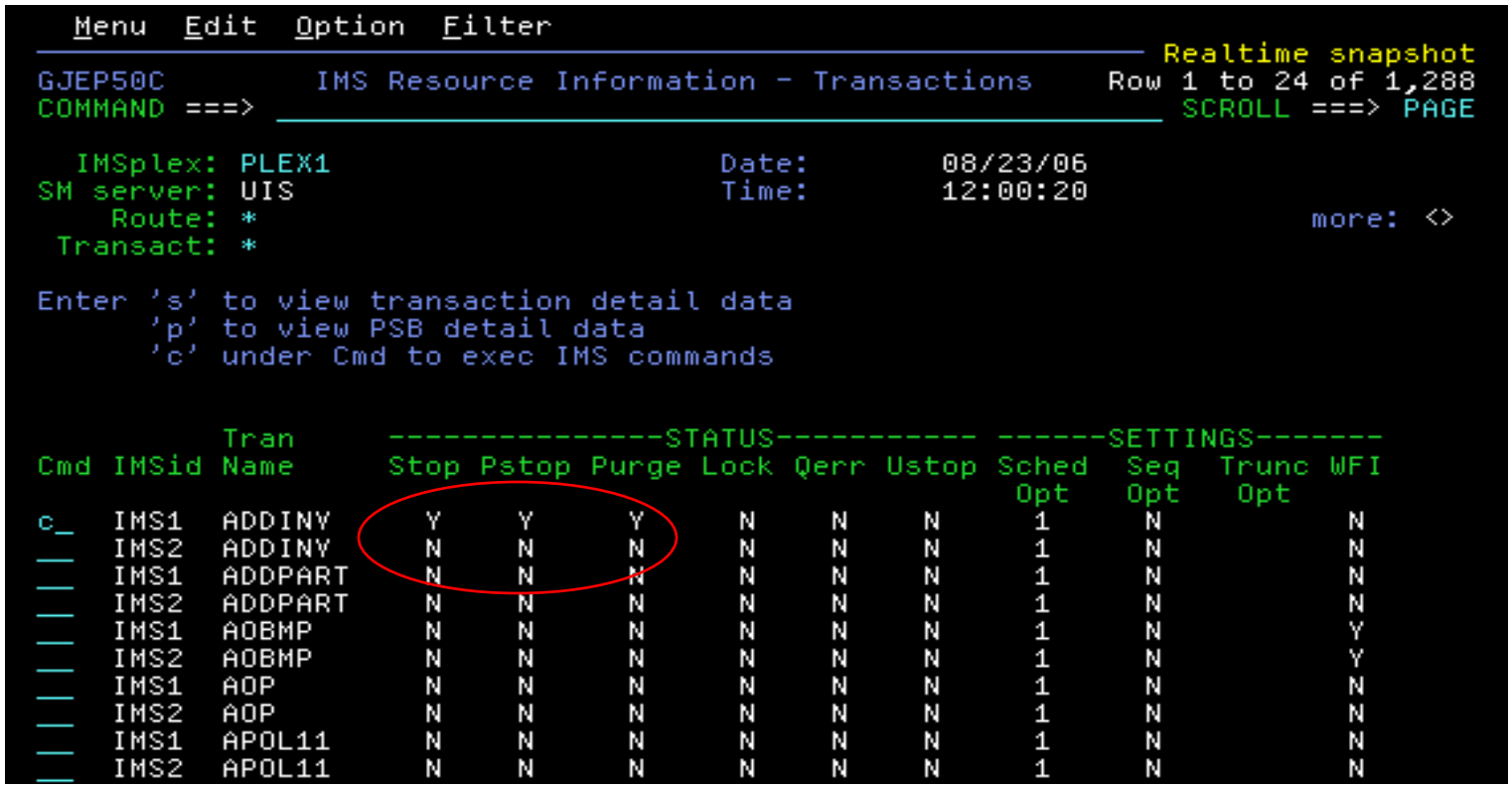
IMS Resource Definitions – Drill-down to Database

```
  Menu  Edit  Option  Filter
                                                          Realtime snapshot
GJEP510          IMS resource information - Programs        Row 1 to 1 of 1
COMMAND ===> _____________________________________ SCROLL ===> PAGE

   SMplex: ISM01                      Date:       08/30/06
SM server: UIS                        Time:       09:48:08
    Route: *                                              more: >
  Program: HPC$M$00

Enter  'c'  to exec IMS commands
       's'  to view program detail data
       'p'  to view PCB (databases) detail data

                                        PSBSize  PSBSize  Size of
Cmd IMSid Name     Type  Lang  PSBSize  -ACBLIB  Int.Lst  IndexWA  GPSB  STYPE
p_  SYS3  HPC$M$00 TP    ASSEM   1,728   19,136   19,328    3,968     N     P
********************************* Bottom of data ********************************
```

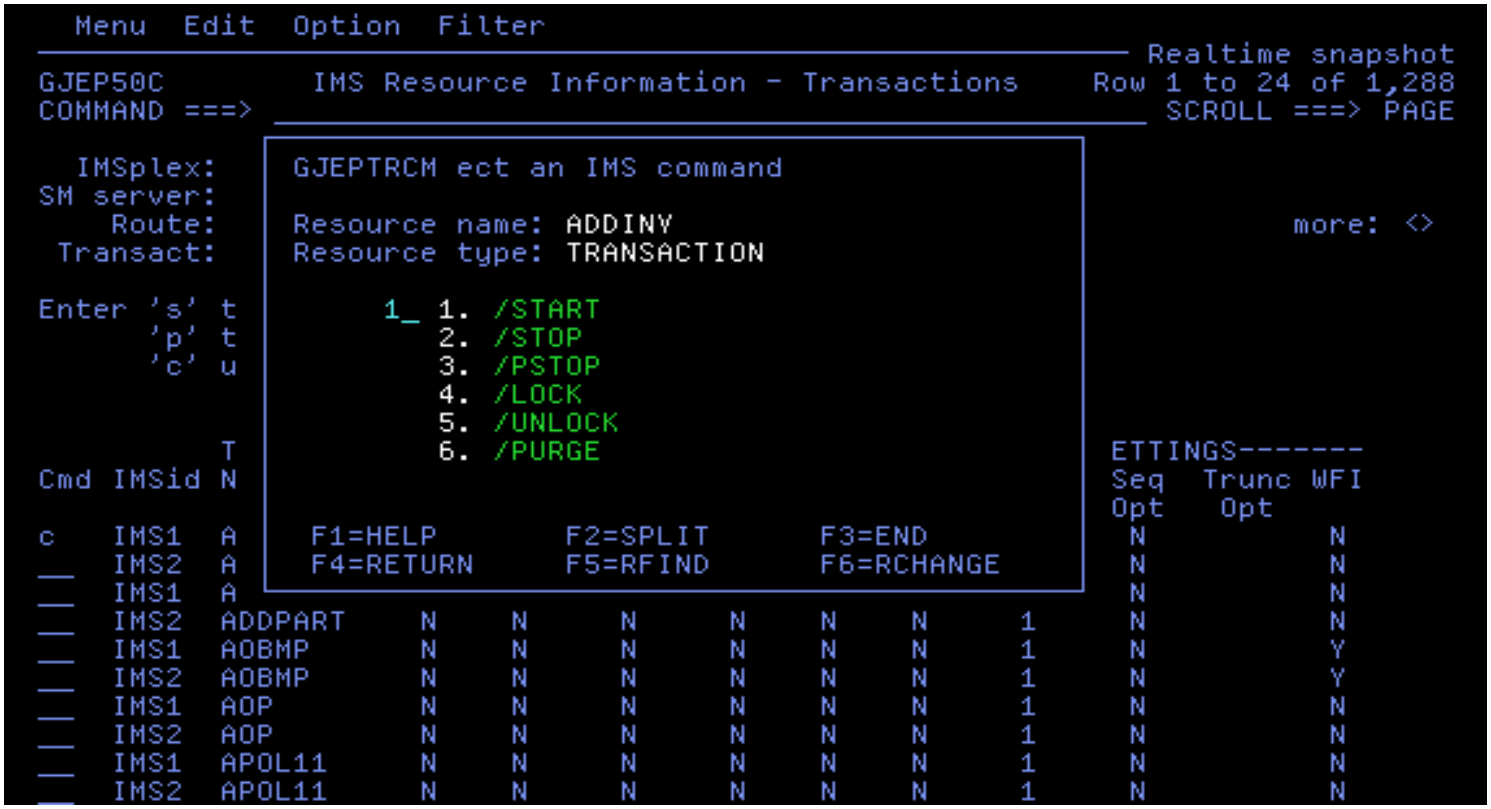
IMS Resource Definitions – Databases for a PSB

```
  Menu  Edit  Option  Filter
                                                          Realtime snapshot
GJEP520          IMS resource information - Databases       Row 1 to 9 of 9
COMMAND ===>                                              SCROLL ===> PAGE

   SMplex: ISM01                      Date:       08/30/06
SM server: UIS                        Time:       09:49:40
    Route: *                                                    more: >
  Program: HPC$M$00

Enter 's' to view database detail data
      'c' under Cmd to exec IMS commands


                   Area/                DMB       Gl DMB             DMBBuff
Cmd IMSid Name     Partition Type       Number    Number  DMBSize    Size     DBAcc
__   SYS3  DBHDOJ01          DL/I          33         0       42        42     UP
__   SYS3  DBHDOK01          DL/I          34         0       49        49     UP
__   SYS3  DBOHIDK5          DL/I          40         0       53        53     UP
__   SYS3  DBOVLFPC          DL/I          41         0       44        44     UP
__   SYS3  DBVHDJ05          DL/I          42         0       46        46     UP
__   SYS3  DDVBTZ02          DL/I          43         0       45        45     EX
__   SYS3  DXVHIDK5          DL/I         251         0        8         8     UP
__   SYS3  D2XHDJ05          DL/I         262         0        8         8     UP
__   SYS3  D2XHIDK5          DL/I         264         0        8         8     UP
******************************** Bottom of data ********************************
```

IMS Resource Definitions – Manage Transactions



IMS Resource Definitions – Manage Transactions

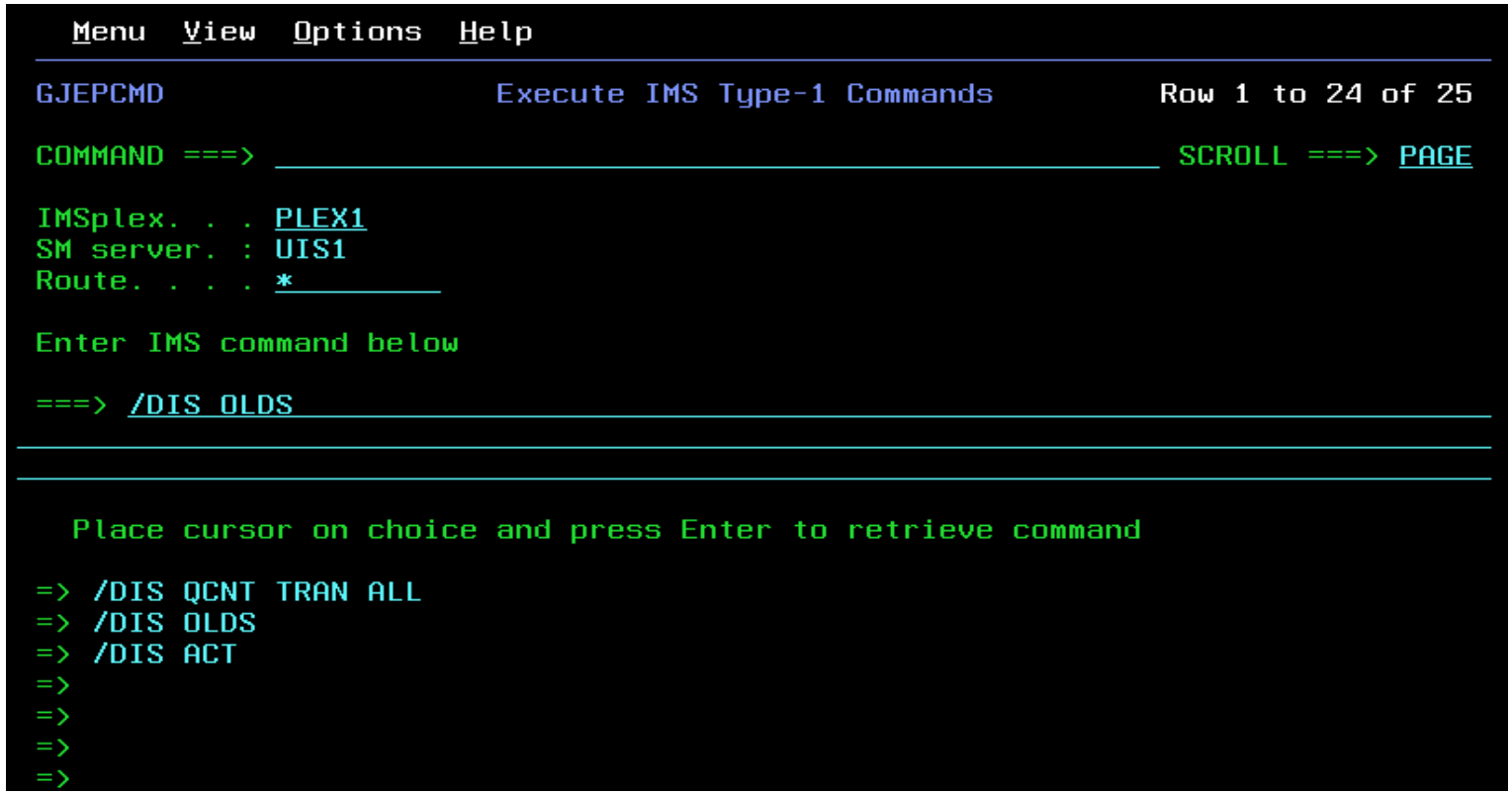


Scenario 4 – Issuing IMS Commands

- **Issue Type 1 command to all IMS systems**
  - Display same resource type across Sysplex
  - Alter resource status across Sysplex

- **Command issued to each IMS system**
  - Output recorded to command file and logged history file
  - ISPF Browse(view) used to display result
  - Scrollable, Primary and line commands (find, exclude, etc.)
  - Retrievable list of previously entered commands

IMS Commands – Type-1



IMS Commands – Type-1

```
 File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
VIEW       USRT004.ECTST21.IMSSM.CMDOUT1                    Columns 00001 00080
Command ===> _                                               Scroll ===> PAGE
****** ********************************* Top of Data ***********************************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 *-------------------------------------------------*
000002 * FIRST Response from: IMS1                       *
000003 *-------------------------------------------------*
000004
000005 W70 OLDS-DDNAME % FULL RATE ARCH-JOB    ARCH-STATUS  OTHER-STATUS
000006 W00 *DFSOLP00       65     0                        IN USE
000007 W00  DFSOLP03                            AVAILABLE
000008 W00  DFSOLP02                            AVAILABLE
000009 W00  DFSOLP01                            AVAILABLE
000010
000011 W01  SINGLE OLDS LOGGING, SINGLE WADS LOGGING
000012 W02  AUTOMATIC ARCHIVE = 01
000013 W03  WADS = *DFSWADS0 DFSWADS1
000014 W04  SLDSREAD ON
000015 X99 *08101/093352*
000016 *-------------------------------------------------*
000017 * FIRST Response from: IMS2                       *
000018 *-------------------------------------------------*
000019
000020 W70 OLDS-DDNAME % FULL RATE ARCH-JOB    ARCH-STATUS  OTHER-STATUS
000021 W00 *DFSOLP00       41     0                        IN USE
000022 W00  DFSOLP03                            AVAILABLE
000023 W00  DFSOLP02                            AVAILABLE
000024 W00  DFSOLP01                            AVAILABLE
000025
000026 W01  SINGLE OLDS LOGGING, SINGLE WADS LOGGING
000027 W02  AUTOMATIC ARCHIVE = 01
000028 W03  WADS = *DFSWADS0 DFSWADS1
000029 W04  SLDSREAD ON
000030 X99 *08101/093352*
****** ******************************** Bottom of Data ********************************
```

IMS Commands – Type-2

```
  Menu  Edit  Option
GJEPCMD                 Execute IMS Type-2 commands        Row 1 to 24 of 25

COMMAND ===> _____________________________________________ SCROLL ===> PAGE

  IMSplex: PLEX1
SM server: UIS
    Route: *

Enter IMS command below

===> QRY IMSPLEX SHOW(ALL)



  Place cursor on choice and press Enter to retrieve command

=> QRY DB NAME(AUTODB)
=> QRY IMSPLEX SHOW(ALL)
=>
=>
=>
```

IMS Commands – Type-2

```
 File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
VIEW       USRT005.IMSSM.CMDOUT1                          Columns 00001 00080
Command ===> _____________________________________________ Scroll ===> PAGE
****** ********************************* Top of Data ********************************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 *-------------------------------------------------*
000002 * FIRST Response from: SCI1                       *
000003 *-------------------------------------------------*
000004  IMSplex . . . . . : PLEX1
000005  Routing . . . . . : *
000006  Date. . . . . . . : 06/08/30
000007  Time. . . . . . . :  10:33:34.2
000008
000009      Response for: QRY IMSPLEX SHOW(ALL)
000010      IMSplex  MbrName    CC Member   JobName  Type  Subtype  Version  OSName
000011               Status
000012      ---------------------------------------------------------------------
000013      CSLPLEX1 OM1OM       0 OM1OM    OM1      OM             1.2.0    ECTST21
000014               READY,ACTIVE
000015      CSLPLEX1 OM1OM       0 IMS1     IMS1     IMS   DBDC     9.1.0    ECTST21
000016               READY,ACTIVE
000017      CSLPLEX1 OM1OM       0 DCIMS19  DCIMS19  OTHER          1.2.0    ECTST21
000018               READY,ACTIVE
000019      CSLPLEX1 OM1OM       0 SCI1SC   SCI1     SCI            1.2.0    ECTST21
000020               READY,ACTIVE
000021      CSLPLEX1 OM1OM       0 RM1RM    RM1      RM    MULTRM   1.2.0    ECTST21
000022               READY,ACTIVE
****** ******************************** Bottom of Data ********************************
```

Scenario 5 – Maintaining command Audit Trail

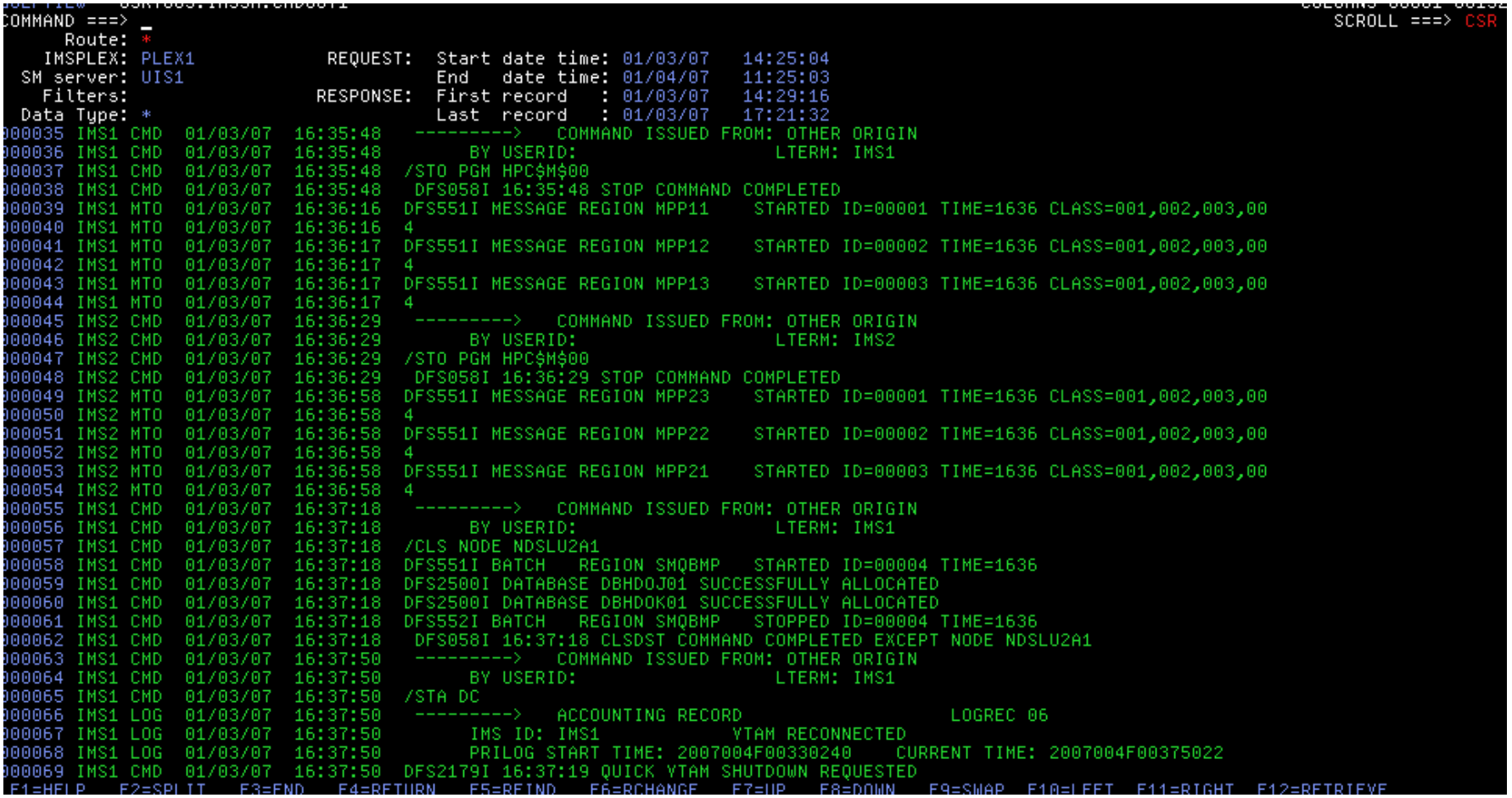
- **Keeping track of operations of your IMS systems**
  - Need for audit trail?
  - Easy way of viewing IMS commands & system messages?
  - Automatic archive of audit log?

