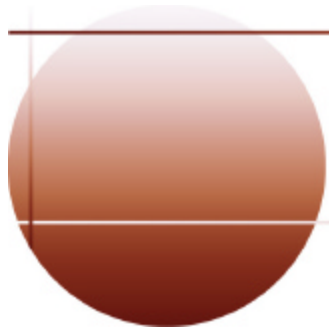E63

IMS V8 Common Service Layer

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IMS

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Systems Management Challenges with IMSs in a Sysplex

- IMS's exploitation of S/390 sysplex is great for availability and scalability.......
  - ► IMS version 5 data sharing
  - ► IMS version 6 shared queues

- But systems management becomes more difficult as you add IMSs!
  - ► commands
  - ► resource definition consistency
  - ► resource state
  - ► online change

Common Service Layer (CSL) Address Spaces

- Set of IMS address spaces that provide infrastructure for systems management in an IMSplex

- Operations Manager (OM)
  - ► manages commands

- Resource Manager (RM)
  - ► manages global resources and processes

- Structured Call Interface (SCI)
  - ► manages communications between IMS components

IMSplex Definition

- Collection of one or more IMS address spaces that work together and typically:
  - ► share databases, resources, or messages
  - ► run in a S/390 or z/OS sysplex environment
  - ► include a Common Service Layer
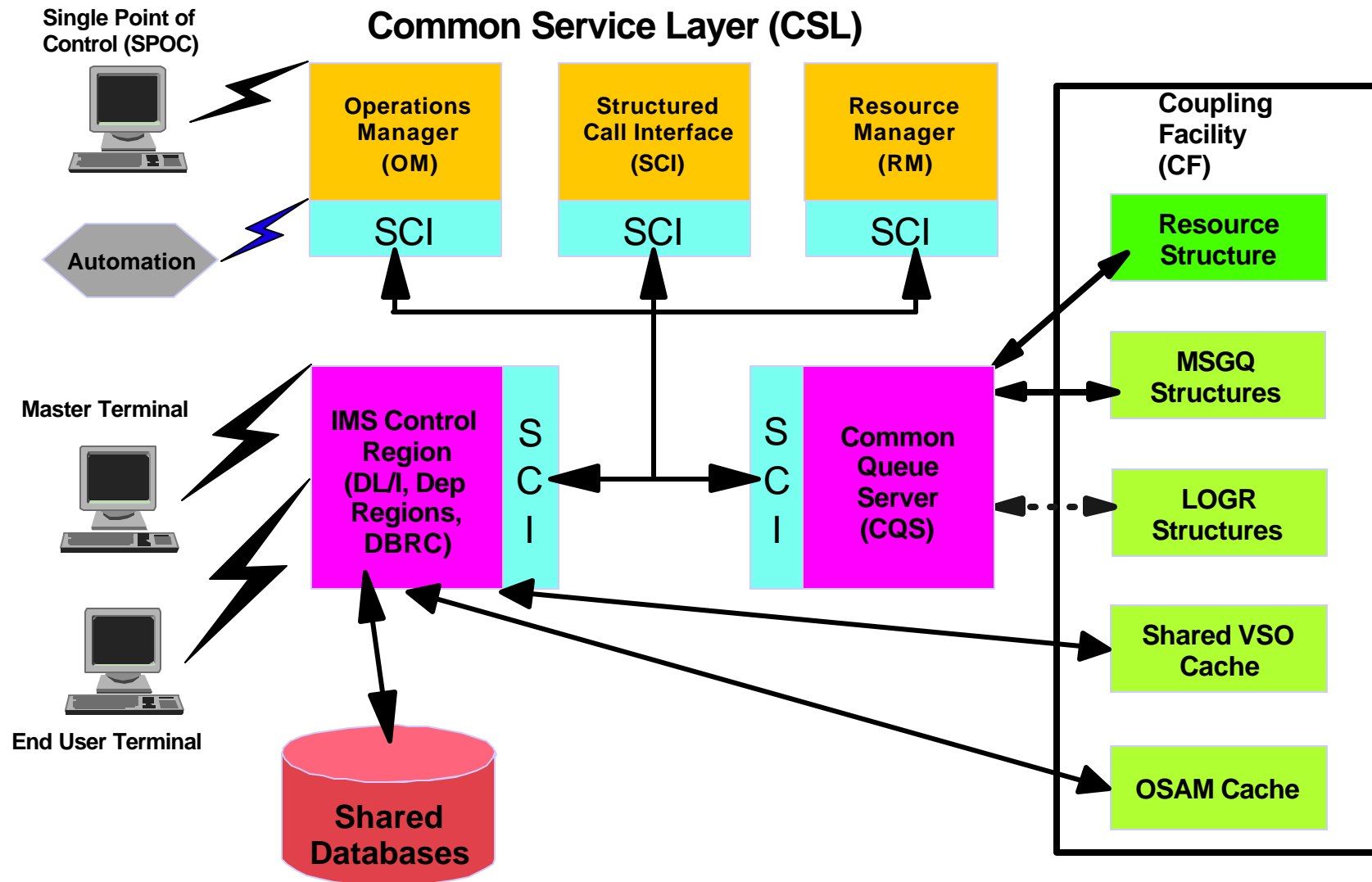
- IMSplex can also mean one IMS

