E01

IMS Version 8 Overview

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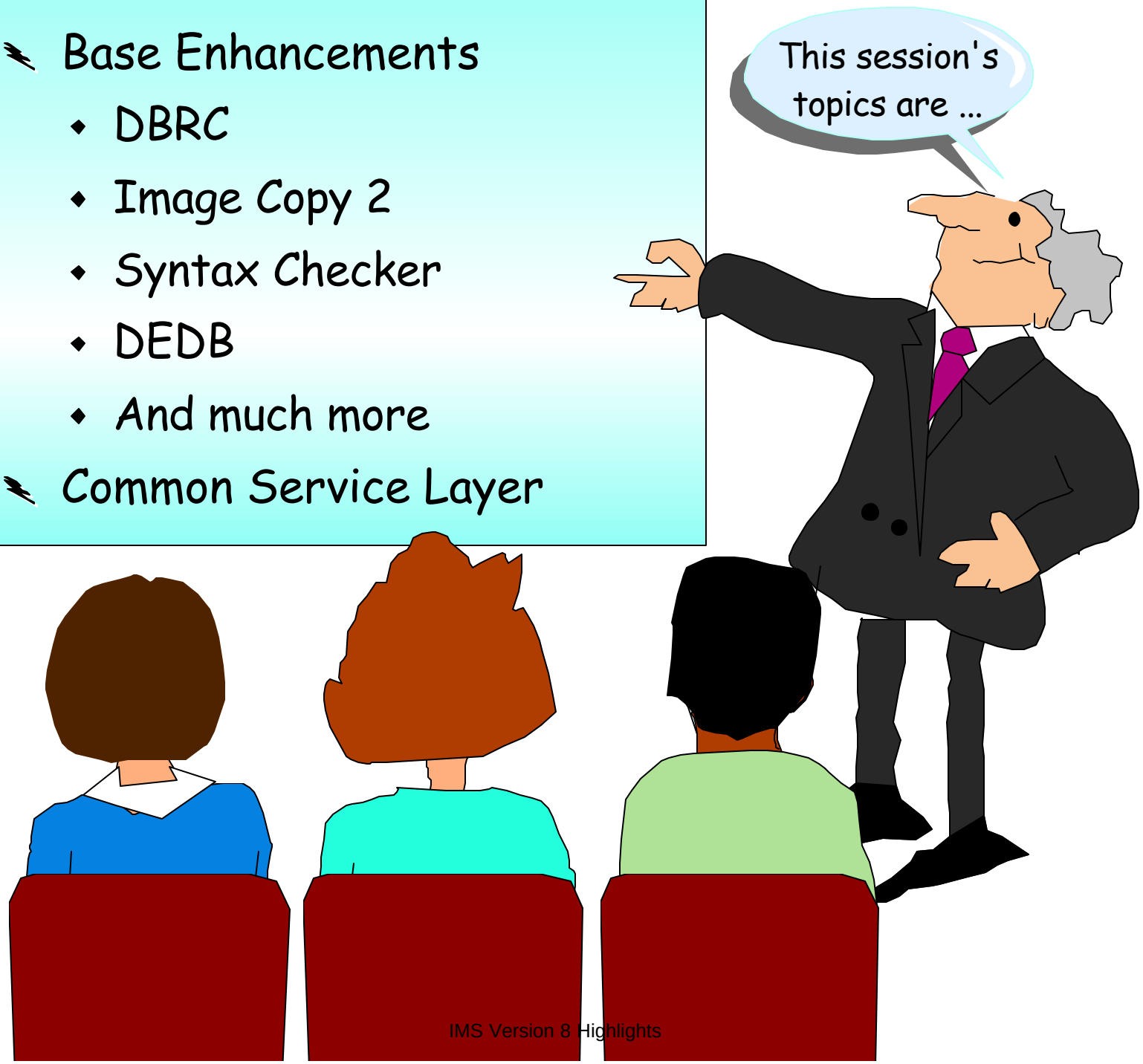
What's in IMS Version 8