- **Sysplex Manager with its history datasets**
  - Log most type-1 IMS commands, command responses and MTO messages from all IMS images regardless of origins (z/OS console, terminal, OTMA, AOI programs using CMD or ICMD interface)
  - Searchable, filterable online viewing of log data using ISPF dialog
  - Automatic archive for full history dataset
  - Archive Directory to assist locating archived data
  - Issue type-1 and type-2 IMS commands while viewing log data (similar to z/OS SDSF)
  - Check SM History datasets status

Command Audit Trail

```
  Menu  Edit  Option
GJEPS00            System exceptions/log data selection specification
Command ===> _____________________________________________________________

  IMSplex: PLEX1     SM server: UIS

Enter the criteria to view the system exceptions/Log data from history dataset:

Enter the System Exception Type for system exception view
                    Data type : CMD          (LLKX, CQSX, LOG, MTO, CMD or *)

Enter the LOG, MTO, CMD filter : *           (IMSid or *)
Enter the CQS filter           : _______     (CQSid or *)

Enter the start date and time of data
                    Start date: 08/25/06     (mm/dd/yy)
                    Start time: 15:48:14     (hh:mm:ss)

Enter the end date and time of data
                    End date  : 08/25/06     (mm/dd/yy)
                    End time  : 15:49:39     (hh:mm:ss)
```

Command Audit Trail



SM History database status and usage

- Up to 8 VSAM Linear datasets make up SM history database
- Used in a circular fashion similar to IMS OLDS
- Automatic archive process to save full datasets to user-defined output location
- Directory to help users keep track of archive output
- Real-time information on status of these history datasets

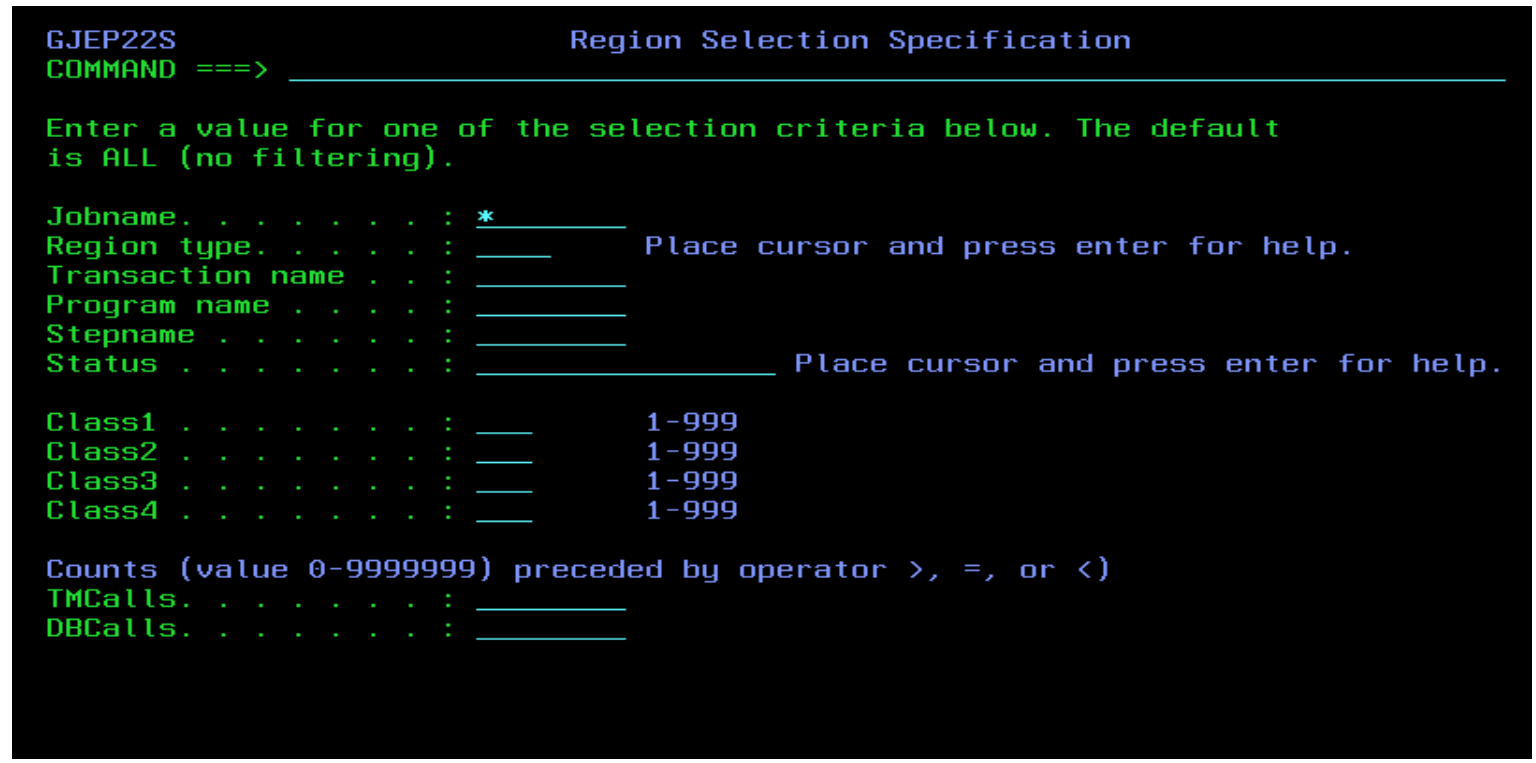
```
  Menu  View  Options  Help
                                                              Realtime snapshot
GJEP102                  History Dataset Information           Row 1 to 2 of 2
COMMAND ===>                                                   SCROLL ===> PAGE

SMplex . . : ISM01                        Date. . : 05/20/08
SM server. : UIS1                         Time. . : 14:55:39

Database ID. . . . . . . . . . :  IMSSMH12
Number of records recorded . . :     8,548
Number of datasets allocated . :         2
Number of datasets used. . . . :         2
Earliest history record. . . . : 08/05/01 19:15:56  yy/mm/dd hh:mm:ss
Latest history record. . . . . : 08/05/20 17:41:43  yy/mm/dd hh:mm:ss

                    ----Recording yy/mm/dd hh:mm:ss----
DDname  St.   RecCnt Earliest          Latest            MaxSize(K) UsedSize(K)
HIST1    F     8,490 08/05/01 19:15:56 08/05/03 12:59:45     12,956      12,288
HIST2    R        58 08/05/03 12:59:55 08/05/20 17:41:43     10,796       2,048
******************************** Bottom of data ********************************
```

Scenario 6 – Managing Dependent Regions

- **Transaction workload back-logged**
  - What dependent regions are available?
  - What transaction classes do they handle?
  - Are they occupied with work?
  - What are they doing?

- **Scrollable list of all dependent regions across Sysplex**
  - Enhanced IMS /DISPLAY ACTIVE REG
  - Displays overall DL/I DB/TM call counts
  - Sort the lock held column to see which reg holds the most locks
  - Resequenced by primary or secondary classes
  - Drill down to lower level of detail

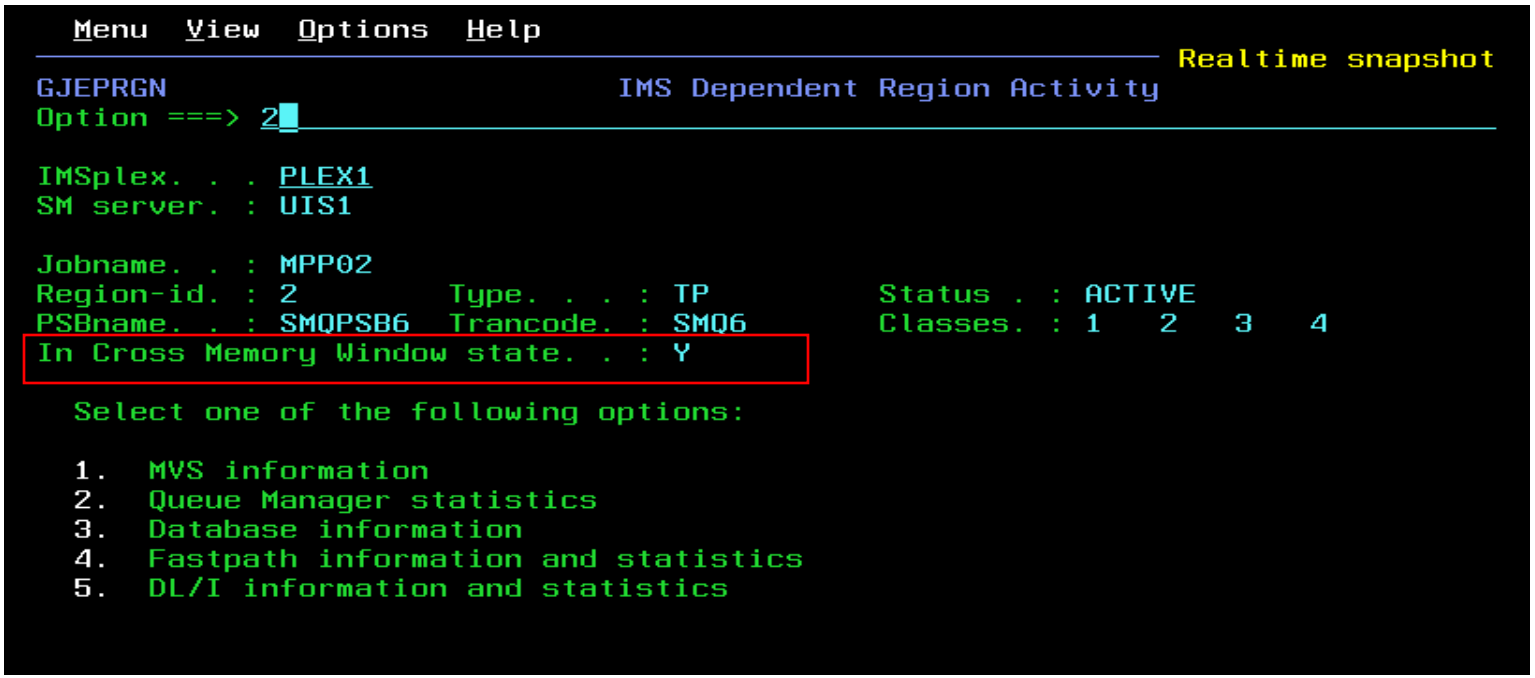
Dependent Region Display



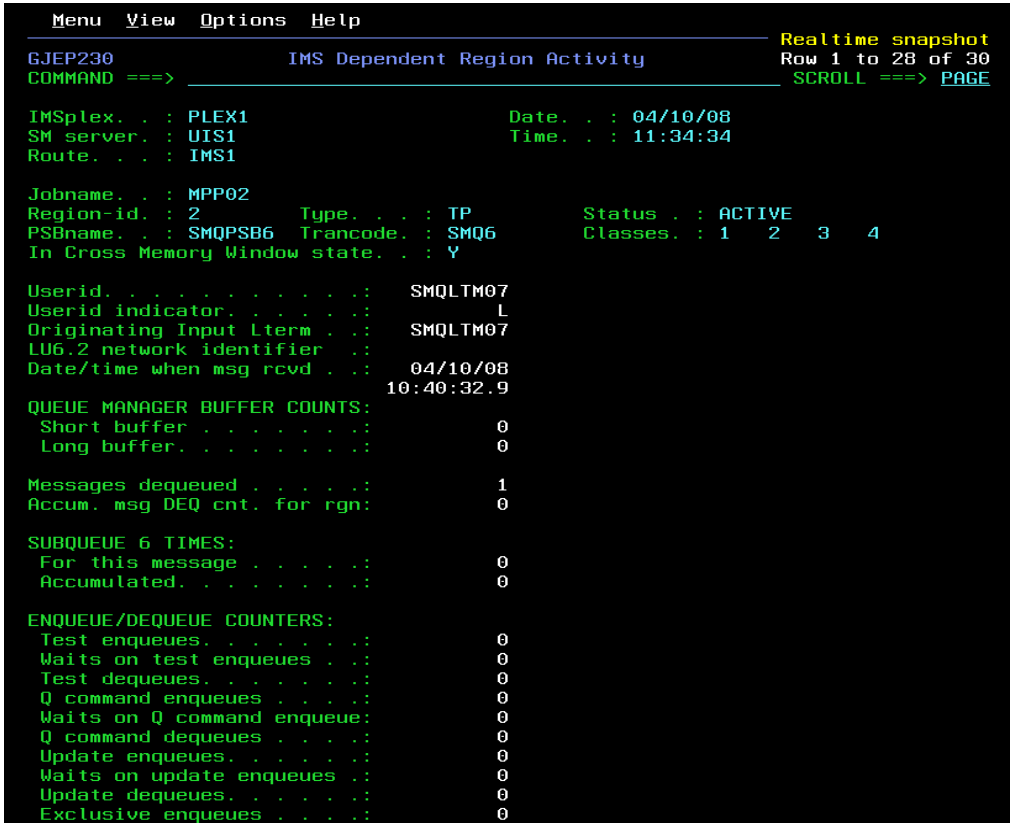
Dependent Region Display

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP220              IMS Dependent Region Activity          Row 1 to 8 of 8
COMMAND ===>                                              SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 11:30:51
Route. . . . *                                            More: >

Enter 's' to select a region for detailed activity
      't' to view transaction resource definition data
      'p' to view PSB resource definition data
      'c' to process IMS commands
      'd'  to produce an SVC dump for the selected region
      'dt' to produce SVC dumps for the selected region type across the plex

Cmd IMS Rgn  Type Jobname  Trancode Program   X-M Locks-held   CPUtime(hs)
__ IMS1 4    BMP  BMP3               PLVAPZ12   N           3           .01
__ IMS1 3    BMP  BMP1               PLVAPZ02   N           2           .01
s_ IMS1 2    TP   MPP02    SMQ6     SMQPSB6    Y           0          2.53
__ IMS1 1    TP   MPP01               PLVAPZ12   N           0           .04
__ IMS2 4    TP   MPP21    NQF2     PMVAPZ22   Y           0           .01
__ IMS2 3    TP   MPP22    NQF1     PMVAPZ12   Y           0           .01
__ IMS2 2    BMP  BMP2               PLVAPZ22   Y           3           .01
__ IMS2 1    BMP  BMP21              HPC$BA00   N           2           .03
********************************* Bottom of data ********************************
```

Dependent Region Display



Dependent Region Display



Dependent Region Display

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP230              IMS Dependent Region Activity        Row 1 to 16 of 16
COMMAND ===> _____________________________________________ SCROLL ===> PAGE

IMSplex. . : PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 11:35:32
Route. . . : IMS1

Jobname. . : MPP02
Region-id. : 2        Type. . . : TP         Status . : ACTIVE
PSBname. . : SMQPSB6  Trancode. : SMQ6       Classes. : 1   2   3   4
In Cross Memory Window state. . : Y

 DB2 subsystem name . . . .:
 DB2 plan name. . . . . .:

Class assoc. with exc.tran.:          0
Number of locks,curr. held.:          0
Maximum number of locks . .:          0

PCB INFORMATION SECTION . .:
 PCB Type-TP/DB PCB . . . .:     TP-PCB
 Status code. . . . . .:
 PCB name . . . . . .:       IOPCB
 DBD name . . . . . .:         N/A
 Terminal name. . . . . .:   SMQLTM07
 Segment name feedback. . .:
 Function code. . . . . .:       GHU
 Processing option. . . . .:
******************************** Bottom of data ********************************
```

Dependent Region Display

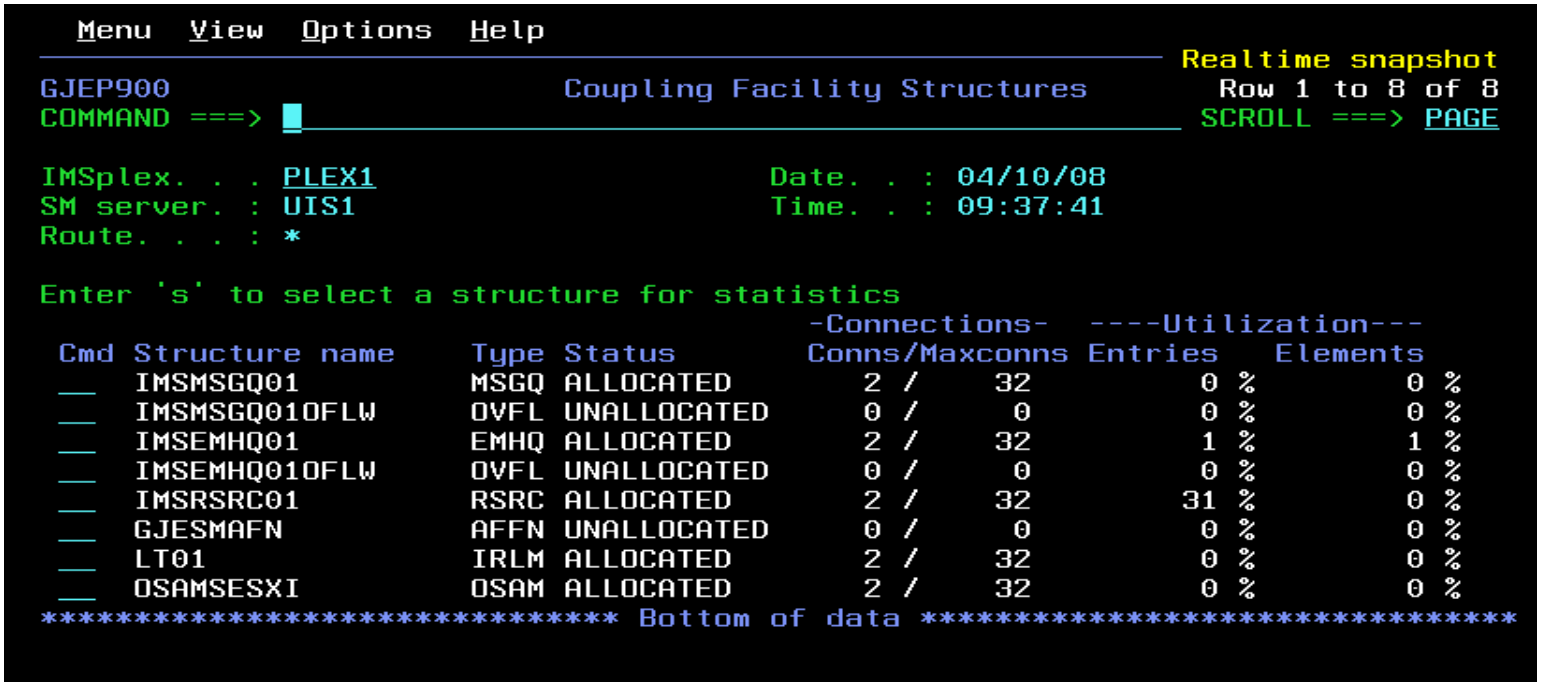
```
  Menu  View  Options  Help
                                                              Realtime snapshot
GJEP230              IMS Dependent Region Activity            Row 1 to 28 of 36
COMMAND ===>                                                  SCROLL ===> PAGE

IMSplex. . : PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 11:36:36
Route. . . : IMS1

Jobname. . : MPP02
Region-id. : 2          Type. . . : TP          Status . : ACTIVE
PSBname. . : SMQPSB6    Trancode. : SMQ6        Classes. : 1   2   3   4
In Cross Memory Window state. . : Y

 MSG GU   CALLS. . . .:                1
 MSG GN   CALLS. . . .:                0
 MSG CHNG CALLS. . . .:                0
 MSG ISRT CALLS. . . .:                0
 MSG PURG CALLS. . . .:                0
 MSG CMD  CALLS. . . .:                0
 MSG GCMD CALLS. . . .:                0
 MSG AUTH CALLS. . . .:                0
 MSG SETO CALLS. . . .:                0
 DB GU   CALLS . . . .:                0
 DB GN   CALLS . . . .:                0
 DB GNP  CALLS . . . .:                0
 DB GHU  CALLS . . . .:                1
 DB GHN  CALLS . . . .:                0
 DB GHNP CALLS . . . .:                0
 DB ISRT CALLS . . . .:                0
 DB DLET CALLS . . . .:                0
 DB REPL CALLS . . . .:                0

 TOTAL OF PREVIOUS DB CALLS:           1
 DB DEQ  CALLS . . . .:                0
System Service Calls. . . .:
 APSB CALLS. . . . . .:                0
 DPSB CALLS. . . . . .:                0
 GMSG CALLS. . . . . .:                0
 ICMD CALLS. . . . . .:                0
 RCMD CALLS. . . . . .:                0
 CHKP CALLS. . . . . .:                0
```

Scenario 7 – Viewing IMS CF Structures

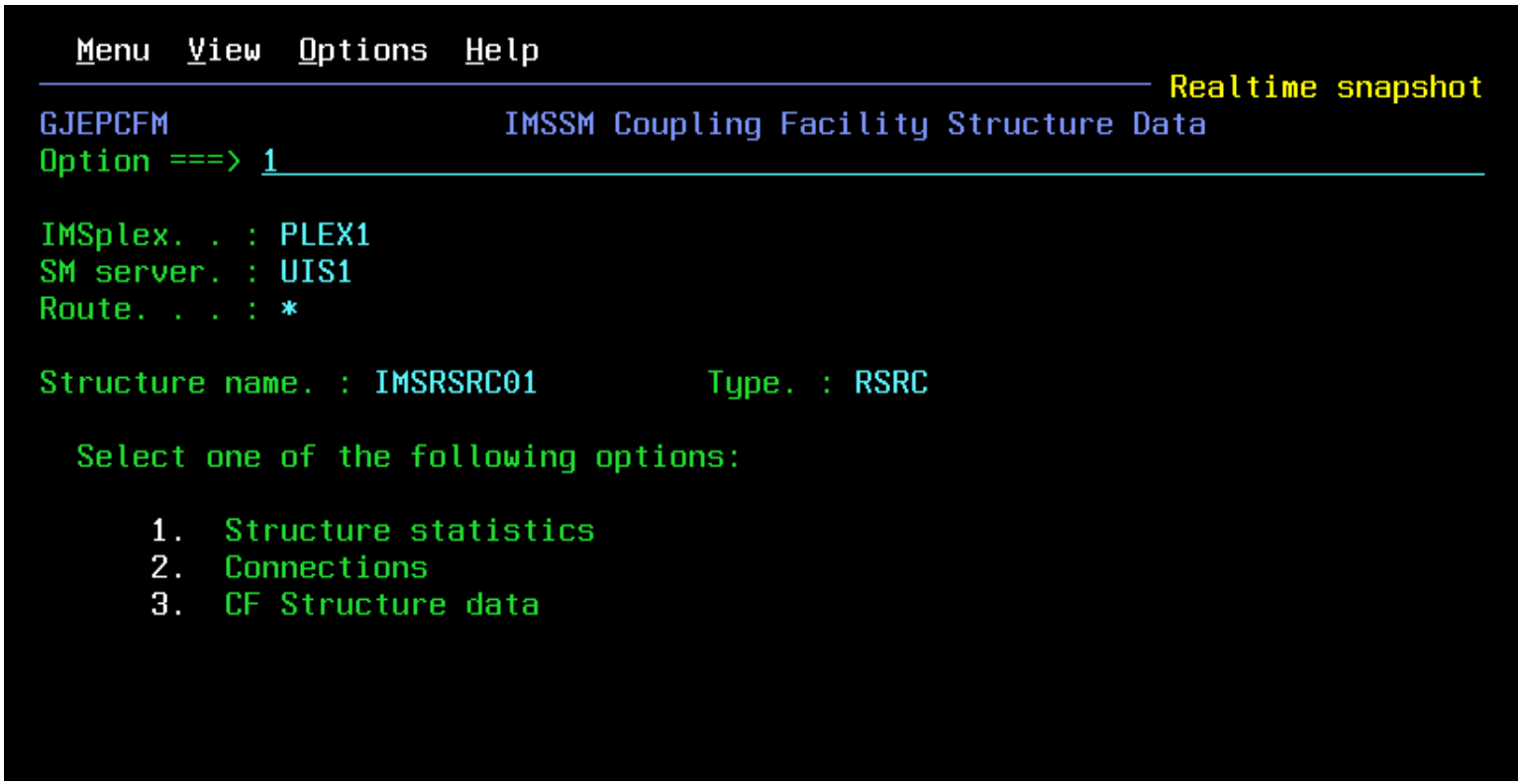
- **Growing use of Coupling Facility Structures**
  - Data Sharing, Shared Message Queues, Resource Manager
  - No single source for list of in use structures and details