IMSplex Address Spaces

- Control region address spaces (DB/TM, DBCTL, DCCTL)

- CSL address spaces (OM, RM, SCI)

- Service address spaces (CQS, DBRC)

- Single point of control address spaces
  (TSO SPOC, IMS Control Center)

- Vendor or customer address spaces

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IMS V8 IMSplex

Single Point of Control (SPOC)

Automation

Common Service Layer (CSL)

Operations Manager (OM)	Structured Call Interface (SCI)	Resource Manager (RM)
SCI	SCI	SCI

Coupling Facility (CF)

Resource Structure

MSGQ Structures

LOGR Structures

Shared VSO Cache

OSAM Cache

Master Terminal

End User Terminal

IMS Control Region (DL/I, Dep Regions, DBRC) — SCI

SCI — Common Queue Server (CQS)

Shared Databases

Common Service Layer (CSL) Configuration

- CSL is optional

- SCI is required on every LPAR

- At least one RM and OM must be defined in IMSplex
  - ► more better for availability, performance

- Only one RM allowed if no resource structure defined

Common Service Layer (CSL) Benefits

- Reduces complexity of managing multiple IMS systems

- Provides single system image

- Provides ease of use through a single point of control (SPOC)

- Supports shared resources

- Improves systems availability

- Provides infrastructure for future architecture and sysplex enhancements

Common Service Layer (CSL) Exploiters

- Enhanced command syntax

- Synchronous command responses

- Single Point of Control (SPOC)

- Global Online Change

- Sysplex Terminal Management (STM)

- DBRC RECON Loss Notification

Structured Call Interface (SCI)

- **Supports a client interface for communications**
  - ► register to SCI to become ***IMSplex member***
  - ► send messages and requests

- **Standardizes communication between IMSplex members**
  - ► cross-memory services on same LPAR
  - ► XCF between LPARs

- **Provides security authorization**

- **Supports user exits for monitoring and tailoring**

Resource Manager (RM)

- Supports a client interface for managing global resources and processes

- Manages global resource information on a resource structure

- Supports user exits for monitoring and tailoring

Operations Manager (OM)

- Manages commands in an IMSplex
  - ▶ OM doesn't understand client command syntax

- Supports a client application programming interface (API) for processing commands
  - ▶ **command processing clients** process commands
  - ▶ **automated operator program (AOP) clients** automate command input and output

- Supports user exits for monitoring and tailoring, modifying commands, and customizing security

OM Command Processing

- Validates command syntax

- Performs command security checking
  - ► RACF
  - ► OM security exit
  - ► None