- Base Enhancements
  - DBRC
  - Image Copy 2
  - Syntax Checker
  - DEDB
  - And much more
- Common Service Layer



DBRC - 16MB RECON Record Size

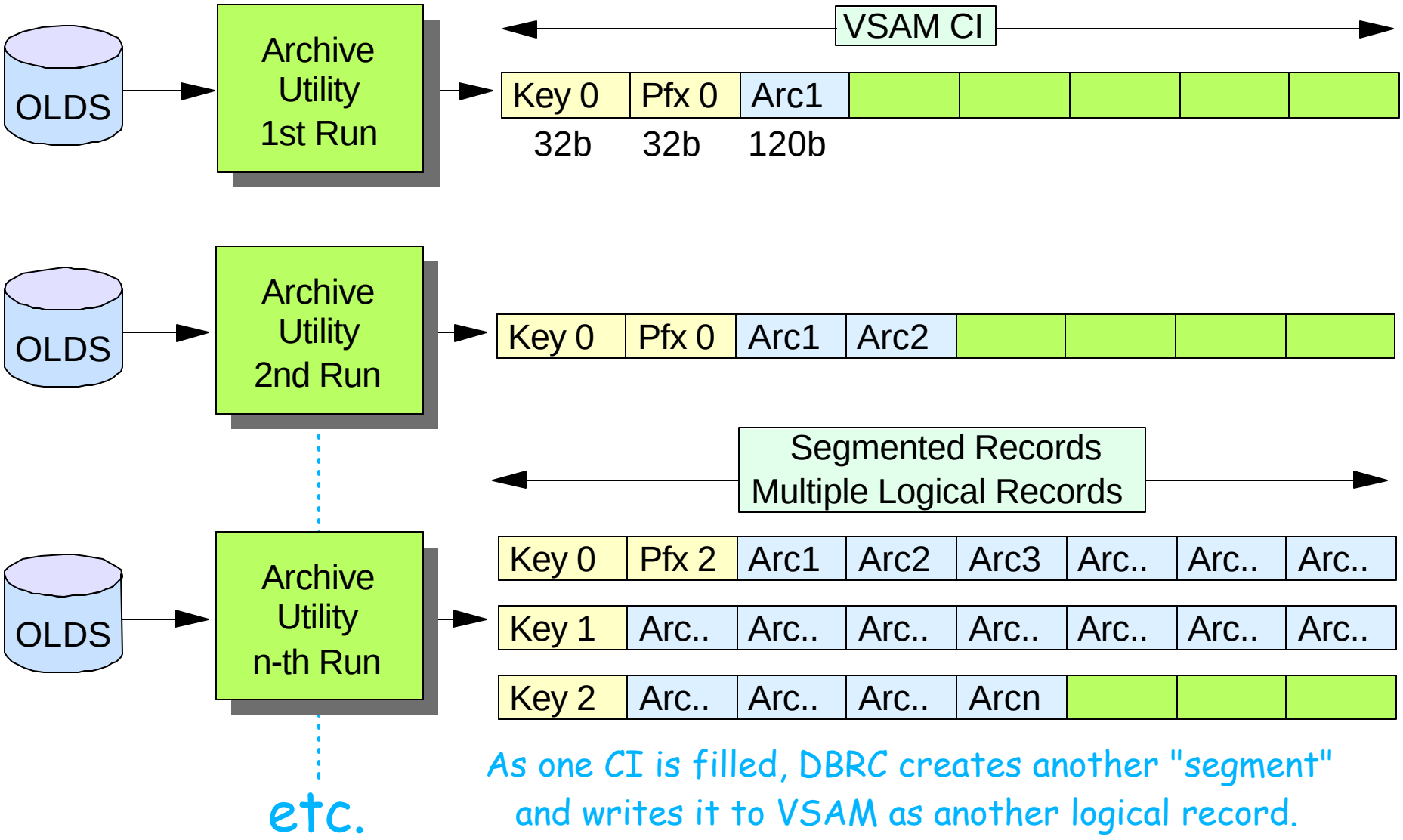
Large maximum record sizes are needed to extend IMS continuous availability