- **Coupling Facility Structure display**
  - Real-time display of structure list
  - Statistics, Connections, Coupling Facility information

IMS Coupling Facility Structures



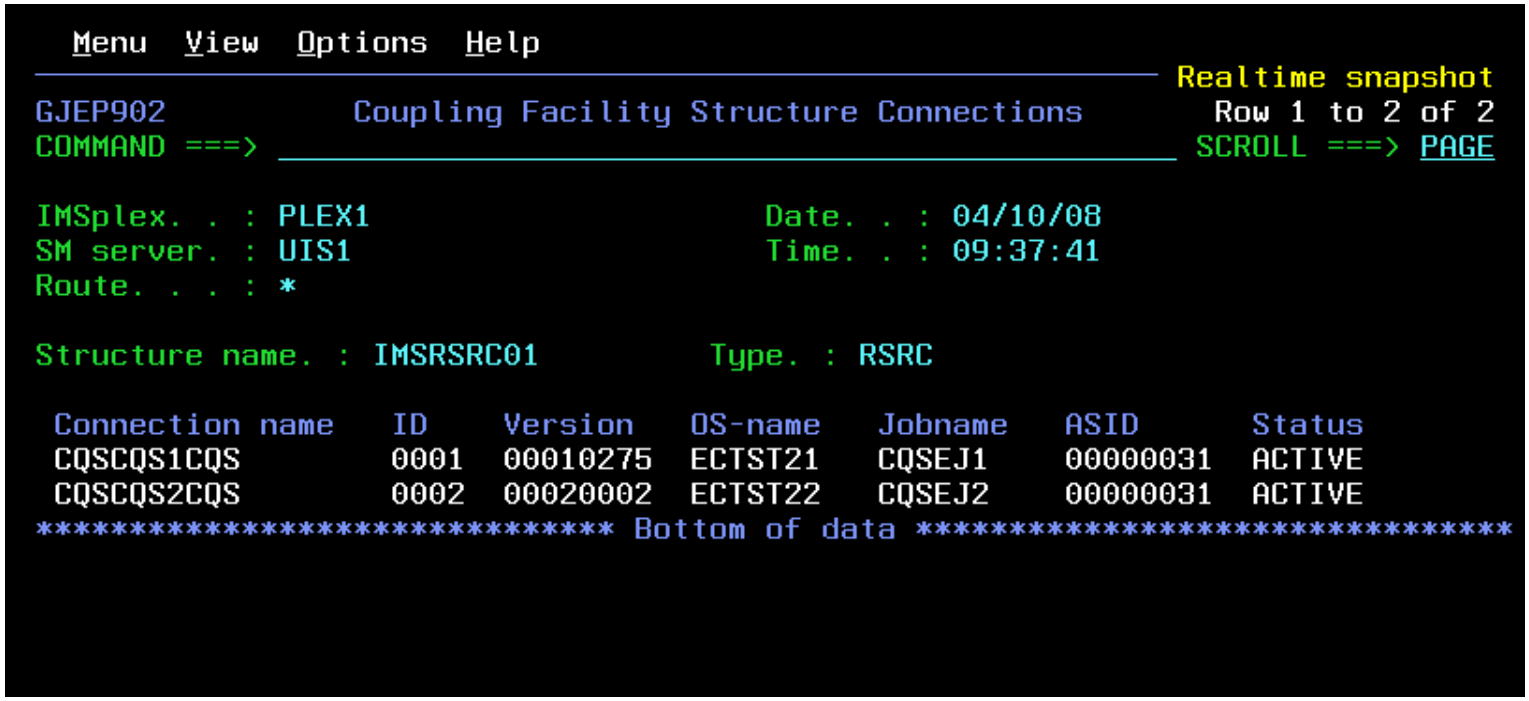
IMS Coupling Facility Structures



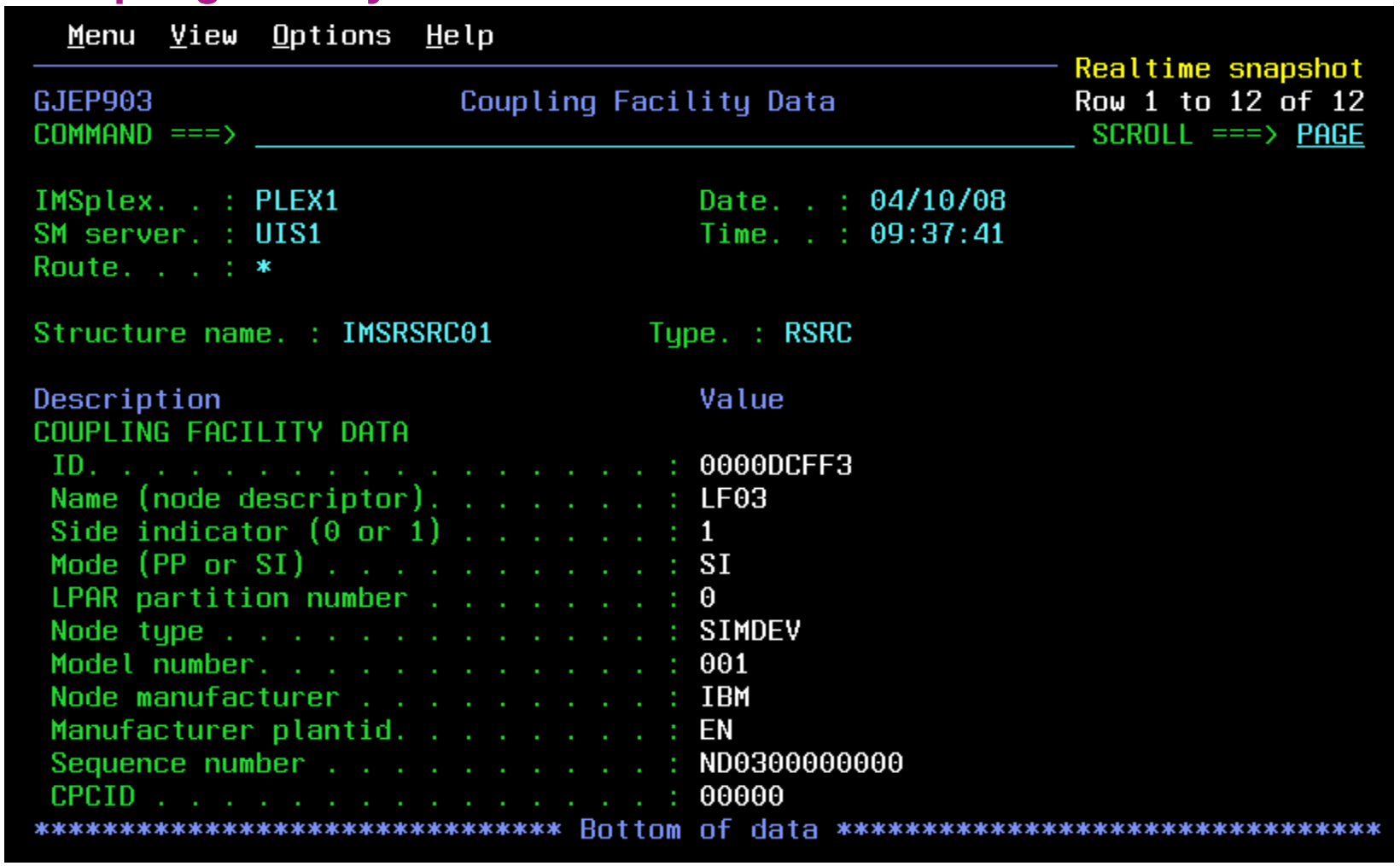
IMS Coupling Facility Structures

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP901                    CF Structure Statistics        Row 1 to 22 of 22
COMMAND ===>                                               SCROLL ===> PAGE

IMSplex. . : PLEX1                    Date. . : 04/10/08
SM server. : UIS1                     Time. . : 09:37:41
Route. . . : *

Structure name. : IMSRSRC01         Type. : RSRC

Description                                    Value
STRUCTURE STATISTICS
 Entry count. . . . . . . . . . :                690
 Element count. . . . . . . . . :                 14
 Maximum entry count. . . . . . :              2,161
 Maximum element count. . . . . :              2,160
 Entry ratio. . . . . . . . . . :                  1
 Element ratio. . . . . . . . . :                  1
 Entries in use (%) . . . . . . :                 31
 Elements in use (%). . . . . . :                  0

 Policy size. . . . . . . . . . :              2,048K
 Policy initial size. . . . . . :                 0K
 Policy minimum size. . . . . . :                 0K
 Structure full threshold (%) . :                 80
 Actual structure size. . . . . :              2,048K
 Storage increment size . . . . :                256K