- Designates command master

- Routes command

- Consolidates command responses

- Returns consolidated response

Command Processing Client Use of OM API

- Registers commands to every OM

- Processes command routed by OM
  - ► command master performs global functions

- Builds command response in XML format

- Returns command response to OM

- Sends unsolicited error messages

Command Processing Client Examples

- **OS/390 address spaces**
  - ► IMS DB/TM
  - ► DBCTL
  - ► DCCTL
  - ► RM

- **Vendor/customer**

Automated Operator Program Client Use of OM API

- **Issues commands to OM**
  - ► timeout value
  - ► routing

- **Receives consolidated command responses from OM**

- **Formats responses for display**
  - ► may support scrolling, sorting, etc

Automated Operator Program Client Examples

- **OS/390 address spaces**
  - ► TSO SPOC
  - ► IMS Connect

- **Workstation address spaces**
  - ► IMS Control Center (using IMS Connect)

- **Vendor/customer**

OM User Exits for Command Manipulation and Authorization

- **Input User Exit**
  - ► called with command input
  - ► views and manipulates a command before it is processed

- **Output User Exit**
  - ► called with command output such as responses, unsolicited output, undeliverable output
  - ► views and manipulates output before it is returned

- **Security User Exit**
  - ► permits command security checking

IMS Introduces Enhanced Command Syntax

- Exploits OM's functions to improve systems management and automation

- Addresses many IMS command requirements

- Long range direction is to convert classic IMS commands to enhanced command syntax

- Supported only through the OM API
  - ► not supported from system console, MTO, E-MCS console, CMD/ICMD DL/I calls
  - ► not passed to AOI exits (DFSAOE00, DFSAOUE0)

Enhanced Command Syntax Rules

- Simplified set of command verbs
  - ► DELETE, INITIATE, QUERY, TERMINATE, UPDATE
- Simplified parse rules
  Action_Verb Resource_Type Keyword(parameter)
- IMS keywords distinguished from user defined resources
- No command recognition character (e.g., "/")
- Wildcard parameters select resource names
  QUERY TRAN NAME(**APOL***)
- Keyword filters selects resources
  QUERY TRAN NAME(APOL*) **STATUS**(STOSCHD,STOQ)
  QUERY TRAN NAME(APOL*) **QCNT**(GT,0)
- SHOW filter selects data fields to return
  QUERY TRAN NAME(APOL*) **SHOW**(CLASS,STATUS)

UPDATE TRAN Classic Command Equivalents

- /ASSIGN TRAN

- /CHANGE TRAN

- /PSTOP TRAN

- /PURGE TRAN

- /START TRAN

- /TRACE SET ON/OFF TRAN

IMS V8 Enhanced Commands

- DELETE LE
- INITIATE OLC
- QUERY IMSPLEX
- QUERY LE
- QUERY MEMBER TYPE(IMS)
- QUERY OLC
- QUERY STRUCTURE
- QUERY TRAN
- TERMINATE OLC
- UPDATE LE
- UPDATE TRAN