 Event monitor control count. . :                  0
 Max event monitor cntrl count. :                  0
 Maximum connections. . . . . . :                 32
 Nr of crnt IMS connections . . :                  2
 CF Max access time (1/10th s). :            NOLIMIT
******************************** Bottom of data ********************************
```

IMS Coupling Facility Structures



IMS Coupling Facility Structures



Scenarios

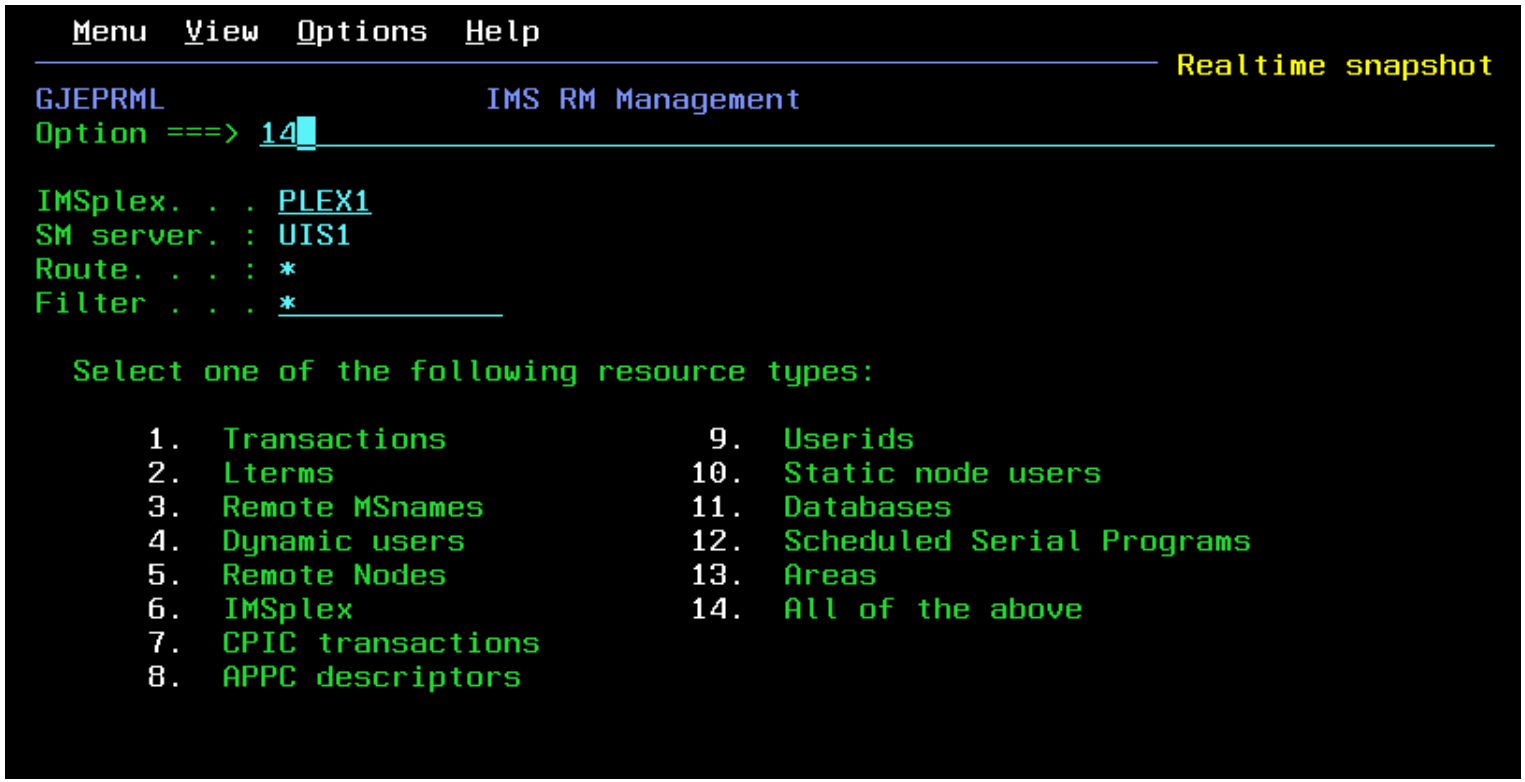
- **IMS**
  - Scenario 1 – Taking Inventory and capture diagnostic data
  - Scenario 2 – Managing IMS System Parameters
  - Scenario 3 – Verifying IMS Resource Definitions
  - Scenario 4– Issuing IMS Commands
  - Scenario 5 – Maintaining Command Audit Trail
  - Scenario 6 – Managing Dependent Regions
  - Scenario 7 – Viewing IMS CF Structures
- **IMSplex**
  - Scenario 8 – Managing CSL RM Structure
  - Scenario 9 – Viewing Aggregate SCI, RM, OM Statistics
- **Data Sharing**
  - Scenario 10 – Resolving Data Sharing Long Locks
  - Scenario 11 - Viewing Real-time IRLM / PI Locking Status
  - Scenario 12 - Viewing Aggregated IRLM Statistics
- **Shared Queue and CQS**
  - Scenario 13 - Set transaction affinity and view local buffer utilization
  - Scenario 14 – Managing Destination Queue Depth
  - Scenario 15 – Viewing CQS Structures
- **Dashboard**
  - Scenario 16 – Dashboard and Thresholds

Scenario 8 – Managing CSL RM Structure

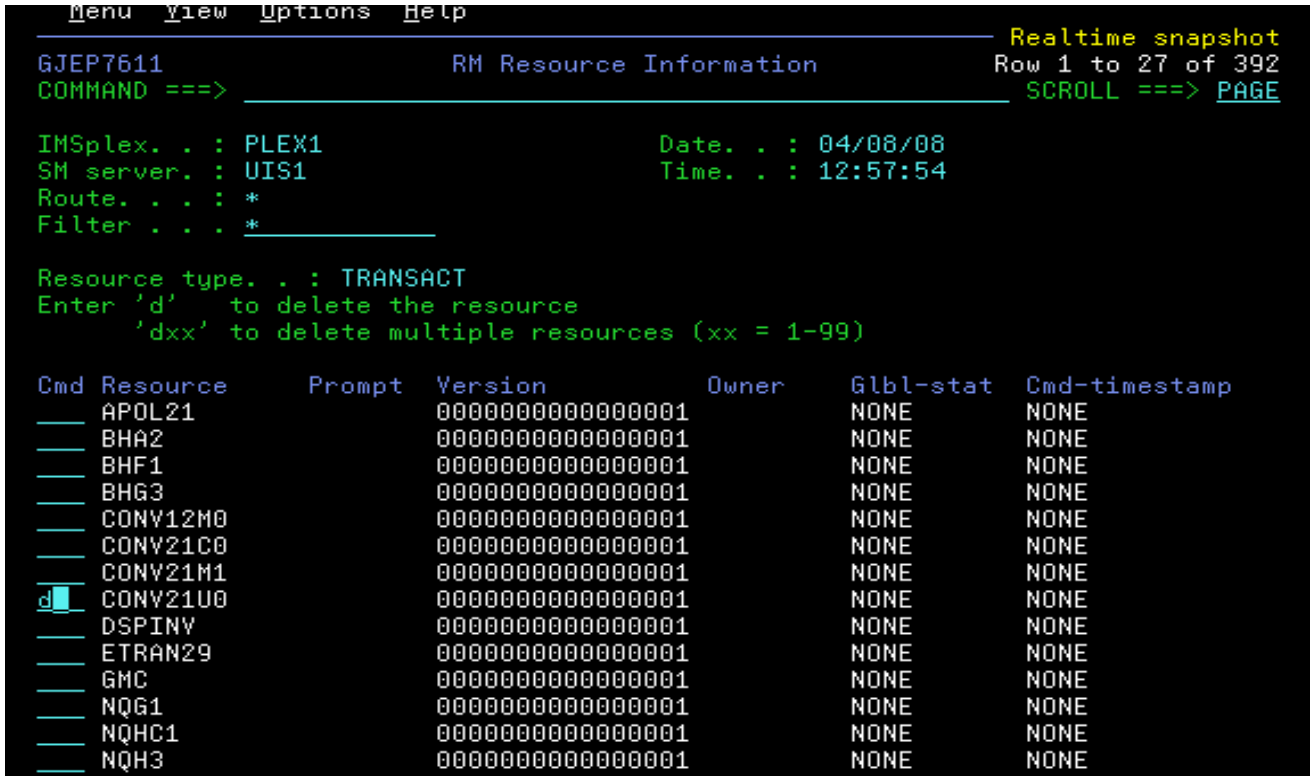
- **Common Service Layer RM Structure Content**
  - Holds global status of IMS Resources in IMSPlex
  - Determines IMSPlex wide status of Trans, LTERMs, Users
  - No capability to view content
  - No capability to alter/delete inconsistently defined resources

- **Resource Management Structure display**
  - Real-time display of structure content
  - Selectable via resource type and name filtering
  - Global status info to aid delete decision
  - Capability to delete selected resource definitions (multiple delete, delete by resource type or by owner)
  - Eliminates need to scratch and reallocate resource structure

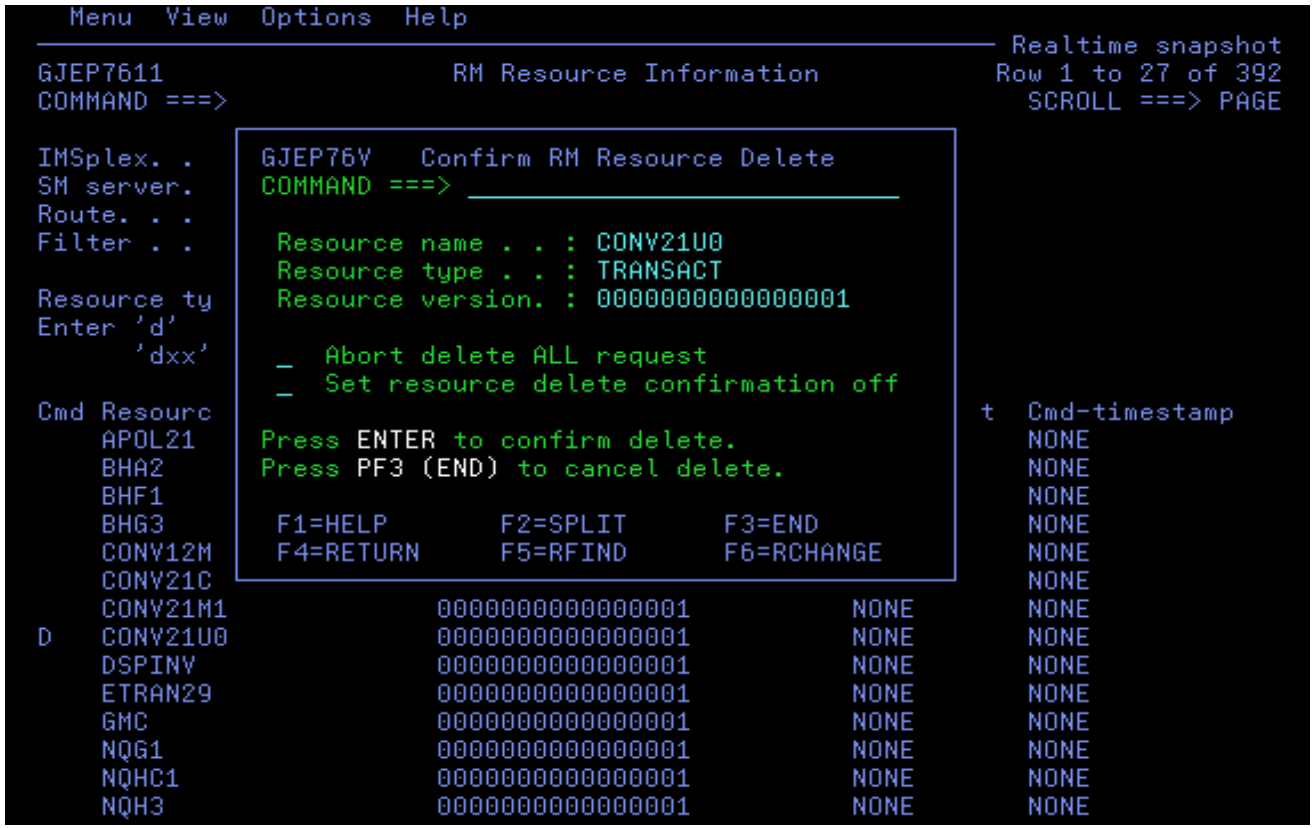
IMS Resource Structure Content



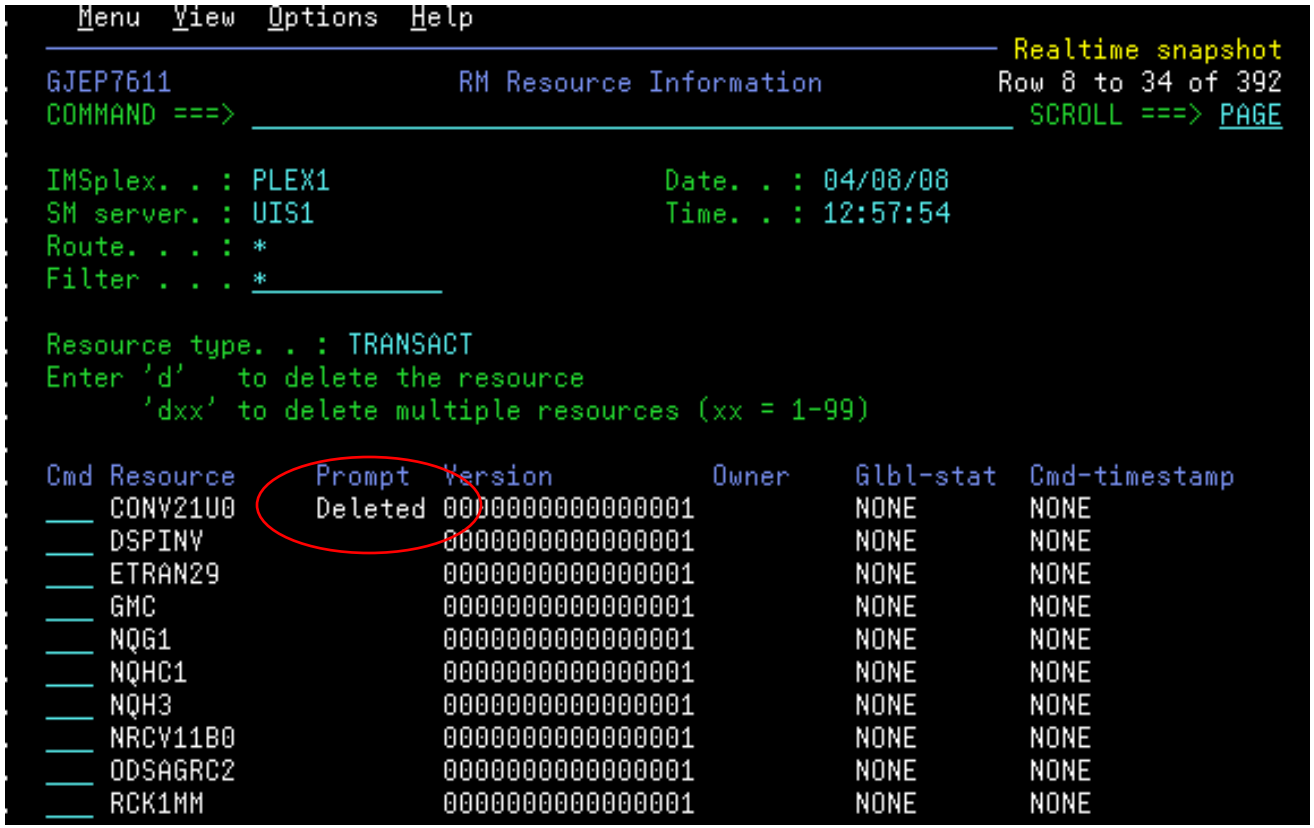
IMS Resource Structure Content



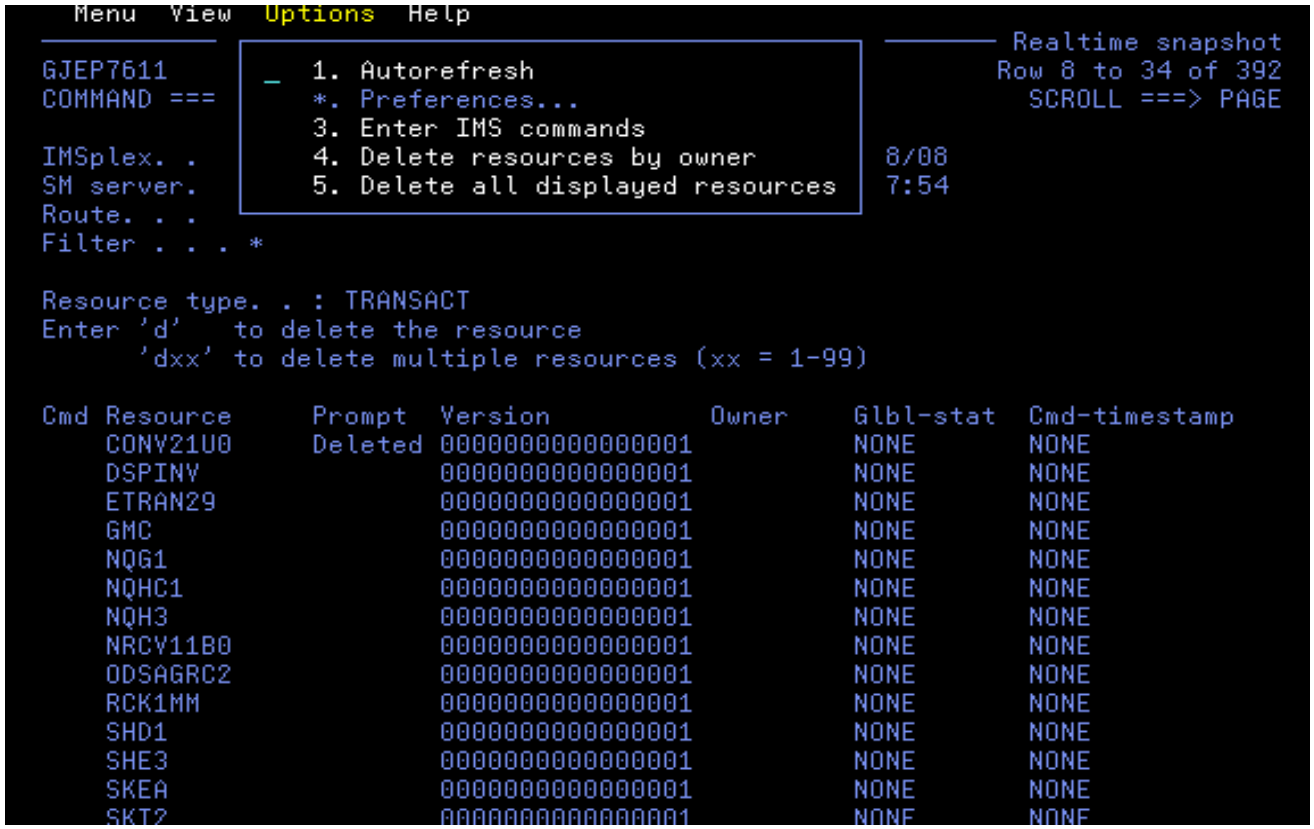
IMS Resource Structure Content



IMS Resource Structure Content



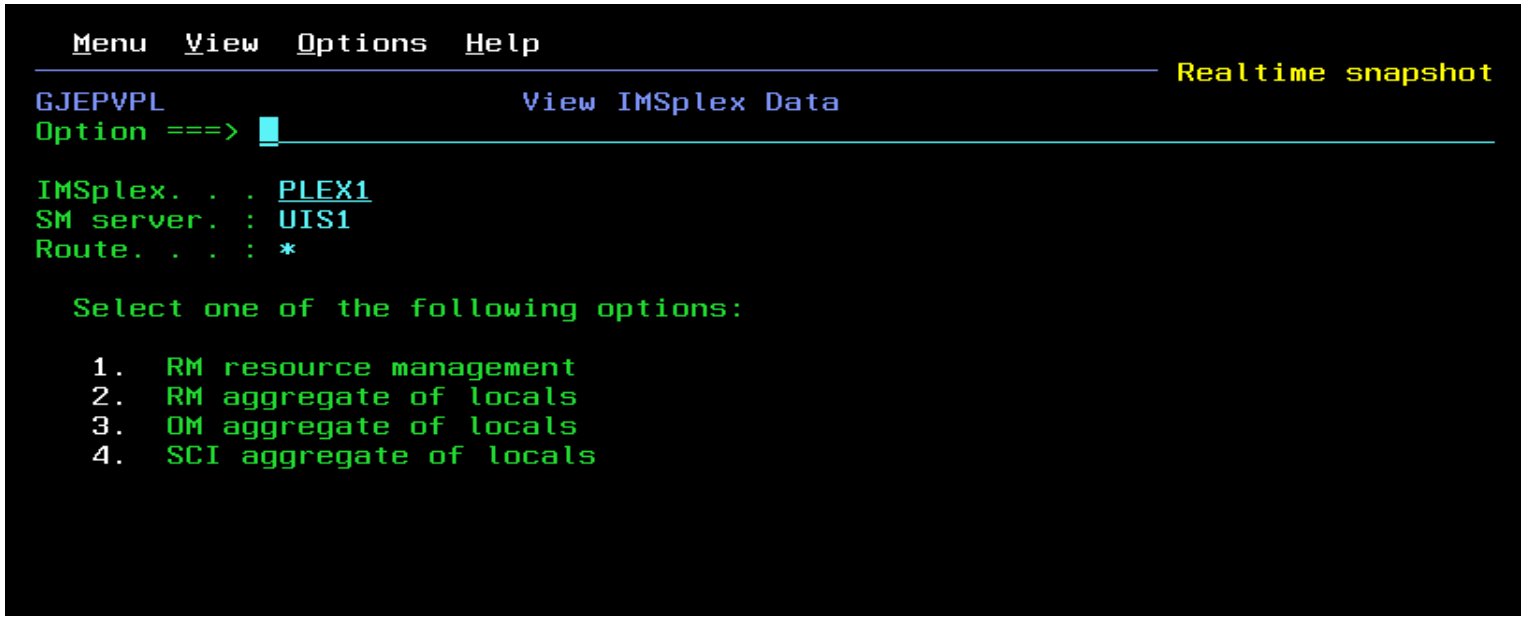
IMS Resource Structure Content



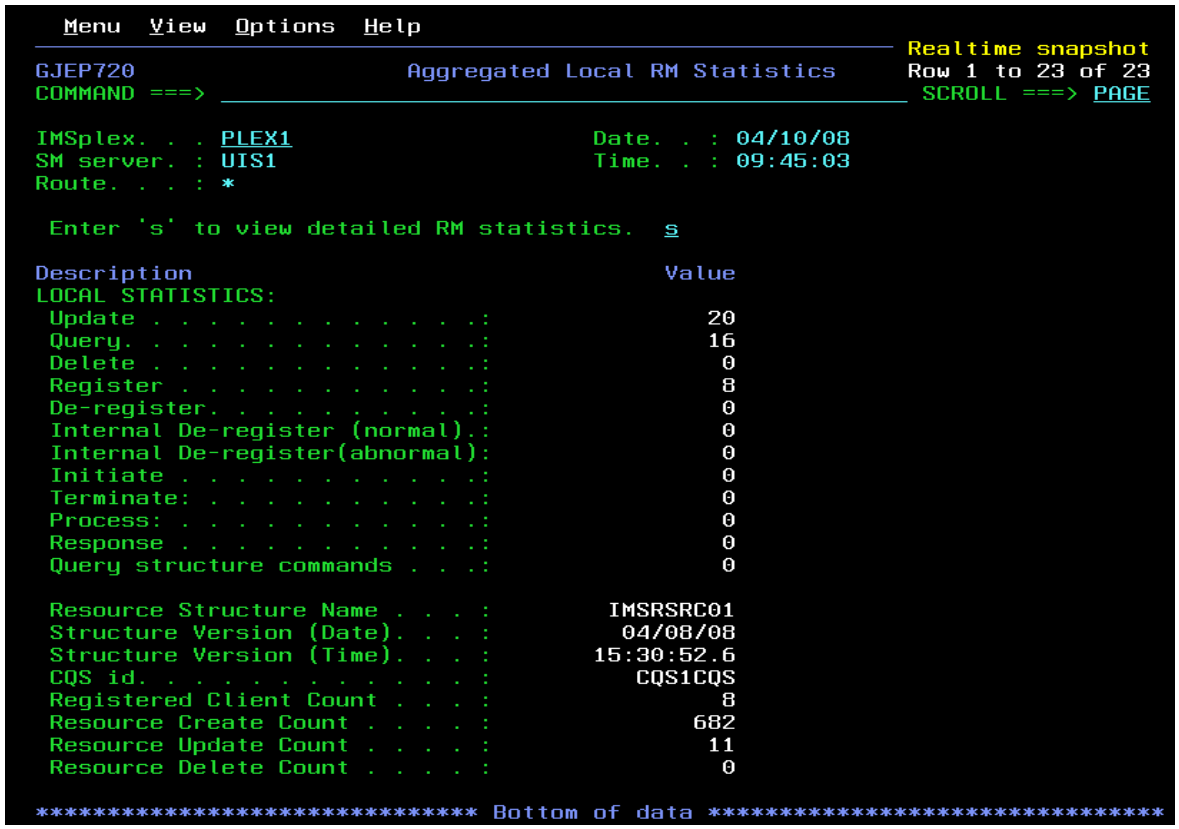
Scenario 9 – Aggregated SCI, RM, OM Statistics

- **Managing the well being of Common Service Layer (CSL) address spaces**
  - Lack of tools to obtain CSL statistical information
  - Multiple instances to check
- **Information gathered from CSL address spaces across Sysplex**
  - Aggregated into single system image
  - Drill down for information from individual address space

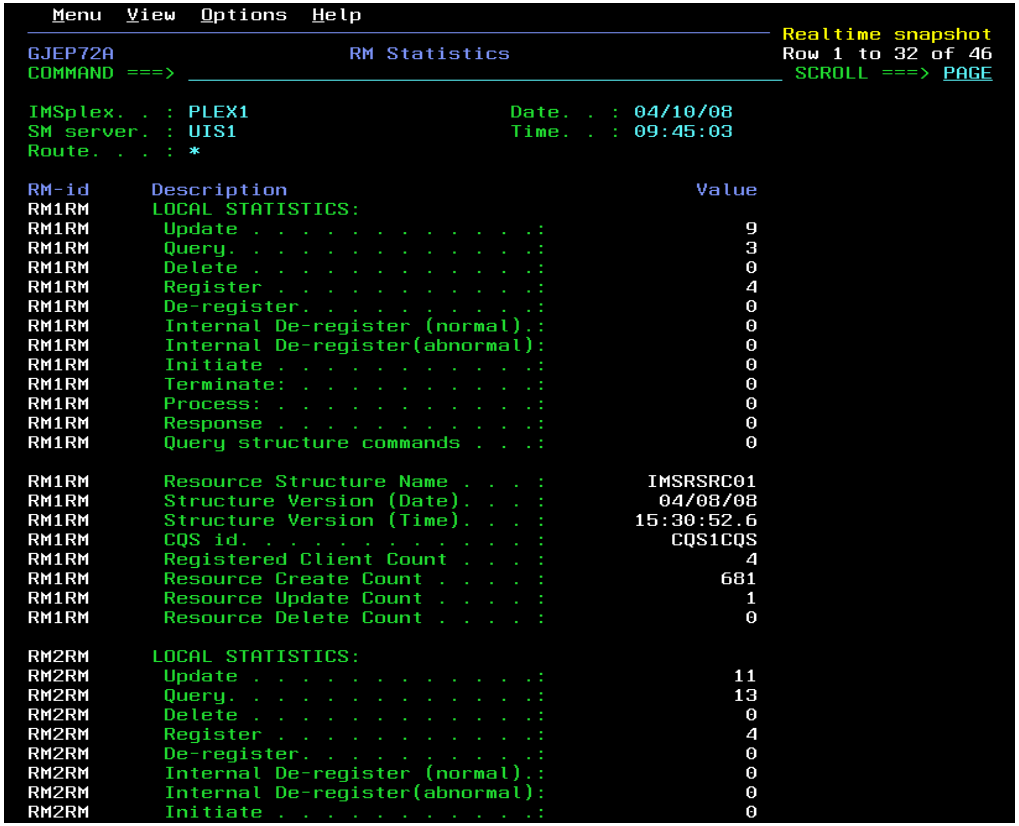
Aggregated RM Statistics



Aggregated RM Statistics



Aggregated RM Statistics



Scenarios

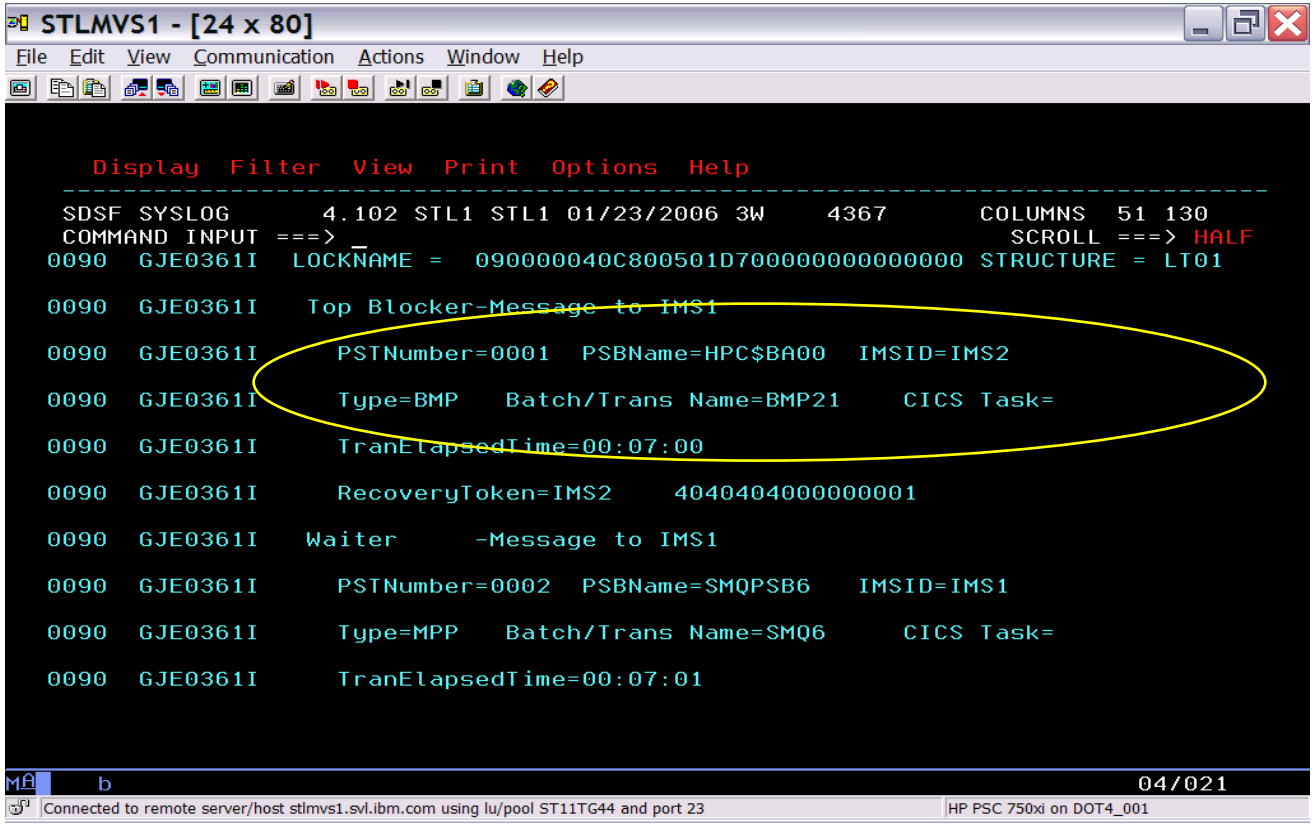
- **IMS**
  - Scenario 1 – Taking Inventory and capture diagnostic data
  - Scenario 2 – Managing IMS System Parameters
  - Scenario 3 – Verifying IMS Resource Definitions
  - Scenario 4– Issuing IMS Commands
  - Scenario 5 – Maintaining Command Audit Trail
  - Scenario 6 – Managing Dependent Regions
  - Scenario 7 – Viewing IMS CF Structures
- **IMSplex**
  - Scenario 8 – Managing CSL RM Structure
  - Scenario 9 – Viewing Aggregate SCI, RM, OM Statistics
- **Data Sharing**
  - Scenario 10 – Resolving Data Sharing Long Locks
  - Scenario 11 - Viewing Real-time IRLM / PI Locking Status
  - Scenario 12 - Viewing Aggregated IRLM Statistics
- **Shared Queue and CQS**
  - Scenario 13 - Set transaction affinity and view local buffer utilization
  - Scenario 14 – Managing Destination Queue Depth
  - Scenario 15 – Viewing CQS Structures
- **Dashboard**
  - Scenario 16 – Dashboard and Thresholds

Scenario 10 – Data Sharing Long Locks

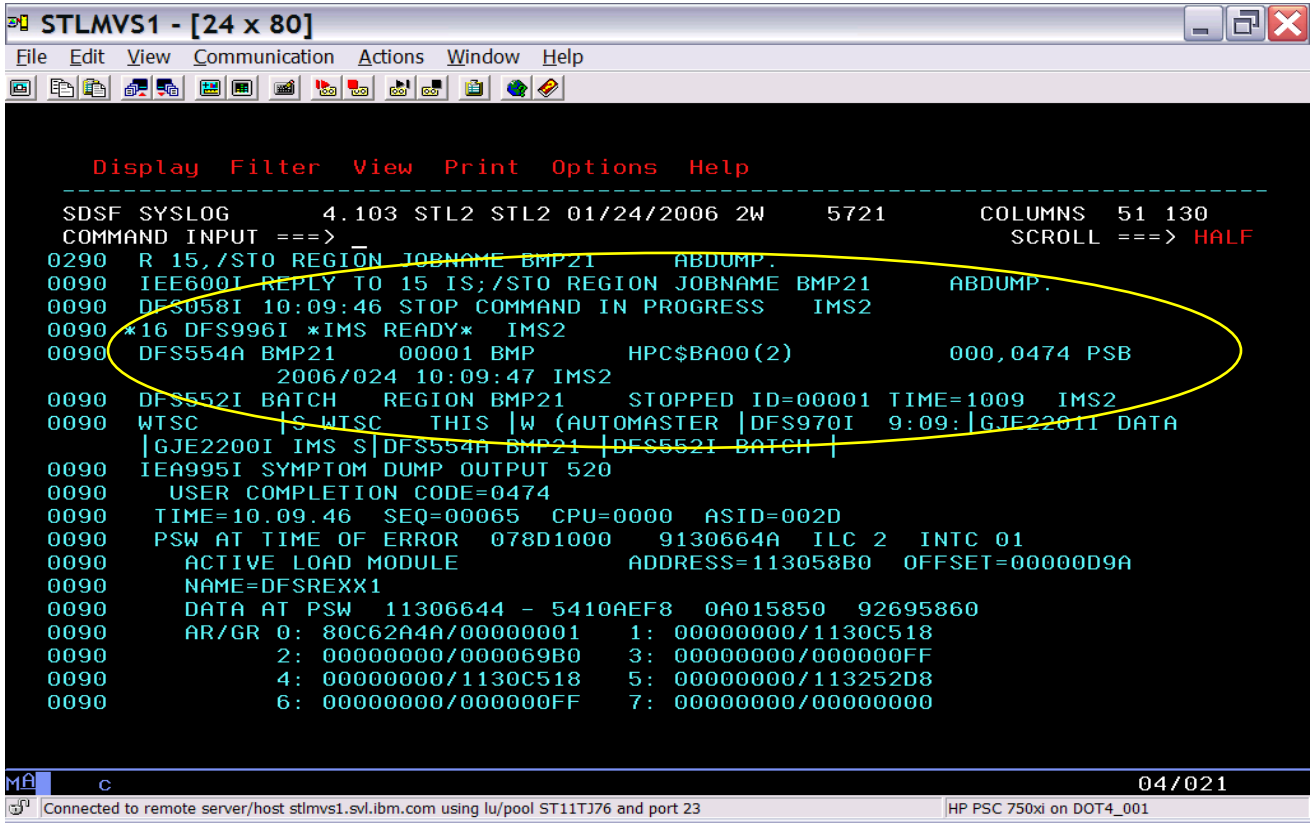
- **DB Lockouts by applications holding IRLM locks for an inordinate amount of time**
  - Could go unrecognized until it becomes critical
  - Lack of supported tools to assist in recognition and identification of problem
  - Manual intervention required to resolve

- **Exception processing for Long Locks**
  - Automatic real-time recognition when IRLM detects
  - Information consolidated, analyzed for top blocker, and presented
  - Information recorded in exceptions file and sent to z/OS console
  - Messages can be sent to z/OS console using user exit so that automated operations can resolve
  - Problem quickly resolved without manual intervention

Data Sharing Long Lock Exceptions



Data Sharing Long Lock Exceptions

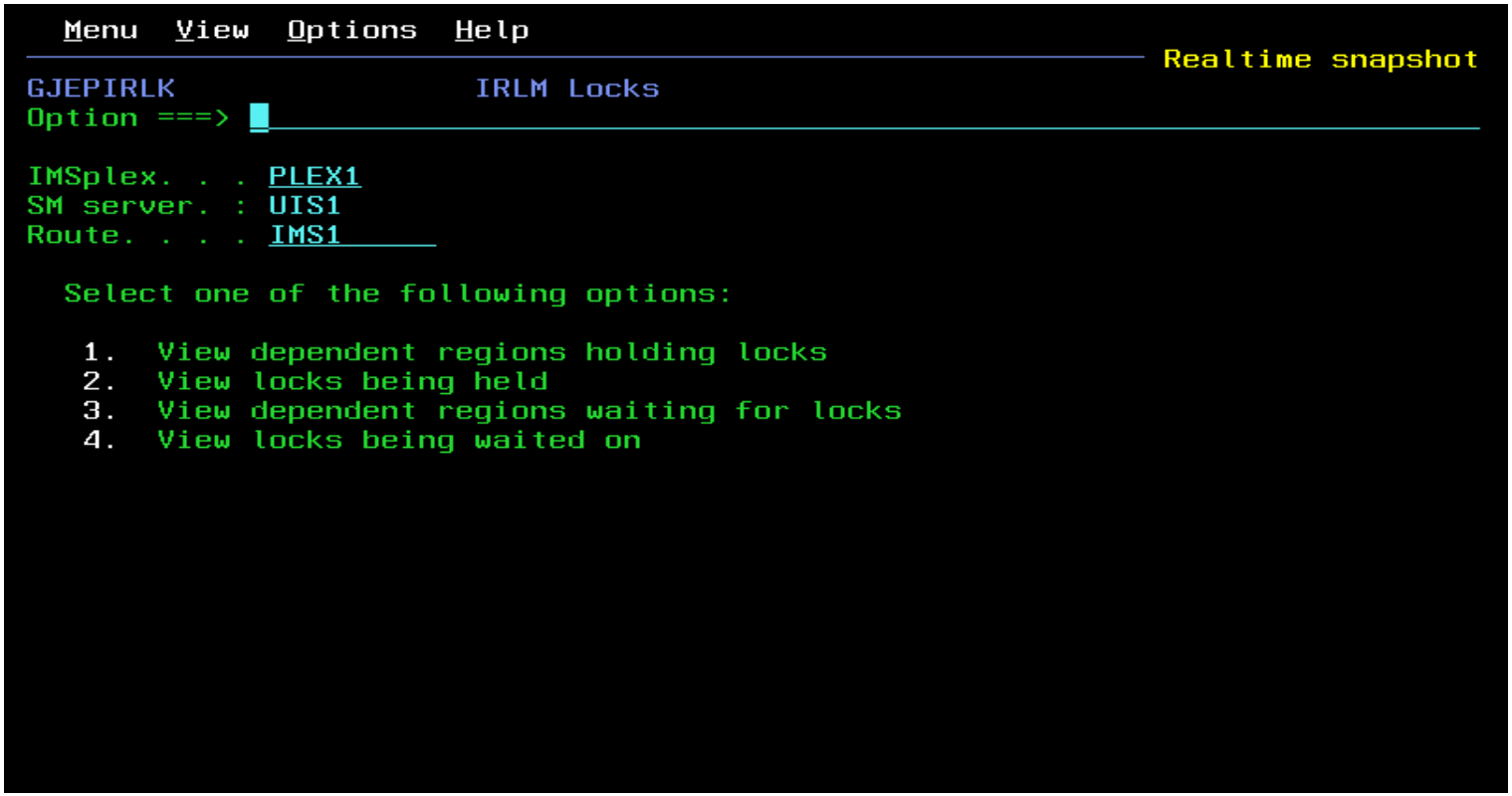


Scenario 11 – Real-time IRLM / PI Locking Display

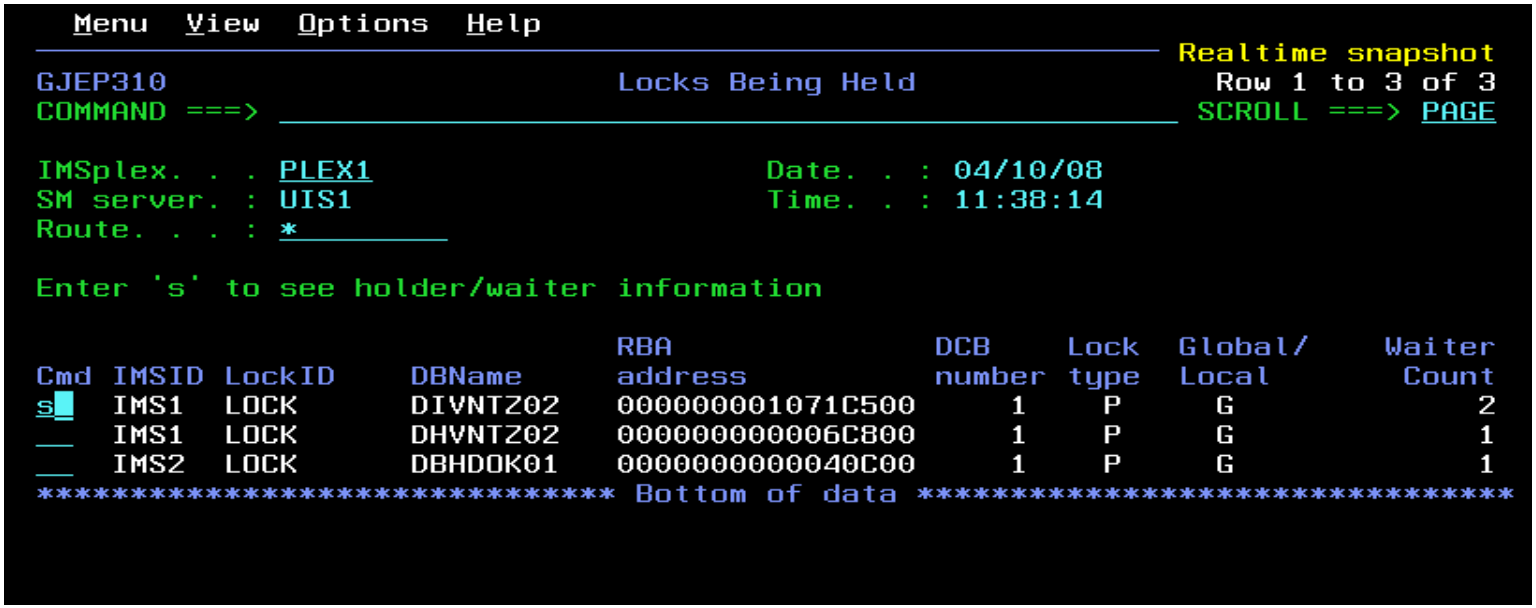
- **Identify resource contention**
  - Which IMS, dependent region, application is holding resources
  - Untangle queue of holder/waiters
  - Determine resources with contention

- **Display of resources with contention**
  - Select by dependent region and drill down to resource
  - Select by resource and drill down to dependent region

Real-time IRLM Locking Display



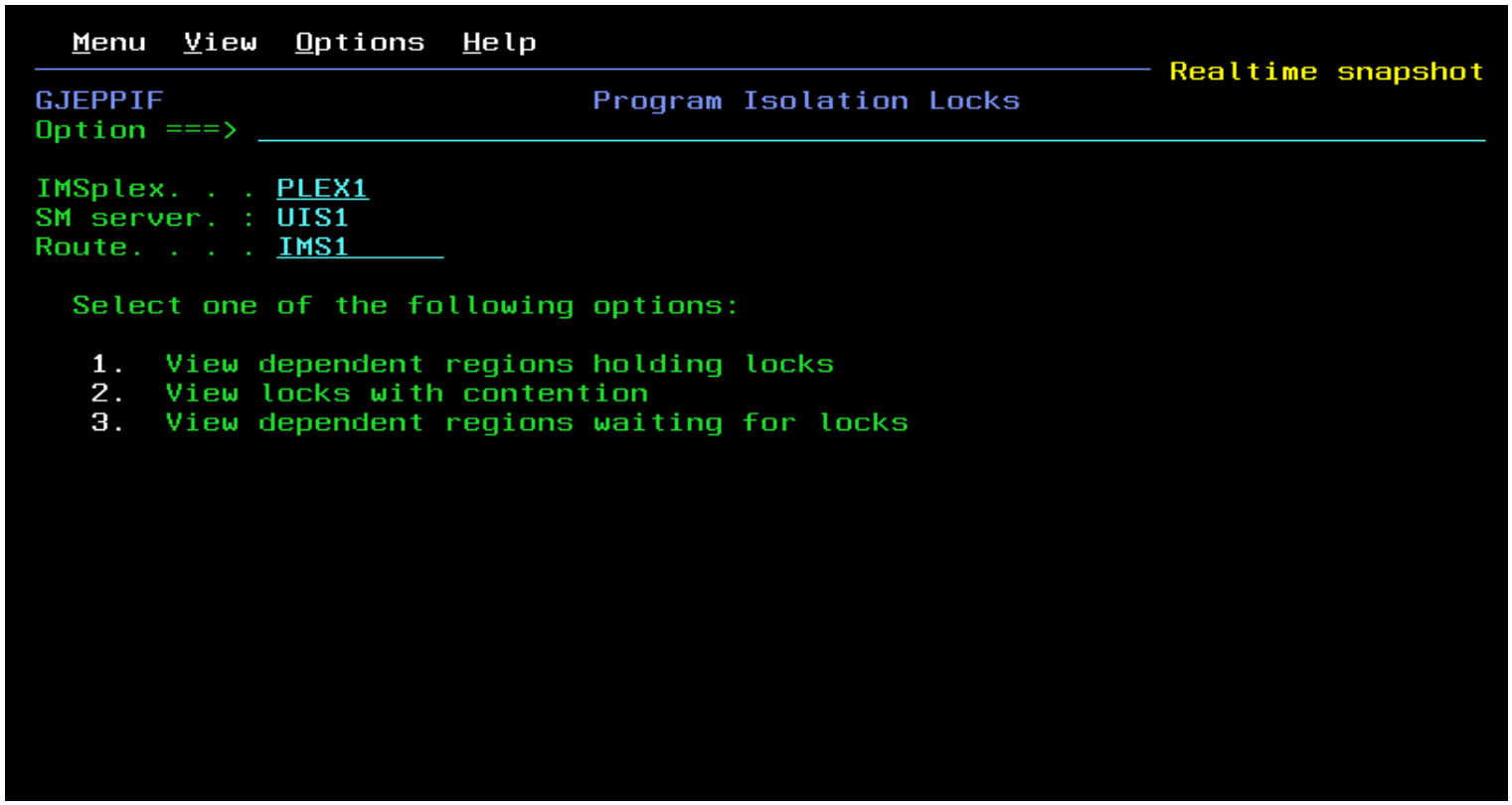
Real-time IRLM Locking Display



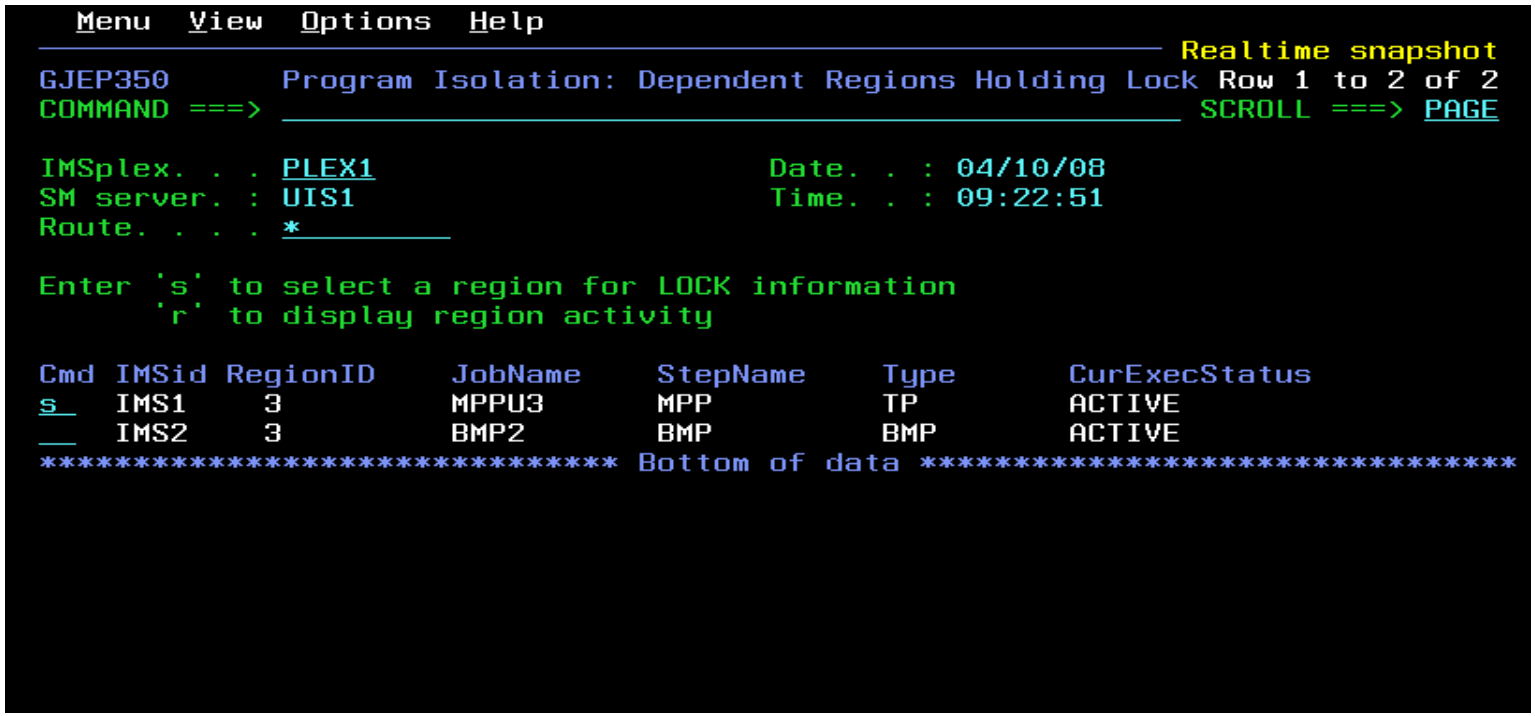
Real-time IRLM Locking Display

```
  Menu  View  Options  Help
 ------------------------------------------------------------ Realtime snapshot
 GJEP311                               Locks Being Held         Row 1 to 3 of 3
 COMMAND ===> ________________________________________________ SCROLL ===> PAGE

 IMSplex. . : PLEX1                       Date. . : 04/10/08
 SM server. : UIS1                        Time. . : 11:38:14
 Route. . . : *

 IMSid. : IMS1      Lock. : DIVNTZ02 000000001071C500

 Enter 'c' to process IMS commands
       'r' to display region activity

     Holder/                                         Job      Lock
 Cmd Waiter   IMSid  RegionID  JobName   StepName  type     state    CurExecStatus
 __  HOLDER   IMS1         4   BMP3      BMP       BMP      UPD      ACTIVE
 __  WAITER   IMS2         2   BMP2      BMP       BMP               ACTIVE
 __  WAITER   IMS2         4   MPP21     MPP       TP                ACTIVE
 ******************************* Bottom of data ********************************
```

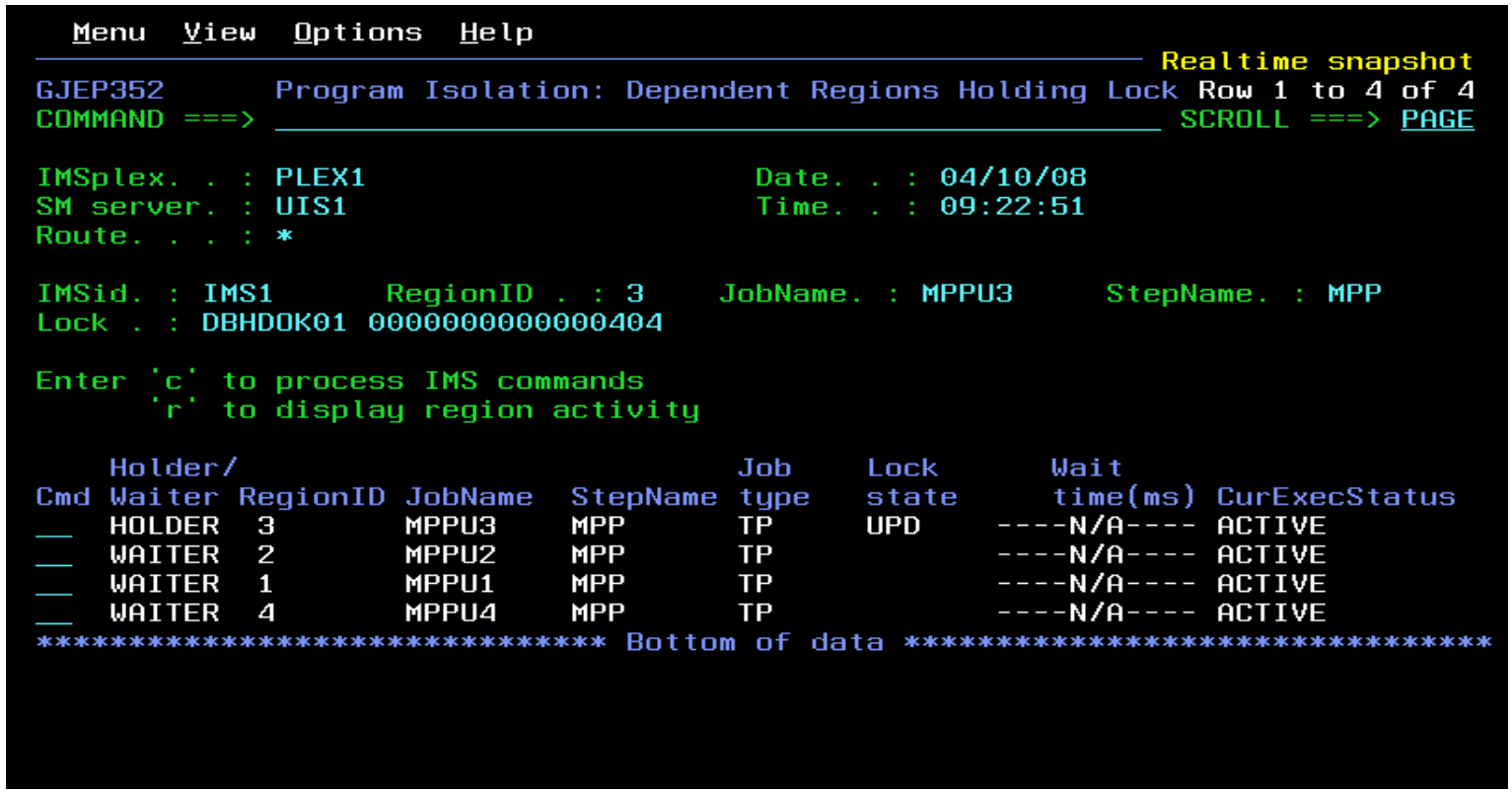
Real-time PI Locking Display



Real-time PI Locking Display



Real-time PI Locking Display

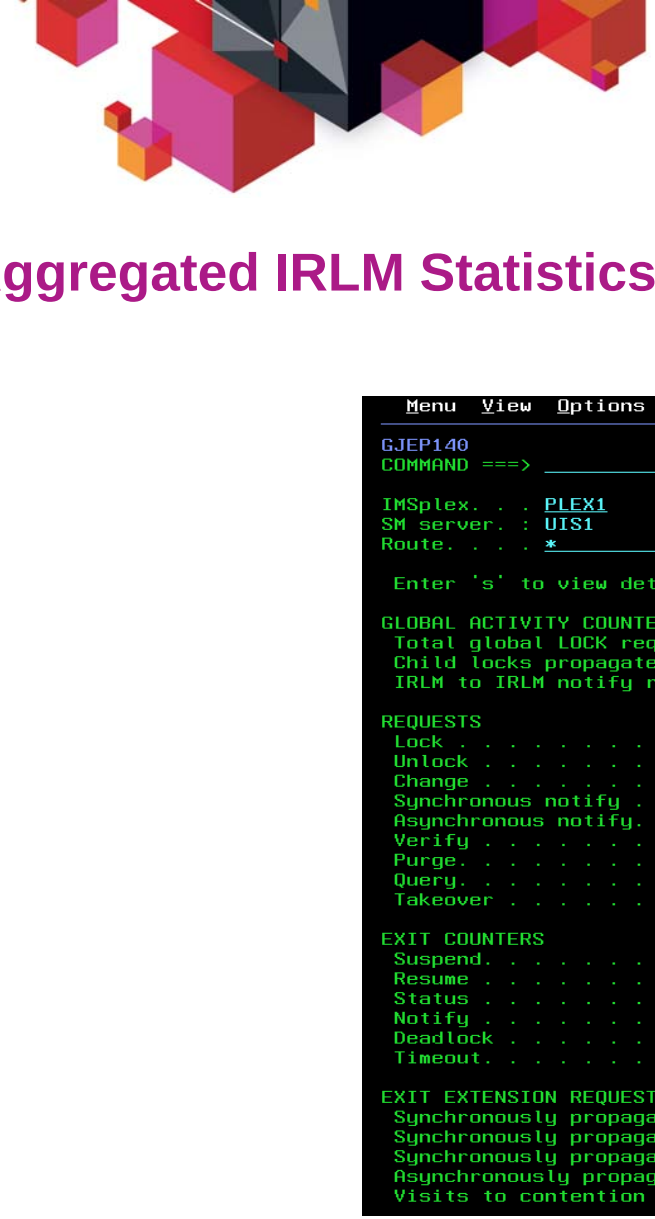


Scenario 12 – Aggregated IRLM Statistics

- **Managing the well being of IRLM(s)**
  - Deadlocks, false contentions, storage utilization?
  - Multiple IRLMs to check

- **Information gathered from IRLMs across Sysplex**
  - Aggregated into single system image
  - Drill down for information from individual IRLMs

Aggregated IRLM Statistics



Aggregated IRLM Statistics

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP141                    IRLM Statistics                Row 34 to 62 of 146
COMMAND ===> ____________________________________________ SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 09:47:26
Route. . . . *



IMSid  Description                                                Value
IMS1   RESOURCE CONTENTIONS:
IMS1    Local. . . . . . . . . . . . . . . . . . . . . . . . .:       0
IMS1    Global . . . . . . . . . . . . . . . . . . . . . . . .:       0
IMS1    False. . . . . . . . . . . . . . . . . . . . . . . . .:       0
IMS1
IMS1   SYSTEM ACTIVITY COUNTERS:
IMS1    Identify requests. . . . . . . . . . . . . . . . . . .:       2
IMS1    Quit requests. . . . . . . . . . . . . . . . . . . . .:       0
IMS1    Local deadlocks. . . . . . . . . . . . . . . . . . . .:       0
IMS1    Global deadlocks . . . . . . . . . . . . . . . . . . .:       0
IMS1    Timeouts RLBS purged . . . . . . . . . . . . . . . . .:       0
```