IMS Introduces Synchronous Command Responses

- Response returned synchronously to improve automation

- Replaces DFS058I COMMAND IN PROGRESS response

- Classic database commands changed in IMS V8:
  - /DBD DB
  - /DBR AREA/DB
  - LOCK DB
  - /START AREA/DB/MADSIOT
  - /STOP ADS/AREA/DB/MADSIOT
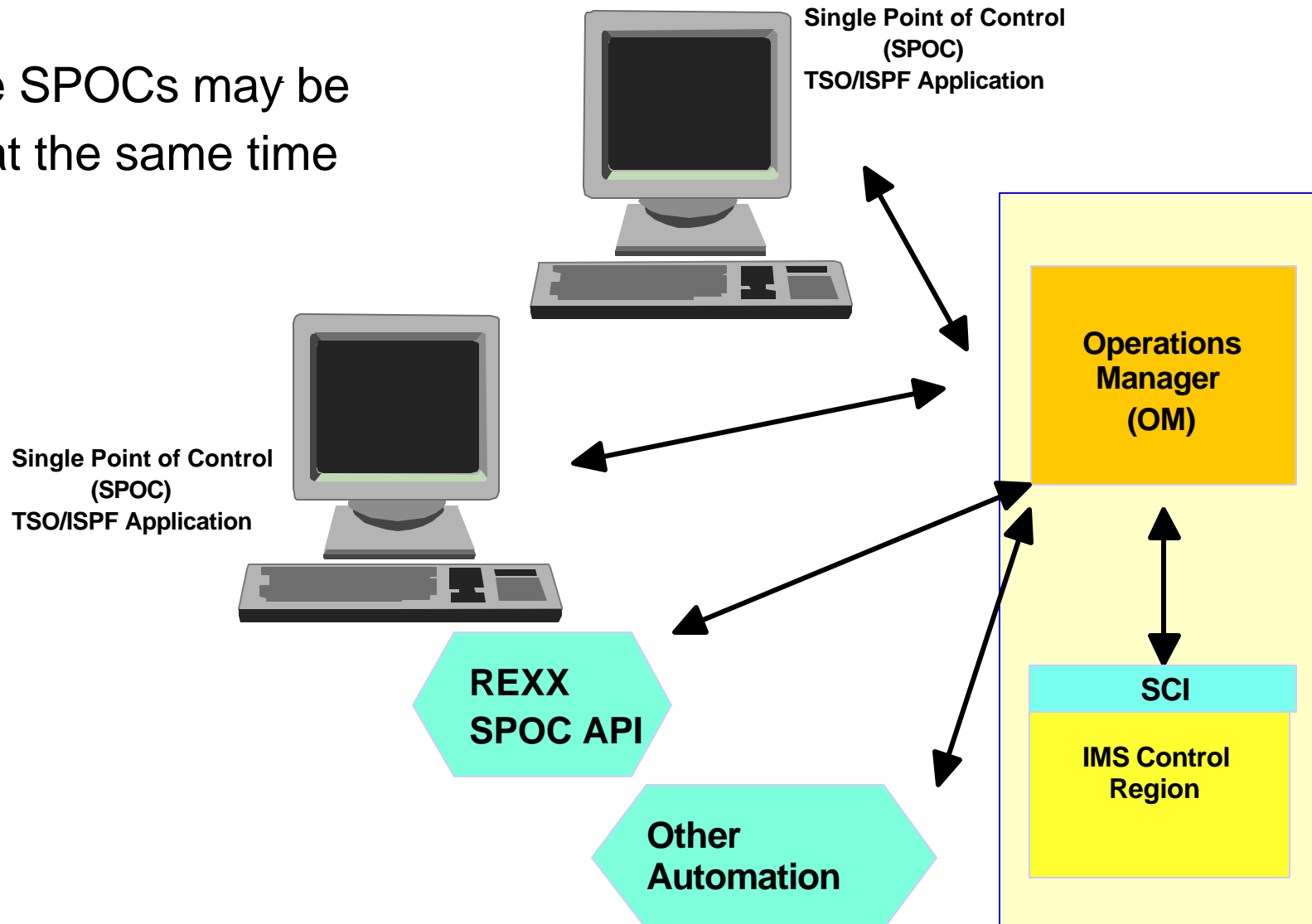 - /UNLOCK DB
  - /VUNLOAD AREA

IMS Single Point of Control (SPOC)

- **Single point of operational control for IMS commands**
  - ► command may be routed to multiple members
  - ► command response is consolidated
- **IMS classic commands and enhanced commands supported**
- **TSO SPOC provides a host-based SPOC**
  - ► output supports scrolling up/down and left/right
  - ► enhanced command output displayed in table format
  - ► enhanced command output can be sorted by column
- **IMS Control Center provides a workstation SPOC**
- **REXX SPOC API provides a REXX program SPOC**
- **Any vendor or customer can write a SPOC**