Scenarios

- **IMS**
  - Scenario 1 – Taking Inventory and capture diagnostic data
  - Scenario 2 – Managing IMS System Parameters
  - Scenario 3 – Verifying IMS Resource Definitions
  - Scenario 4– Issuing IMS Commands
  - Scenario 5 – Maintaining Command Audit Trail
  - Scenario 6 – Managing Dependent Regions
  - Scenario 7 – Viewing IMS CF Structures
- **IMSplex**
  - Scenario 8 – Managing CSL RM Structure
  - Scenario 9 – Viewing Aggregate SCI, RM, OM Statistics
- **Data Sharing**
  - Scenario 10 – Resolving Data Sharing Long Locks
  - Scenario 11 - Viewing Real-time IRLM / PI Locking Status
  - Scenario 12 - Viewing Aggregated IRLM Statistics
- **Shared Queue and CQS**
  - Scenario 13 - Set transaction affinity and view local buffer utilization
  - Scenario 14 – Managing Destination Queue Depth
  - Scenario 15 – Viewing CQS Structures
- **Dashboard**
  - Scenario 16 – Dashboard and Thresholds

Scenario 13 – Transaction Affinity

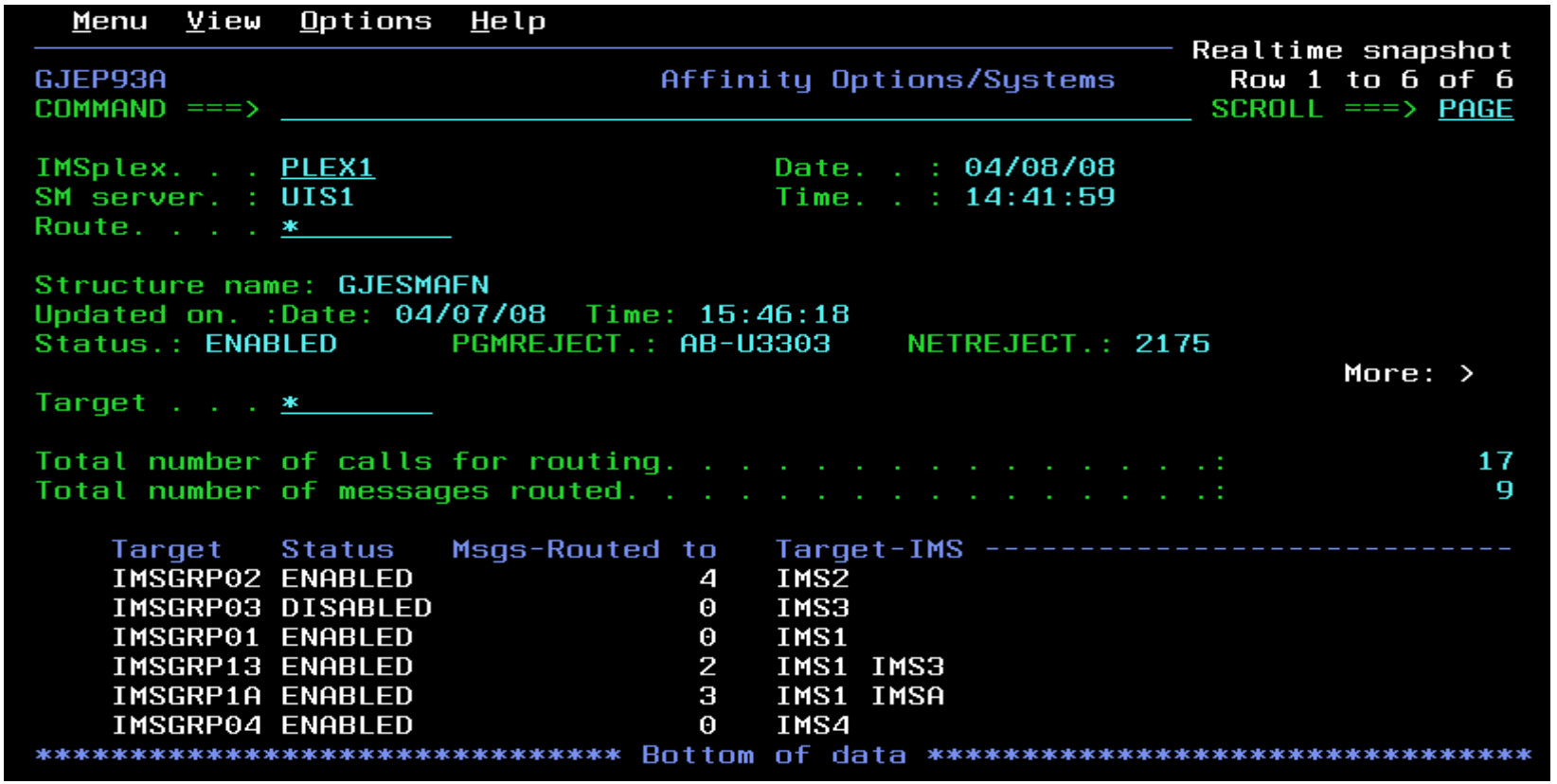
- **IMS provides limited transaction affinity support**
  - Want to use Shared Queues, but still need special processing for some transactions?
  - Some resources (i.e. databases) only accessible from certain IMS?
  - Don’t want to convert transactions to serial?
  - Need to reduce ‘false’ scheduling and DB lock contention?

- **Use affinity routing with Sysplex Manager**
  - Associate a transaction with an IMS or group of IMS by name, generic name or class
  - Work for all message origins (VTAM, APPC, OTMA, program-to-program switch messages)
  - Routing statistics is provided for system level and transaction level for planning and accuracy check

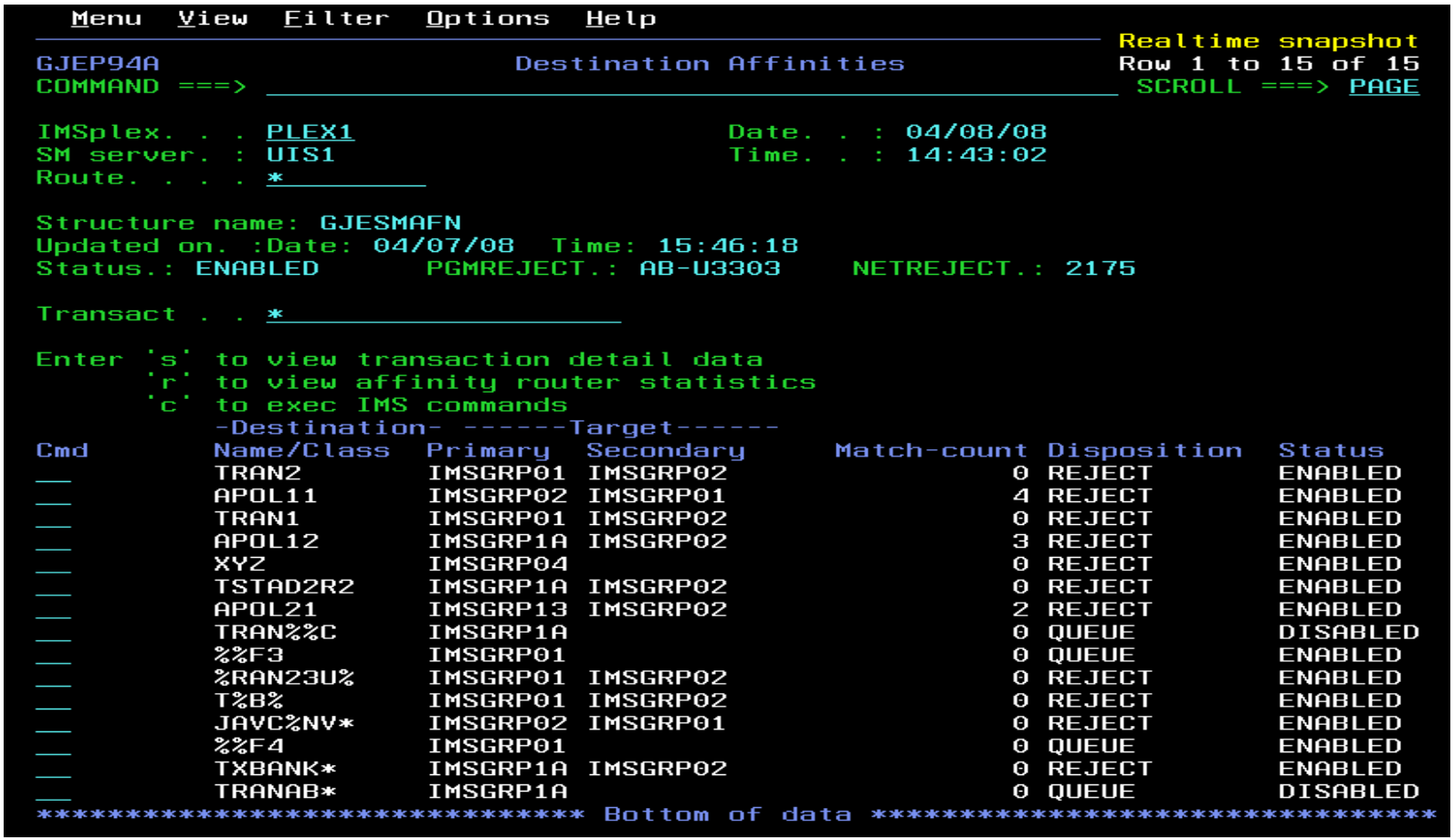
Transaction Affinity – PROCLIB sample

```
VIEW        IMSTOOL.IMSSM.SAMPLIB(GJEARTG1) - 01.00          Columns 00001 00072
Command ===> _____________________________________________ Scroll ===> CSR
000200 OPTIONS(STRUCTURE(GJESMAFN),STATUS(ENABLED),
000300 PGMREJECT(ABEND(U3303)),NETREJECT(2175))
000400
000500 SYSTEM(TARG(IMSGRP01),IMS(IMS1),STATUS(ENABLED))
000600 SYSTEM(TARG(IMSGRP02),IMS(IMS2),STATUS(ENABLED))
000700 SYSTEM(TARG(IMSGRP03),IMS(IMS3),STATUS(DISABLED))
000800 SYSTEM(TARG(IMSGRP1A),IMS(IMS1,IMSA,IMS1),STATUS(ENABLED))
000900
001000 AFFINITY(TYPE(TRANSACT),TARG(IMSGRP1A,IMSGRP02),DISP(REJECT),
001100   DEST(NAME(APOL12)),STATUS(ENABLED))
001200
001300 AFFINITY(TYPE(TRANSACT),TARG(IMSGRP02,IMSGRP01),DISP(REJECT),
001400   DEST(NAME(JAVC%NV*)),STATUS(ENABLED))
001500
001600 AFFINITY(TYPE(TRANSACT),TARG(IMSGRP1A),DISP(QUEUE),
001700   DEST(NAME(TRAN%%C,TRANAB*)),STATUS(DISABLED))
001800
001900 AFFINITY(TYPE(TRANSACT),TARG(IMSGRP01),
002000   DEST(NAME(%%F3,%%F4)))
002100
002200 AFFINITY(TYPE(TRANSACT),TARG(IMSGRP1A),DEST(CLASS(1,2,3)))
****** ***************************** Bottom of Data ******************************
```

Affinity Routing Statistics – System View



Affinity Routing Statistics – Destination View



```
  Menu  View  Filter  Options  Help
                                                          Realtime snapshot
GJEP94A                  Destination Affinities           Row 1 to 15 of 15
COMMAND ===>                                               SCROLL ===> PAGE

IMSplex. . . PLEX1                       Date. . : 04/08/08
SM server. : UIS1                        Time. . : 14:43:02
Route. . . . *

Structure name: GJESMAFN
Updated on. :Date: 04/07/08  Time: 15:46:18
Status.: ENABLED       PGMREJECT.: AB-U3303    NETREJECT.: 2175

Transact . . *

Enter 's' to view transaction detail data
      'r' to view affinity router statistics
      'c' to exec IMS commands
          -Destination- ------Target------
Cmd       Name/Class   Primary   Secondary     Match-count Disposition  Status
__        TRAN2        IMSGRP01  IMSGRP02                0 REJECT       ENABLED
__        APOL11       IMSGRP02  IMSGRP01                4 REJECT       ENABLED
__        TRAN1        IMSGRP01  IMSGRP02                0 REJECT       ENABLED
__        APOL12       IMSGRP1A  IMSGRP02                3 REJECT       ENABLED
__        XYZ          IMSGRP04                          0 REJECT       ENABLED
__        TSTAD2R2     IMSGRP1A  IMSGRP02                0 REJECT       ENABLED
__        APOL21       IMSGRP13  IMSGRP02                2 REJECT       ENABLED
__        TRAN%%C      IMSGRP1A                          0 QUEUE        DISABLED
__        %%F3         IMSGRP01                          0 QUEUE        ENABLED
__        %RAN23U%     IMSGRP01  IMSGRP02                0 REJECT       ENABLED
__        T%B%         IMSGRP01  IMSGRP02                0 REJECT       ENABLED
__        JAVC%NV*     IMSGRP02  IMSGRP01                0 REJECT       ENABLED
__        %%F4         IMSGRP01                          0 QUEUE        ENABLED
__        TXBANK*      IMSGRP1A  IMSGRP02                0 REJECT       ENABLED
__        TRANAB*      IMSGRP1A                          0 QUEUE        DISABLED
********************************* Bottom of data ********************************
```

Affinity Routing Statistics – Destination View

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP94R         Destination Affinities - Router Statistics   Row 1 to 3 of 3
COMMAND ===> _____________________________________________ SCROLL ===> PAGE

IMSplex. . : PLEX1                      Date. . : 04/08/08
SM server. : UIS1                       Time. . : 14:43:55

Structure name: GJESMAFN
Updated on. :Date: 04/07/08  Time: 15:46:18
Status.: ENABLED      PGMREJECT.: AB-U3303    NETREJECT.: 2175

Transact . . *

Primary target . : IMSGRP02   Secondary target : IMSGRP01
Status . . . . . : ENABLED    Disposition. . . : REJECT

Destination. . . : APOL11
From    Match-count  Other destination router statistics
IMS2              0
IMSA              2
IMS1              2
******************************** Bottom of data ********************************
```

SQ local buffer utilization

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP890                 Shared Queue Local Buffer Usage   Row 1 to 10 of 10
COMMAND ===> _____________________________________________ SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date. . : 04/08/08
SM server. : UIS1                       Time. . : 14:45:41
Route. . . : IMS1_____

IMSid Description                                    Value
IMS1  BUFFER QUEUE STATISTICS:
IMS1   Buffers in use . . . . . .:                     141
IMS1   Count of buffers available . .:                 200
IMS1   Percent buffers in use . . . .:                  70
IMS1   High threshold for buffers . .:                 160
IMS1   Low threshold for buffers. . .:                   0
IMS1   In use high water mark . . . .:                 143
IMS1   Times buffer pool expanded . .:                   0
IMS1   Percentage to expand/compress.:                  20
IMS1   Maximum bfr expansion reached.:                   N
****************************** Bottom of data ********************************
```

Scenario 14 – Destination Queue Depth

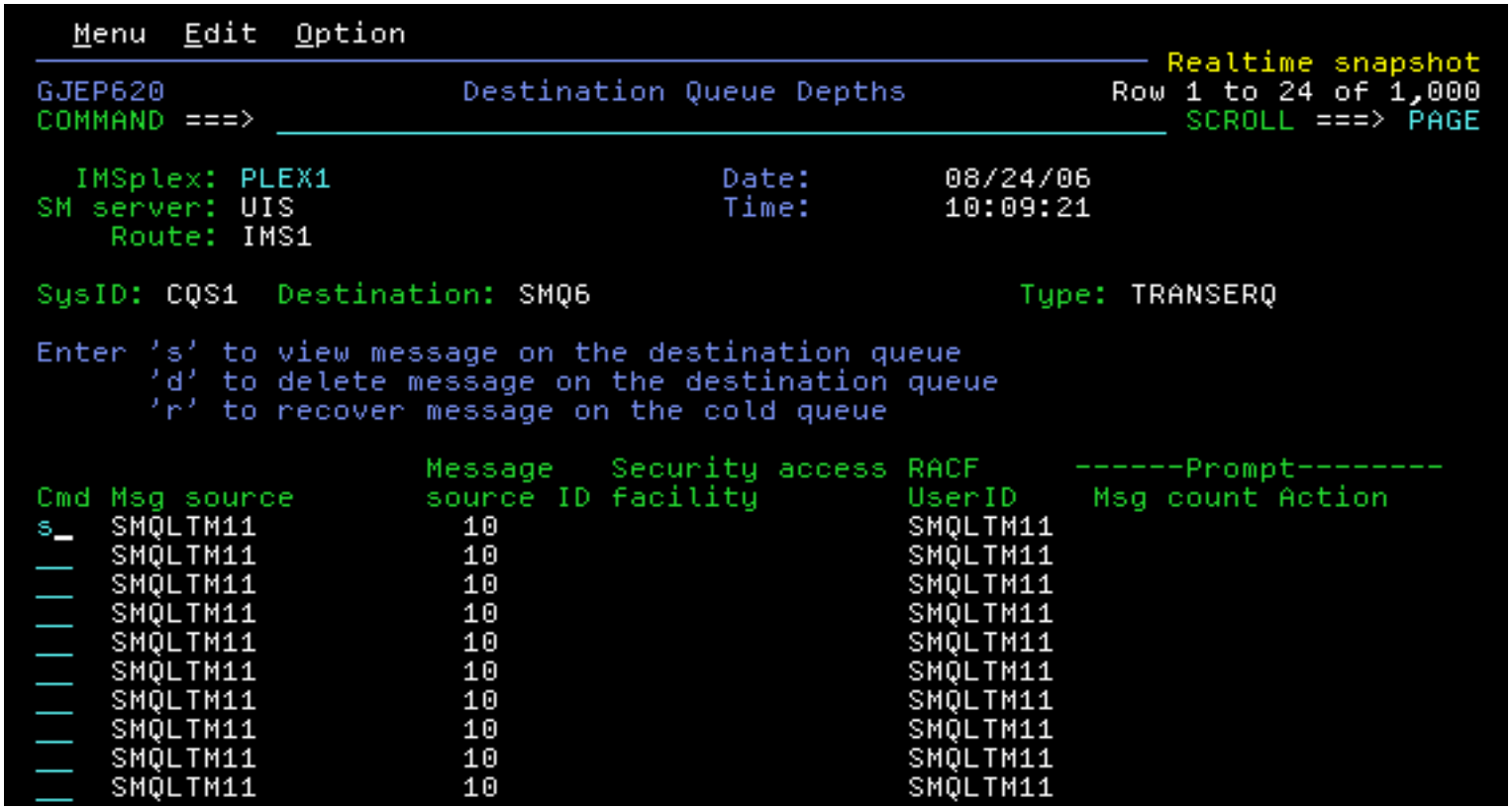
- **Managing Destination Queue Depth & CQS for Shared Queues**
  - Limited tools to browse, delete and recover messages on Shared Queues
  - Lack of tools to obtain CQS statistical information and manage messages on Shared Queues
  - Required to optimize Shared Queues environment

- **DQD data & List of Shared Queue Structures in use**
  - Filter based on Destination name or ID
  - High level information, Drill down to levels of detail
  - Browse, Delete and Recover messages from Cold queue
  - Statistics for: structure, rebuild, checkpoint
  - CQS processing counters

Destination Queue Depth

```
  Menu  Edit  Option  Filter
                                                          Realtime snapshot
GJEP210              Destination Queue Depths              Row 1 to 2 of 2
COMMAND ===>                                              SCROLL ===> PAGE

  IMSplex: PLEX1                    Date:       08/24/06
SM server: UIS                      Time:       10:08:12
    Route: IMS1                                                   more: >

Enter 's' to list messages on the destination queue
      'd' to delete all messages on the destination queue
      'r' to recover all messages on the cold queue

                                          -------Counts---------- Affinity
Cmd ID    Destination             Type        On-Q     Enq     Deq SIDR IMSI
s_  CQS1  SMQ6                    TRANSERQ   1,000     N/A     N/A      IMS2
__  CQS1  SMQ6                    TRANSERQ     560     N/A     N/A      IMS1
******************************** Bottom of data ********************************
```