'Single' does not mean 'only'

Multiple SPOCs may be
active at the same time

**Single Point of Control
(SPOC)
TSO/ISPF Application**

**Single Point of Control
(SPOC)
TSO/ISPF Application**

**Operations
Manager
(OM)**

**REXX
SPOC API**

SCI

**IMS Control
Region**

**Other
Automation**

QUERY IMSPLEX response example

```
    File  Display  View  Options  Help
---------------------------------------------------------------
                      IMS Single Point of Control
 Command ===>
   ---------------------- Plex .PLEX1_ Route . _____  Wait . 5:00
 Response for: QUERY IMSPLEX SHOW(TYPE,STATUS,SUBTYPE)
IMSplex   MbrName     CC Member    Type   Subtype   Status
CSLPLEX1 OM1OM         0 CQS1CQS   CQS              ACTIVE
CSLPLEX1 OM1OM         0 SYS3      IMS    DBDC      READY,ACTIVE
CSLPLEX1 OM1OM         0 RM1RM     RM     MULTRM    READY,ACTIVE
CSLPLEX1 OM1OM         0 CQS2CQS   CQS              ACTIVE
CSLPLEX1 OM1OM         0 OM1OM     OM               READY,ACTIVE
CSLPLEX1 OM1OM         0 IMS2      IMS    DBDC      READY,ACTIVE
CSLPLEX1 OM1OM         0 USRT011   AOP              ACTIVE
CSLPLEX1 OM1OM         0 SCI1SC    SCI              READY,ACTIVE




F1=Help F3=Exit F4=Showlog F6=Expand  F9=Retrieve  F12=Cancel
```

QUERY IMSPLEX log example

```
  File  Display  View  Options  Help
---------------------------------------------------------------------
PLEX1                      IMS Single Point of Control
Command ===>


 -------------------------------- Plex . PLEX1  Route .         Wait . 5:00
Log for . . : QUERY IMSPLEX SHOW(TYPE,STATUS,SUBTYPE)


IMSplex . . . . . : PLEX1
Routing . . . . . :
Start time. . . . : 2003.199 13:12:52.04
Stop time . . . . : 2003.199 13:12:52.04
Return code . . . : 00000000
Reason code . . . : 00000000
Command master. . :




F1=Help     F3=Exit      F4=Showlist  F6=Expand    F9=Retrieve F12=Cancel
```

QUERY TRAN response example

```
   File  Display  View  Options  Help
----------------------------------------------------------------
 PLEX1                        IMS Single Point of Control
 Command ===>
 ---------------------- Plex . PLEX1 Route . _____ Wait . 5:00


 Response for: QRY TRAN NAME(SKS*) SHOW(ALL)                More:  >


Trancode MbrName CC   PSBname      QCnt LCls   LQCnt  LLCT LPLCT LCPRI LNPRI
SKS1     IMS2     0                       5
SKS1     IMS2     0   STLDDLT1            1        0 65535 65535     8     8
SKS1     SYS3     0   STLDDLT1            1        0 65535 65535     8     8
SKS2     IMS2     0                  0
SKS2     IMS2     0   STLDDLT2            2        0 65535 65535     8     8
SKS2     SYS3     0   STLDDLT2            2        0 65535 65535     8     8
SKS3     IMS2     0                  0
SKS3     IMS2     0   STLDDLT3            3        0 65535 65535     8     8
SKS3     SYS3     0   STLDDLT3            3        0 65535 65535     8     8
SKS4     IMS2     0                  0



F1=Help F3=Exit F4=Showlog F6=Expand  F9=Retrieve  F12=Cancel
```