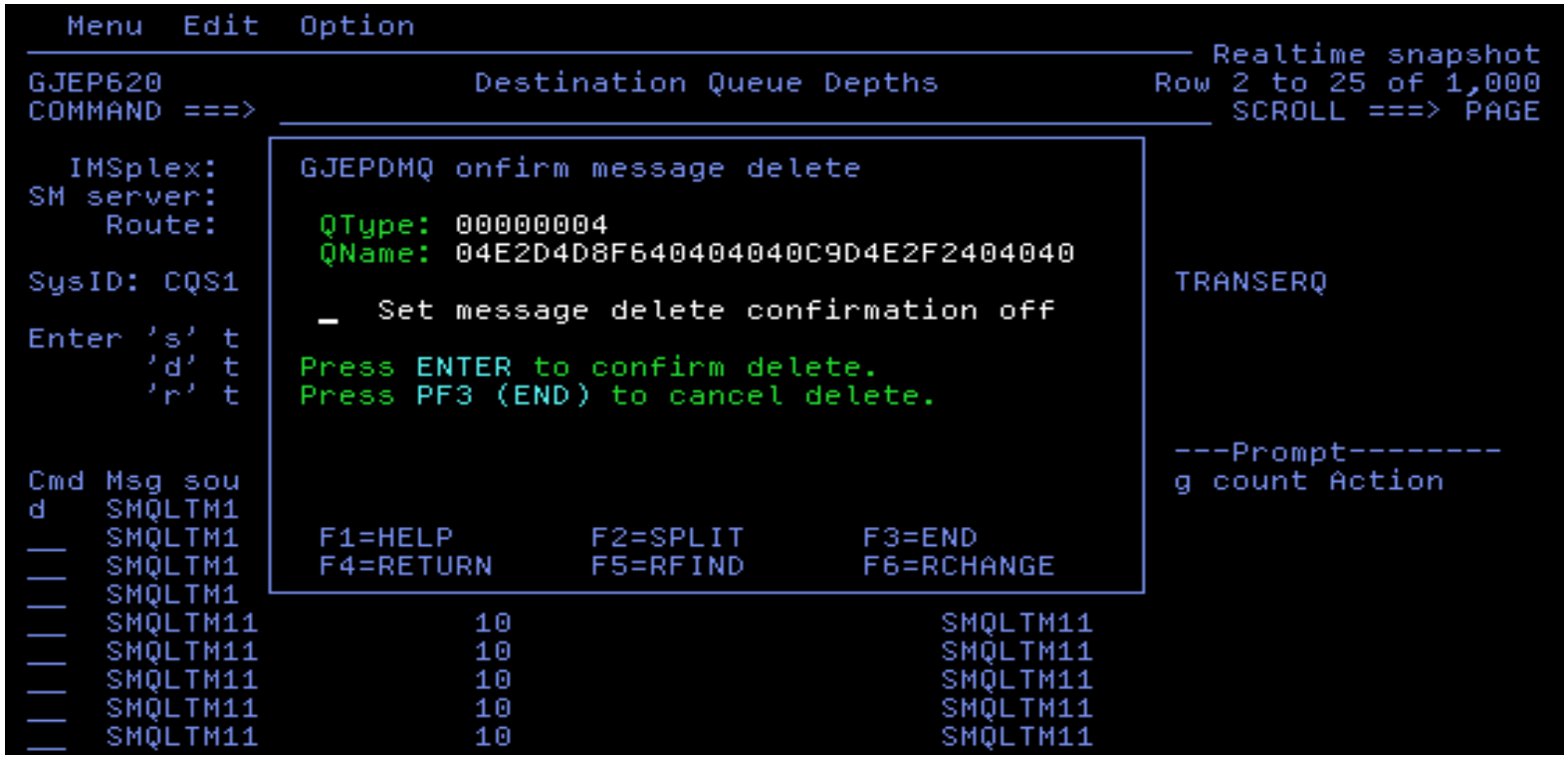
Destination Queue Depth



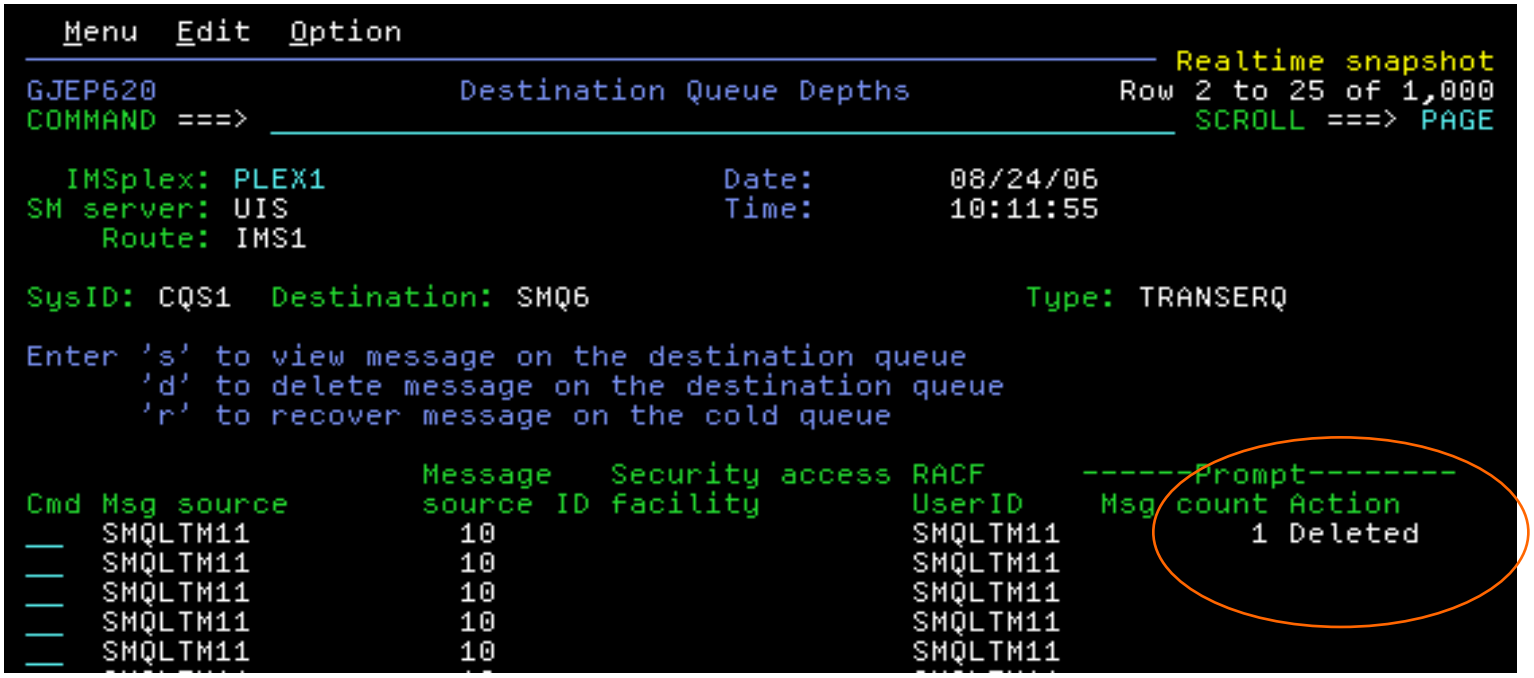
Destination Queue Depth

```
  Menu  Edit  Option
                                                          Realtime snapshot
GJEP630                Detailed message view              Row 1 to 24 of 53
COMMAND ===> _____________________________________ SCROLL ===> PAGE

  IMSplex: PLEX1                      Date:       08/24/06
SM server: UIS                        Time:       09:59:50
    Route: IMS1

Destination.....: SMQ6                      Most severe status....:
Message source..: SMQLTM11                  Message id............: 10

 __     Enter 'd' to delete this message
        Enter 'r' to recover this message


Message
      INPUT MESSAGE QUEUED              MSGS LENGTH:00530
      NODE NAME:  SMQLU111              SOURCE LTERM: SMQLTM11
      DEST LTERM/TRAN: SMQ6
      ORIGIN IMS:IMS2                   PROCESSING IMS: IMS2
      MSG TIMESTAMP: 20062351738343601 35
      1ST/CURRENT DRRN:08000003/08000003
      UOW: C9D4E2F240404040BF4C318B87947A1AC9D4E2F240404040BF4C318B87947A1A
      ** SQ MESSAGE - PUT PROCESS **
        BASIC PREFIX
 00000000   02120000  01C18110  08000003  08000003  ..  .Aa..  ..  .
 00000010   01CE9000  C9D4E2F2  40404040  BF4C318B  .ó  IMS2    |<.↓
 00000020   87947A1A  C9D4E2F2  40404040  BF4C318B  gm:.IMS2    |<.↓
 00000030   87947A1A  80000400  00000000  00000000  gm:.~ .
        SYSTEM PREFIX
 00000000   00408100  C8000000  E2D4D8D3  E4F1F1F1    a H   SMQLU111
 00000010   00040000  00000000  00000000  00000001  .           .
 00000020   E2D4D8D3  E3D4F1F1  E2D4D8F6  40404040  SMQLTM11SMQ6
 00000030   00000000  00000000  40404040  40404040
```

Destination Queue Depth



Destination Queue Depth



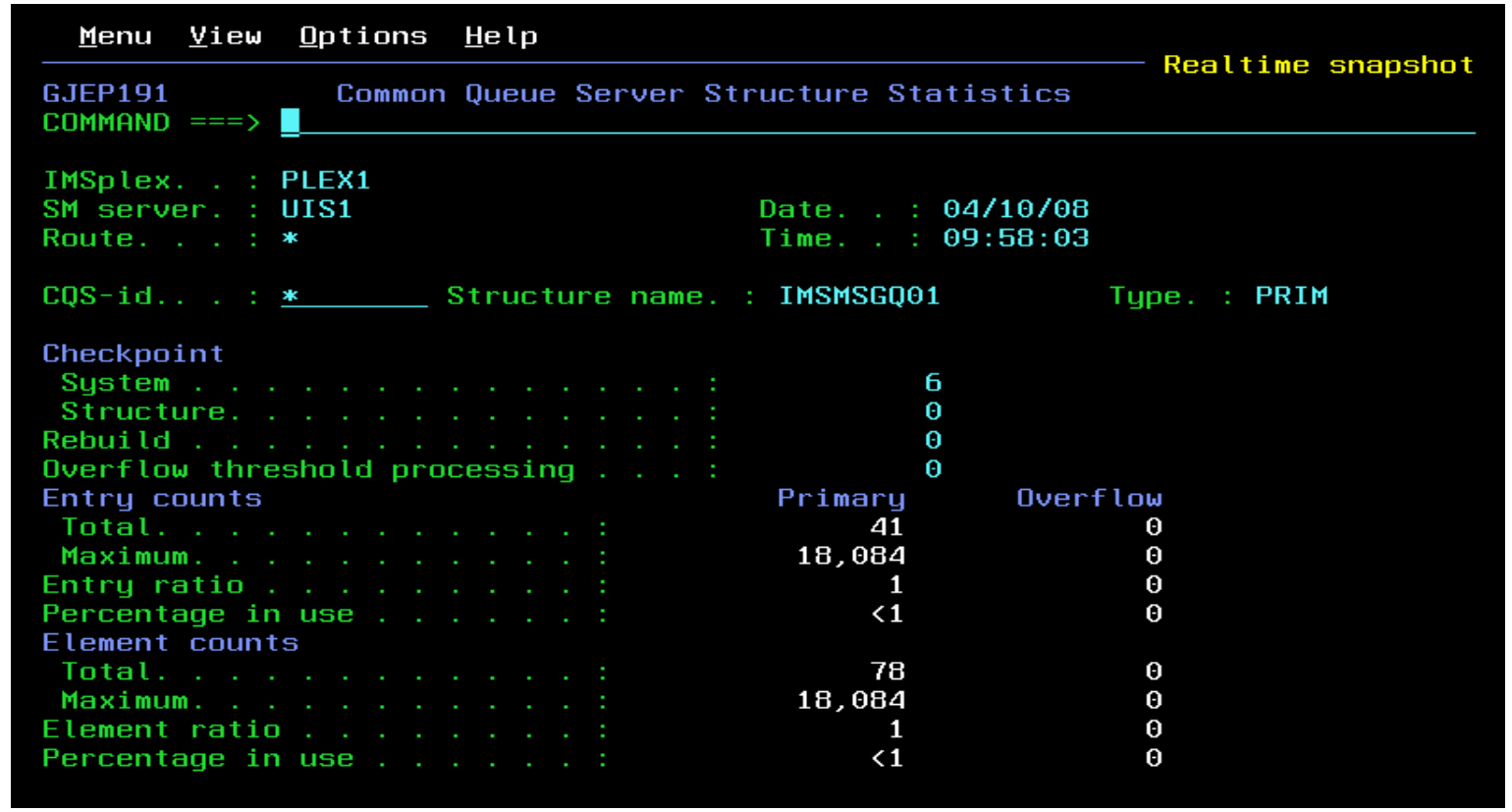
CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP190      Aggregated IMS Common Queue Server Structures   Row 1 to 2 of 2
COMMAND ===>                                              SCROLL ===> PAGE

IMSplex. . . PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 09:58:03
Route. . . : *

Enter 's' to select a structure for statistics

                                        ----Utilization---
 CMD Structure    Name                  Entries   Elements
 __   EMHQ        IMSEMHQ01                 1 %         1 %
      OVFL        NOT-CONNECTED             0 %         0 %

 s_   PRIM        IMSMSGQ01                <1 %        <1 %
      OVFL        NOT-CONNECTED             0 %         0 %

******************************** Bottom of data ********************************
```

CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEPSQM           Common Queue Server Structure Statistics
Option ===>

IMSplex. . : PLEX1
SM server. : UIS1
Route. . . : *

Structure name. : IMSMSGQ01          Type. : PRIM

  Select one of the following options:

    1. Structure statistics
    2. Processing counters
    3. Structure rebuild statistics
    4. Structure checkpoint statistics
```

CQS Shared Message Queues



CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP192        Common Queue Server Processing Counters    Row 1 to 30 of 38
COMMAND ===>                                              SCROLL ===> PAGE

IMSplex. . : PLEX1                    Date. . : 04/10/08
SM server. : UIS1                     Time. . : 09:58:03
Route. . . : *

CQS-id.. . : *_______ Structure name. : IMSMSGQ01        Type. : PRIM

Description                                      Value
Requests:
 CQSBRWSE. . . . . . . . . . . . . .:                0
 CQSCHKPT. . . . . . . . . . . . . .:                0
 CQSCONN . . . . . . . . . . . . . .:                4
 CQSDEL. . . . . . . . . . . . . . .:                0
 CQSDISC . . . . . . . . . . . . . .:                0
 CQSINFRM. . . . . . . . . . . . . .:                9
 CQSMOVE . . . . . . . . . . . . . .:                0
 CQSPUT. . . . . . . . . . . . . . .:               74
 CQSQUERY. . . . . . . . . . . . . .:            4,110
 CQSREAD . . . . . . . . . . . . . .:                0
 CQSRECVR. . . . . . . . . . . . . .:                0
 CQSRSYNC. . . . . . . . . . . . . .:                4
 CQSUNLCK. . . . . . . . . . . . . .:                2

MVS requests:
 IXGWRITE (MVS LOGGER) . . . . . . .:               78
 IXGBRWSE (MVS LOGGER) . . . . . . .:                0
 IXLLIST DEQ EVENTQ. . . . . . . . .:                0
 IXLLIST WRITE . . . . . . . . . . .:               53
 IXLLIST READ. . . . . . . . . . . .:              342
 IXLLIST MOVE. . . . . . . . . . . .:                0
 IXLLIST DELETE. . . . . . . . . . .:                0
 IXLMG . . . . . . . . . . . . . . .:              683
 IXLUSYNC. . . . . . . . . . . . . .:                4
```

CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP193         Common Queue Server Structure Rebuild Statistics
COMMAND ===>

IMSplex. . : PLEX1                      Date. . . : 04/10/08
SM server. : UIS1                       Time. . . : 10:04:51
Route. . . : *

CQS-id.. . : CQS2____ Structure name. : IMSMSGQ01          Type. : PRIM

                                            Old    New (Rebuild)
Data Elements in use. . . . . :              78              78
Data Elements allocated . . . . . :      18,084          18,084
Data Entries in use . . . . . :              41              41
Data Entries allocated  . . . . . :      18,084          18,084
EMCS in use . . . . . :                   1,243             622
EMCS allocated. . . . . :                36,487          36,487
Size in 4K Blocks . . . . . :             4,096           4,352
CF Total space in 4K Blocks . . . . :    13,632          13,632
CF Free space in 4K Blocks. . . . . :     2,048           6,144
Old CF name Structure allocated on. :       LF03            LF03
```

CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                              Realtime snapshot
GJEP194       Common Queue Server Structure Checkpoint Stats  Row 1 to 30 of 36
COMMAND ===> _____________________________________________  SCROLL ===> PAGE

IMSplex. . : PLEX1                    Date. . : 04/10/08
SM server. : UIS1                     Time. . : 10:06:45
Route. . . : *

CQS-id.. . : *_______ Structure name. : IMSMSGQ01         Type. : PRIM

Description                                              Value
Return code for this Structure checkpoint .           00000000

QUIESCE TIME
 Start date . . . . . .                                 04/10/08
 Start time . . . . . .                                10:06:36.0
 End date . . . . . .                                   04/10/08
 End time . . . . . .                                  10:06:36.4
 Quiesce elapsed time(ms) . . . . . .                         366

DATA SPACE/DATA SET CAPTURE TIME
 Start date . . . . . .                                 04/10/08
 Start time . . . . . .                                10:06:36.4
 End date . . . . . .                                   04/10/08
 End time . . . . . .                                  10:06:36.5
 Data space capture time (ms) . . . . . .                     90

End data set capture date . . . . . .                   04/10/08
End data set capture time . . . . . .                  10:06:36.5
Structure resume START date . . . . . .                 04/10/08
Structure resume START time . . . . . .                10:06:36.5
Date all System checkpoints completed . . .             04/10/08
Time all System checkpoints completed . . .            10:06:37.6
```

CQS Shared Message Queues

```
  Menu  View  Options  Help
                                                          Realtime snapshot
GJEP194       Common Queue Server Structure Checkpoint Stat Row 24 to 36 of 36
COMMAND ===> _____________________________________________ SCROLL ===> CSR

IMSplex. . : PLEX1                      Date. . : 04/10/08
SM server. : UIS1                       Time. . : 10:08:28
Route. . . : *

CQS-id.. . : *_______ Structure name. : IMSMSGQ01          Type. : PRIM

Description                                              Value
PRIMARY STRUCTURE
 Allocated elements . . . . . .                         18,084
 Elements in use. . . . . .                                 78
 Allocated list entries . . . . . .                     18,084
 List entries in use. . . . . .                             42

OVERFLOW STRUCTURE
 Allocated elements . . . . . .                              0
 Elements in use. . . . . .                                  0
 Allocated list entries . . . . . .                          0
 List entries in use. . . . . .                              0