QUERY TRAN response (more) example

```
  File  Display  View  Options  Help
 -------------------------------------------------------------
 PLEX1                       IMS Single Point of Control
 Command ===>
 ---------------------- Plex . PLEX1 Route . _____ Wait . 5:00


 Response for: QUERY TRAN NAME(SKS*) SHOW(ALL)                    More: < +
 Trancode MbrName   LNPRI LLPRI LSegSz LSegNo LParLim RegCnt LMaxRgn LclStat
 SKS1     IMS2
 SKS1     IMS2        8     8     0      0     65535     0       0
 SKS1     SYS3        8     8     0      0     65535     0       0
 SKS2     IMS2
 SKS2     IMS2        8     8     0      0     65535     0       0
 SKS2     SYS3        8     8     0      0     65535     0       0
 SKS3     IMS2
 SKS3     IMS2        8     8     0      0     65535     0       0
 SKS3     SYS3        8     8     0      0     65535     0       0
 SKS4     IMS2



 F1=Help F3=Exit F4=Showlog F6=Expand  F9=Retrieve  F12=Cancel
```

DISPLAY STATUS DB example

```
   File   Display   View   Options   Help
-------------------------------------------------------------------
PLEX1                      IMS Single Point of Control
Command ===>


  -------------------------------- Plex . PLEX1  Route .           Wait . 5:00
Log for . . : DISPLAY STATUS DB                                    More:    +


IMSplex . . . . . : PLEX1
Routing . . . . . :
Start time. . . . : 2003.199 13:19:31.57
Stop time . . . . : 2003.199 13:19:31.57
Return code . . . : 00000000
Reason code . . . : 00000000
Command master. . : IMS2


MbrName   Messages
-------- ------------------------
IMS2           **DATABASE**
IMS2           BANKATMS   NOTINIT, NOTOPEN, STOPPED
IMS2           BANKFNCL   NOTINIT, NOTOPEN, STOPPED
IMS2           BANKLDGR   NOTINIT, NOTOPEN, STOPPED                       USRT011
IMS2           BANKTERM   NOTINIT, NOTOPEN, STOPPED
 F1=Help      F3=Exit        F4=Showlist   F6=Expand    F9=Retrieve F12=Cancel
```

/DBR DB example

```
  File   Display  View  Options  Help
------------------------------------------------------------------
PLEX1                      IMS Single Point of Control
Command ===>
 ----------------------- Plex . PLEX1  Route . _____ Wait . 5:00
Log for . . : DBR DB BANKATMS BANKTERM BANKLDGR BE3ORDER


IMSplex . . . . . : PLEX1
Routing . . . . . :
Start time. . . . : 2002.023 12:15:14.13
Stop time . . . . : 2002.023 12:15:14.62
Return code . . . : 00000000
Reason code . . . : 00000000
Command master. . : IMS2


MbrName  Messages
-------- ------------------------
IMS2     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKATMS RC=04
IMS2     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKTERM RC=04
IMS2     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKLDGR RC=04
IMS2     DFS0488I  DBR COMMAND COMPLETED. DBN= BE3ORDER RC= 0
SYS3     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKATMS RC=04
SYS3     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKTERM RC=04
SYS3     DFS0488I  DBR COMMAND COMPLETED. DBN= BANKLDGR RC=04
SYS3     DFS0488I  DBR COMMAND COMPLETED. DBN= BE3ORDER RC= 0
IMS3     DFS3466I DDIR FOR DATABASE BANKATMS NOT FOUND
IMS3     DFS3466I DDIR FOR DATABASE BANKTERM NOT FOUND
IMS3     DFS3466I DDIR FOR DATABASE BANKLDGR NOT FOUND
IMS3     DFS0488I  DBR COMMAND COMPLETED. DBN= BE3ORDER RC= 0
```

Common Service Layer (CSL) Summary

- **CSL** provides **infrastructure** for systems management
  - ► operations, resources, communications

- **CSL exploiters** provide systems management **value**
  - ► enhanced command syntax
  - ► synchronous command responses
  - ► single point of control (SPOC)
  - ► Global Online Change
  - ► Sysplex Terminal Management (STM)
  - ► DBRC RECON Loss Notification