SRDS WRITES required. . . . . .                              2
********************************* Bottom of data ********************************
```

Scenarios

- **IMS**
  - Scenario 1 – Taking Inventory and capture diagnostic data
  - Scenario 2 – Managing IMS System Parameters
  - Scenario 3 – Verifying IMS Resource Definitions
  - Scenario 4– Issuing IMS Commands
  - Scenario 5 – Maintaining Command Audit Trail
  - Scenario 6 – Managing Dependent Regions
  - Scenario 7 – Viewing IMS CF Structures
- **IMSplex**
  - Scenario 8 – Managing CSL RM Structure
  - Scenario 9 – Viewing Aggregate SCI, RM, OM Statistics
- **Data Sharing**
  - Scenario 10 – Resolving Data Sharing Long Locks
  - Scenario 11 - Viewing Real-time IRLM / PI Locking Status
  - Scenario 12 - Viewing Aggregated IRLM Statistics
- **Shared Queue and CQS**
  - Scenario 13 - Set transaction affinity and view local buffer utilization
  - Scenario 14 – Managing Destination Queue Depth
  - Scenario 15 – Viewing CQS Structures
- **Dashboard**
  - Scenario 16 – Dashboard and Thresholds

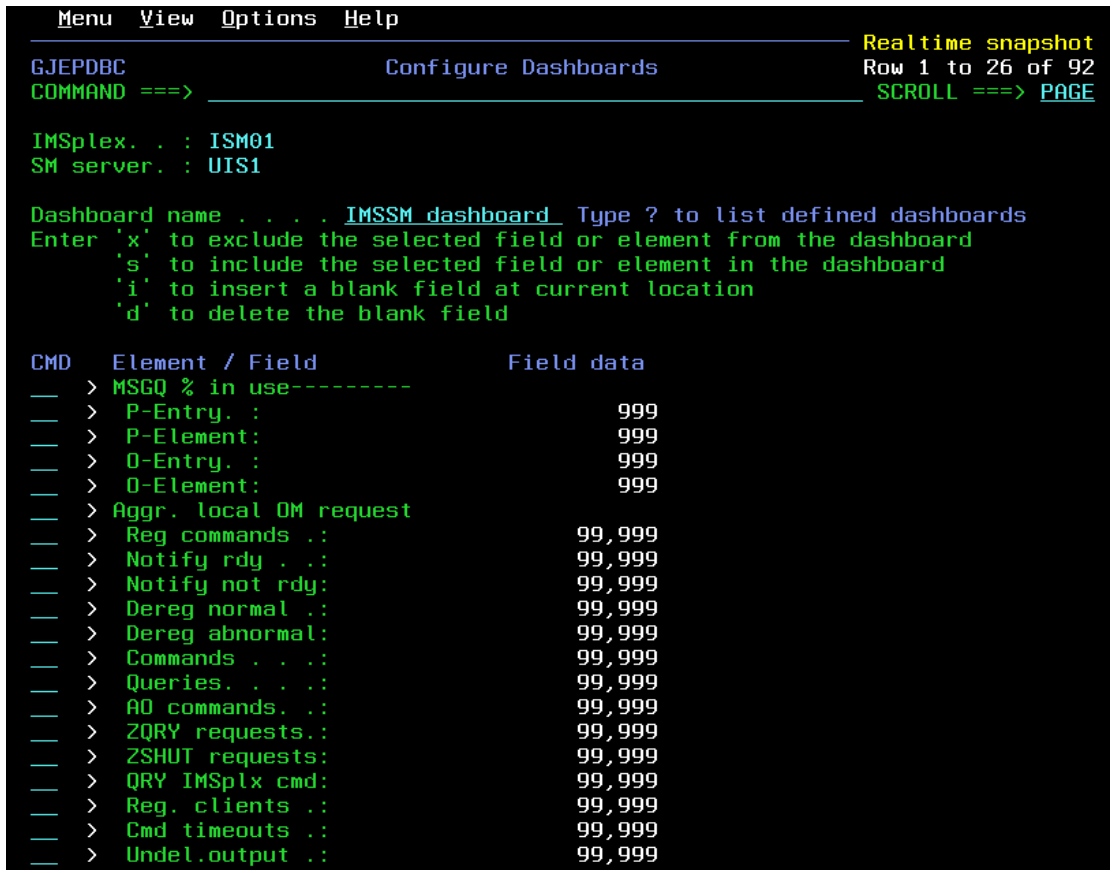
Scenario 16 – Dashboard Sysplex at a Glance

- **Managing the IMS Sysplex through key system indicators**
  - Determine overall Sysplex health at a Glance
  - Alert when indicators violate predefined thresholds
  - Set multiple monitoring thresholds depending on workloads, time of day…

- **Critical data from key areas summarized on one or more screens**
  - User customized content, positioning, threshold value
  - Threshold exceptions are logged for future review
  - One or more per user, default supplied
  - Automatic screen refresh capability for operational ease
  - Drill down for additional detail

Configure Your Dashboard

- Create and customize a new dashboard



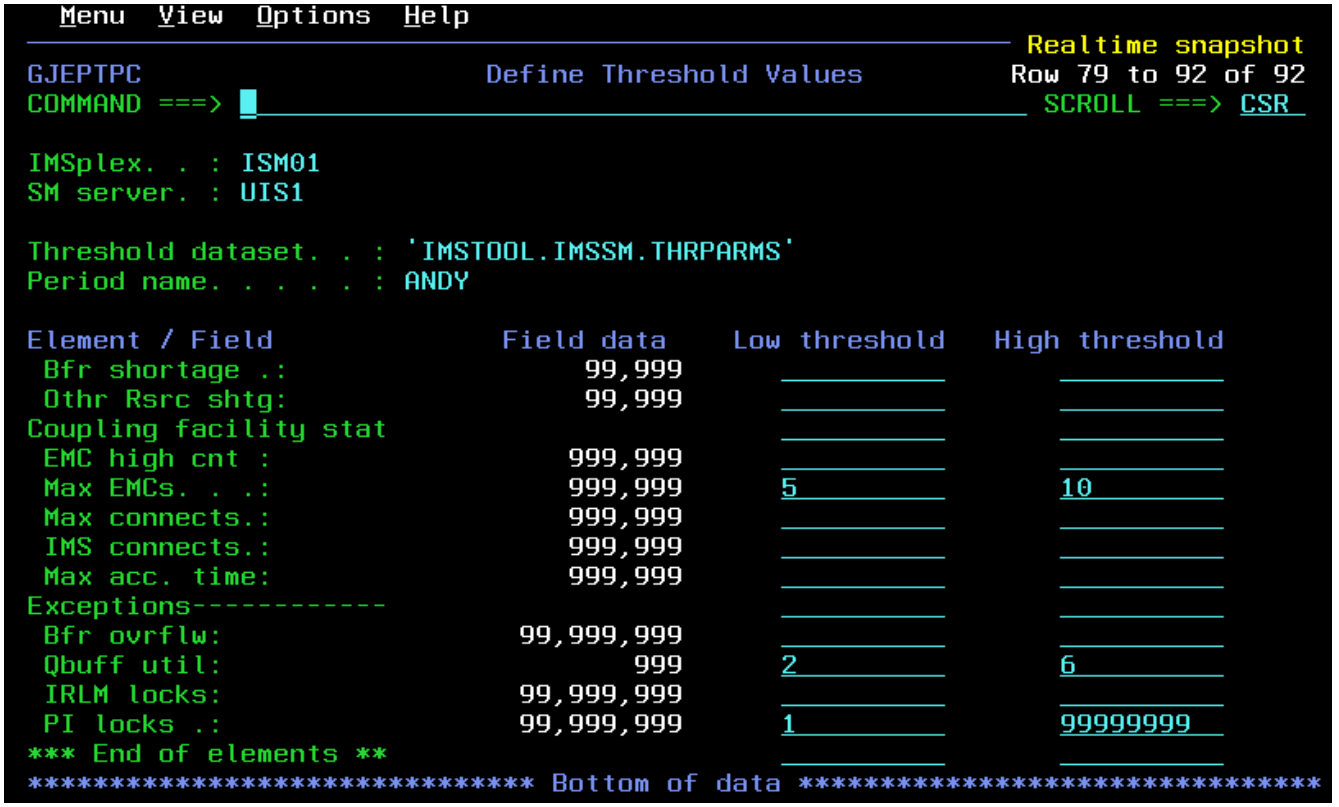
When to monitor

- Define monitoring periods

```
GJEPTPD                    Define Monitoring Periods              Row 1 to 7 of 7
COMMAND ===> _____________________________________________ SCROLL ===> PAGE

Enter period data to add/edit a period.

Name. . . . . _______
Active. . . . Y                                    (Y = yes, N = no)
Days. . . . . _ _ _ _ _ _ _                        (1 to 7 (1=Sun, 2= Mon,..))
Hours (AM). . __ __ __ __ __ __ __ __ __ __ __ __  (0 to 11)
Hours (PM). . __ __ __ __ __ __ __ __ __ __ __ __  (12,1 to 11)

Enter 's' to define thresholds for a period, or 'd' to delete a period,
      'e' to edit a period

Cmd   Name     Active Days             Hours
 __   ANDY       Y    1 2 3 4 5 6 7 AM: 00 01 02 03 04 05 06 07 08 09 10 11
                                    PM: 12 01 02 03 04 05 06 07 08 09 10 11
 __   THRESHAB   N    1 - - - - - - AM: 00 -- -- -- -- -- -- -- -- -- -- --
                                    PM: 12 -- -- -- -- -- -- -- -- -- -- --
 __   TEST01     N    1 - - - - - - AM: -- 01 -- -- -- -- -- -- -- -- -- --
                                    PM: -- -- -- -- -- -- -- -- -- -- -- --
 __   B          N    - 2 - - - - - AM: -- -- 02 -- -- -- -- -- -- -- -- --
                                    PM: -- -- 02 -- -- -- -- -- -- -- -- --
 __   DJB        Y    - 2 3 4 5 6 - AM: 00 01 02 03 04 05 06 07 08 09 10 11
                                    PM: 12 01 02 03 04 05 06 07 08 09 10 11
 __   PERIOD1    Y    - 2 - - - - - AM: -- -- -- -- -- -- -- -- -- -- 10 --
                                    PM: -- -- 02 -- -- -- -- -- -- -- -- --
 __   A          Y    - 2 - - - - - AM: -- 01 -- -- -- -- -- -- -- -- -- --
                                    PM: -- -- -- -- -- -- -- -- -- -- -- --
******************************** Bottom of data ********************************
```

Low and High Thresholds

- Define threshold values

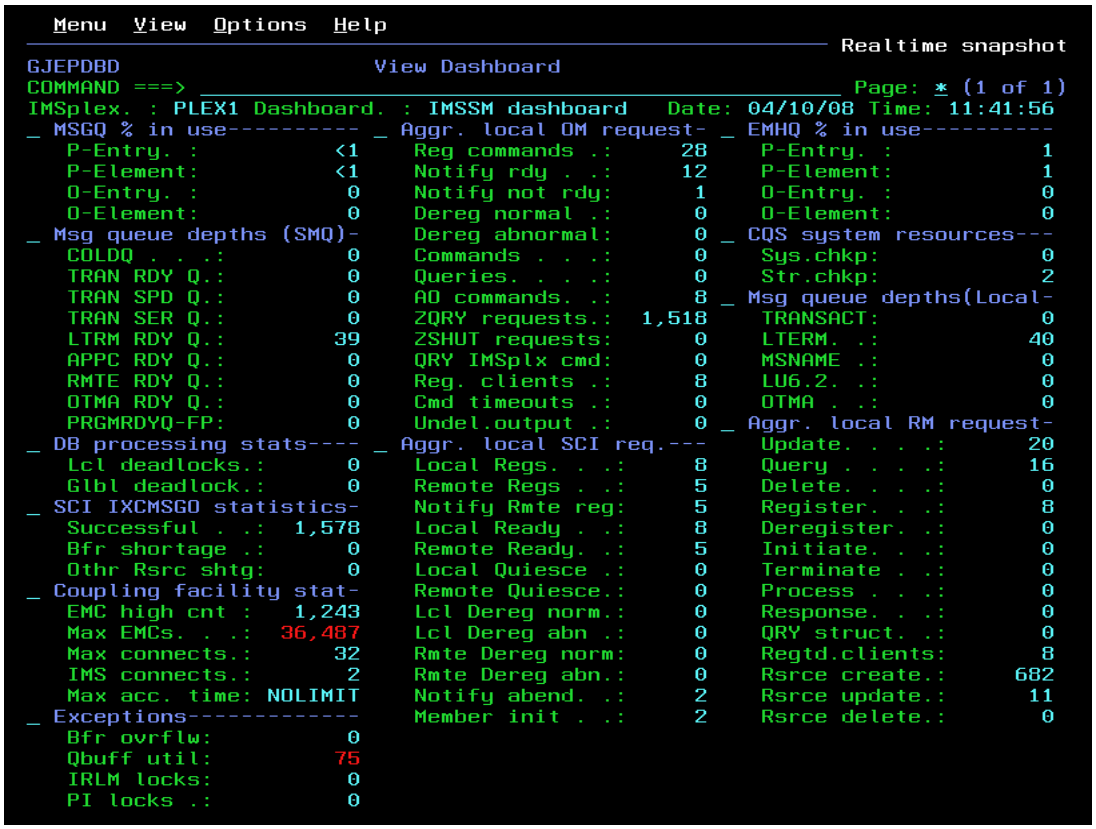


Threshold Processing Interval

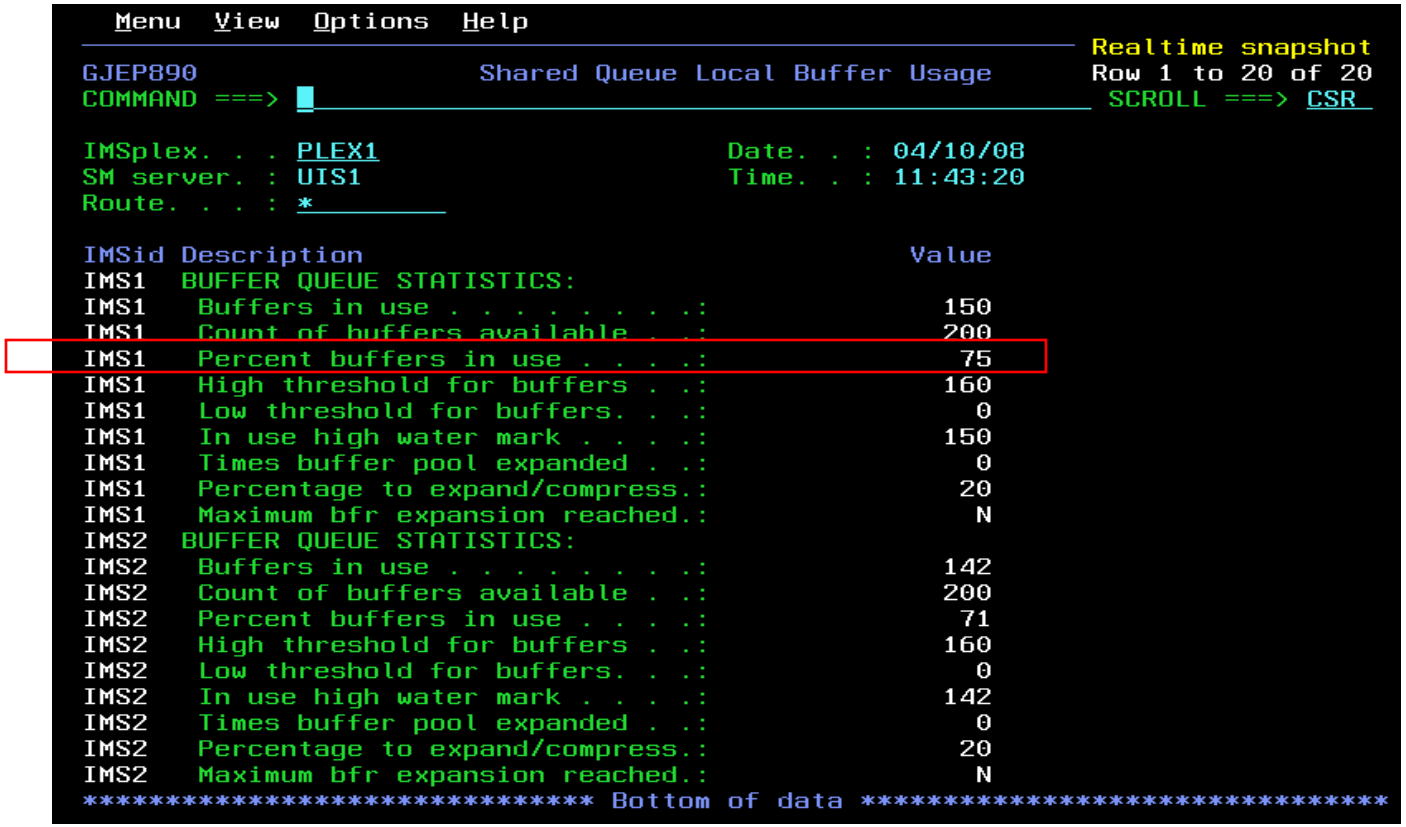
- Set dashboard data collection interval

```
GJEPSET                    Settings
COMMAND ===> ____________________________________________________________


Auto-refresh interval . . . . . 10        1-59 seconds
Dashboard data collection intvl . 060     15-999 seconds (default 60)
Date format . . . . . . . . . . 3         1 = yyyy/ddd, 2 = dd/mm/yy
                                          3 = mm/dd/yy, 4 = yy/mm/dd
IMS DS high level qualifier . . . _____________________________________

Options to receive notifications
  System exceptions . . . . . _       / = ON

Browse data set allocation parameters:
  Data set name . . . . . . . . . ______________________________________
  Primary CYLS. . . . . . . . . . 010       1-999
  Secondary CYLS. . . . . . . . . 010       1-999
  UNIT. . . . . . . . . . . . . . SYSALLDA  optional (default SYSALLDA)
  Volume serial number. . . . . . ______    optional (default by system)
  Number of lines for request . . 01000     optional (default 1000)
```

Dashboard



Dashboard – Drill Down



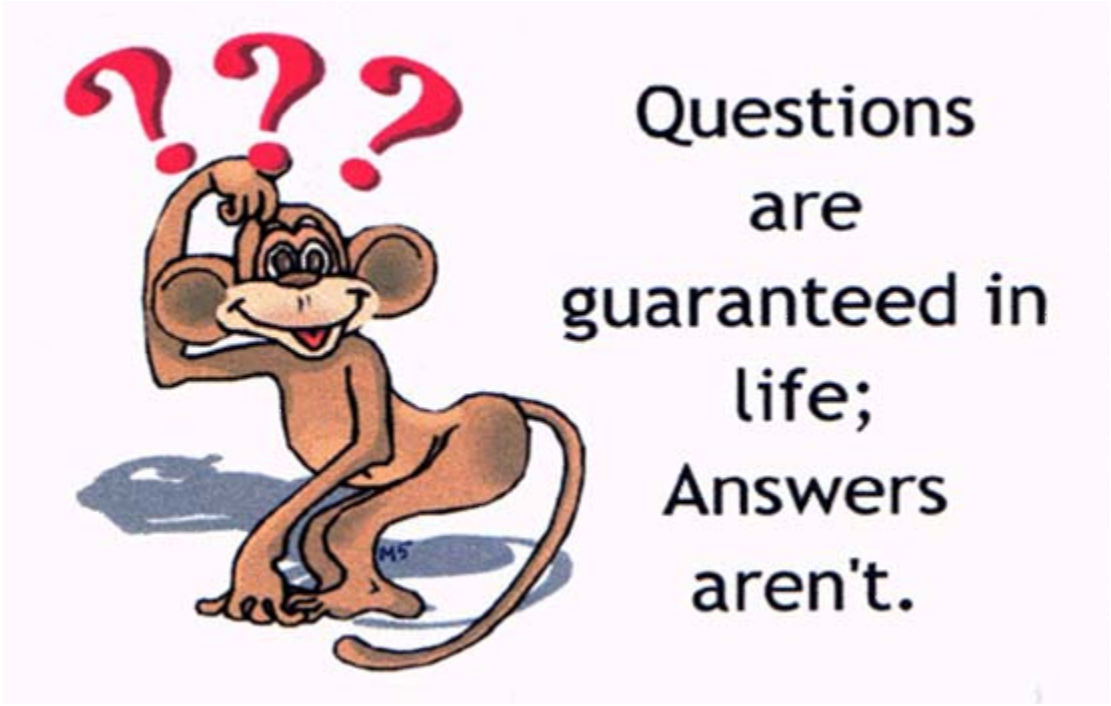
References

- **For publications and demo, visit IMS Sysplex Manager for z/OS at**
  - http://www-306.ibm.com/software/data/db2imstools/imstools-library.html

Contact information

- **Andy Nguyen**
- **E-mail address: adn@us.ibm.com**

Q & A



CQS log stream and offloading

- Should be large enough to minimize offloading and increase READ performance
- WRITE requests can run at the same time as offload processing.
- Should not be larger than CQS requires to leave room for other structures on CF
- Monitor for optimal sizing of coupling facility structures for response, throughput, and availability.
- If the coupling facility space allocated for a log stream reaches 100% utilization, all write requests against that log stream are rejected until offloading can complete.

Monitoring for offload conditions

- Up to 168 offload data sets by default
- Additional extents are requested by the DSEXTENTS parameter in the LOGR policy
- CQS issues a message, deletes a few log records from the log stream to make space for structure checkpoint log records, takes a structure checkpoint, and continues processing. The CQS message is:
- CQS0350W CQS LOG CONNECT DS DIRECTORY FULL LOG STREAM logstr-name STRUCTURE str-name
- While the structure checkpoint relieves the shortage, it will have a temporary impact on the availability of the log stream and CQS will not be able to process any IMS PUT requests until the structure checkpoint is complete and CQS has deleted the tail of the log stream.

IBM

CQS structure checkpoint

- Structure checkpoint takes a snapshot of the shared queues on a queue structure and writes the data to the structure recovery data set (SRDS) so that CQS can recover the queues after a structure failure. Structure checkpoint processing copies all recoverable data objects from a structure pair to a SRDS.
- When it performs the copy operation, CQS stops all activity against the structure to ensure that the structure does not change while the checkpoint is being taken. If CQS receives a request to process work when a structure checkpoint is in progress, the request is held until after the structure checkpoint is complete.
- Recommendation: Because no other work for a structure can be processed while CQS is taking a checkpoint, consider processing structure checkpoints during non-peak hours.
- After all shared queues are copied to the SRDS, each CQS performs a system checkpoint to ensure its restart checkpoint has a time stamp that is more recent than the current structure checkpoint.
- The structure checkpoint process then deletes all log records that are not needed for structure recovery, allowing the logger to reclaim space in the CQS log and preventing the log from becoming full.

How CQS restarts

- During CQS restart, CQS reads the log records from the last system checkpoint and restores the environment for committed data objects and backs out uncommitted data objects on queue structures.
- The frequency of system checkpoint affects this restart. CQS must read more log records when checkpoints are infrequent than when the checkpoints occur more often.
- Because the CQS log is shared by multiple CQSs, CQS restart time is affected by the number of log records written by the multiple CQSs, not just the CQS that is being restarted.
- CQS takes an initial system checkpoint at the end of a restart.

SSPM – Sysplex Serial Program Management

- Sysplex serialized program management allows users in a shared queues environment to prevent application programs that are defined as serial from being scheduled in parallel on another IMS™ system in an IMSplex.
- Information about scheduled serial PSBs is maintained in the RM resource structure to ensure that the serial PSB is scheduled in only one IMS across an IMSplex at any point in time.
- For an IMS in an IMSplex to schedule a serial PSB, that IMS must successfully create a unique instance for the PSB on the RM resource structure before it completes scheduling.
- If another IMS finds that the PSB instance is not unique, it discontinues the scheduling process for the PSB.

Global IMS resource status

- IMS™ uses the RM resource structure to maintain command status for databases, DEDB areas, and transactions across an IMSplex. This global status enables all IMS systems to view databases, DEDB areas, and transactions in an IMSplex as single databases, areas, and transactions. (not for RSR tracker system
- The status of global resources is maintained for most databases whether or not they are registered to DBRC, for DEDB areas, and for transactions. Database status is not maintained for shared secondary index databases and MSDBs.
- By maintaining this information globally using RM, you can, for example, stop a database globally, and any IMS system that joins the IMSplex recognizes that the database is stopped. Similarly, an IMS system joining the IMSplex can be prevented from accessing or updating a database that is in use by an offline process.

RM usage

- **Resource name uniqueness**
  IMS ensures that a resource name is active only once in the IMSplex at any particular time. IMS systems within the IMSplex cannot activate the same resource at the same time. The IMSplex automatically enforces resource name uniqueness only when Resource Manager (RM) is active and a resource structure is defined in the coupling facility.
- **Resource type consistency**
  Resource type consistency ensures that a name is unique within a group of resources, called a *name type*. The IMSplex automatically enforces resource type consistency when RM is active and a resource structure is defined in the coupling facility.
- **Global callable services**
  Callable services are provided for user-provided exit routines in order to find resources such as nodes, LTERMs, and users. Callable services returns global resource information shared in the resource structure. If no global information is available, local information is returned by default.

TM resources managed by RM

- **TM resources: APPC descriptors**
  IMS defines APPC descriptors to RM at initialization or during /STA LU62DESC to maintain resource type consistency for message destinations.
- **TM resources: VTAM LTERMs**
  IMS defines VTAM® LTERMs to RM for resource type consistency for message destinations, name uniqueness for LTERMs, and LTERM status recovery.
- **TM resources: MSNAMEs**
  MSC networks use MSNAMEs to define remote IMS systems and logical link paths between remote and local IMS systems in an MSC network. For MSNAMEs, Resource Manager (RM) enforces only resource type consistency for message destinations, but not resource name uniqueness.
- **TM resources: VTAM terminal nodes**
  IMS defines nodes to RM to enforce name uniqueness for single-session VTAM terminals and to recover node status.
- **TM resources: transactions**
  IMS defines a transaction dynamically with the type-2 CREATE TRAN command or statically in the system where the application will run or dynamically as a CPI-C transaction executed by an APPC conversation. A transaction can run in multiple systems concurrently as name uniqueness is not enforced.
- **TM resources: user names**
  The user name and the user ID are usually the same; however, user exits and descriptors can override the user name. The *user* is the user signed on to a dynamic terminal or parallel session subpool and has associated work and status. The *user ID* identifies a person signed on to a terminal for security authorization by a security product such as RACF®.
- **TM resources: user IDs**
  The *user ID* identifies a person signed on to a terminal for security authorization by a security product such as RACF.