- Pre-V8 used VSAM *spanned* records
- Maximum size limited to Control Area size
- Prevented RECON backup to tape if >32K

IMS V8 uses "segmented" records instead of VSAM spanned records

- Controlled by IMS
  - Not limited by VSAM maximum record size or control area size
- Records are divided into multiple segments - 1/CI
  - Last two bytes of KEY is Segment #
  - First segment contains DATA PREFIX with last Segment #
- Maximum total size of all segments - 16MB
  - *Over 100,000 single volume archived data sets*

DBRC - 16MB RECON Record Size ...



As one CI is filled, DBRC creates another "segment" and writes it to VSAM as another logical record.

Data prefix in 1st segment identifies last segment.

DBRC - PRILOG Compression

In previous releases

- PRILOG compression is attempted
  - When record reaches 50% of maximum record size
  - Again when record reaches 75% of maximum record size
  - When DELETE.LOG INACTIVE is issued

In IMS V8

- PRILOG compression is attempted *on every archive*, and when **DELETE.LOG INACTIVE** command entered
- If compression attempt removes no data set entries
  - **DSP1150I LOG RECORD(S) COULD NOT BE COMPRESSED,**
    RECORD TIME = timestamp
    reason type = timestamp
- Reason types: **EARLIEST ALLOC TIME,**
  LOG RETENTION TIME, or
  EARLIEST CHECKPOINT

DBRC - Command Authorization

Security support for DBRC commands

- Commands can be authorized
  - At the *command verb* level
    - For example, the **CHANGE** command
  - At the *verb + resource type* level
    - For example, the **CHANGE.DB** command
  - At the *verb + resource type + resource name* level
    - For example, the **CHANGE.DB** DBD(**ACCTDB**) command

```
CHANGE.RECON CMDAUTH(SAF|EXIT|BOTH|NONE,safhlq)
```

- Security profiles may differ for different RECONs
- Security is invoked only for commands issued from DBRC Utility (DSPURX00) or HALDB Partition Definition Utility
  - Use IMS command security for /RMx commands

DBRC Command Authorization ...

RACF Definitions

- Uses FACILITY resource class
  - RDEFINE FACILITY *resource* UACC(NONE)
    - *resource* is *safhlq.command-verb.resource-type.resource-name*
- Users must be given **READ** access to command resource
  - PERMIT resource CLASS(FACILITY) ID(user_id) ACCESS(READ)

Example

```
RDEFINE FACILITY IMSP.CHANGE.DB.ACCTDB UACC(NONE)

PERMIT IMSP.CHANGE.DB.ACCTDB CLASS(FACILITY)
            ID(MAKENA) ACCESS(READ)
```

Image Copy 2

Enhanced in V8

- Can copy *multiple database data sets in one execution of IC2*
  - Logical and physical copies performed in parallel

- Can copy *groups of DBDSs* (e.g. DBDSGRP)
  - All DBDSs in group are copied in parallel
  - Single message reports when all logical copies are complete
    - DFS3121A Logical copy complete for GROUP <grpname>; ....

```
DFS3121A LOGICAL COPY COMPLETE FOR GROUP FNCLGRP;
          0 OF 5 DATA SETS FAILED
DFS3121I COPIED DB/AREA ACCT DDN ACCT1 DSN IMSPRD.DB.ACCT.ACCT1
DFS3121I COPIED DB/AREA ACCT DDN ACCT2 DSN IMSPRD.DB.ACCT.ACCT2
DFS3121I COPIED DB/AREA CUST DDN CUSTA DSN IMSPRD.DB.CUST.CUSTA
DFS3121I COPIED DB/AREA CUST DDN CUSTB DSN IMSPRD.DB.CUST.CUSTB
DFS3121I COPIED DB/AREA CUST DDN CUSTC DSN IMSPRD.DB.CUST.CUSTC
```

- Can write multiple image copies to one output data set
- Additional DFSMSdss OPTIMIZE options
- DBRC GENJCL.IC support

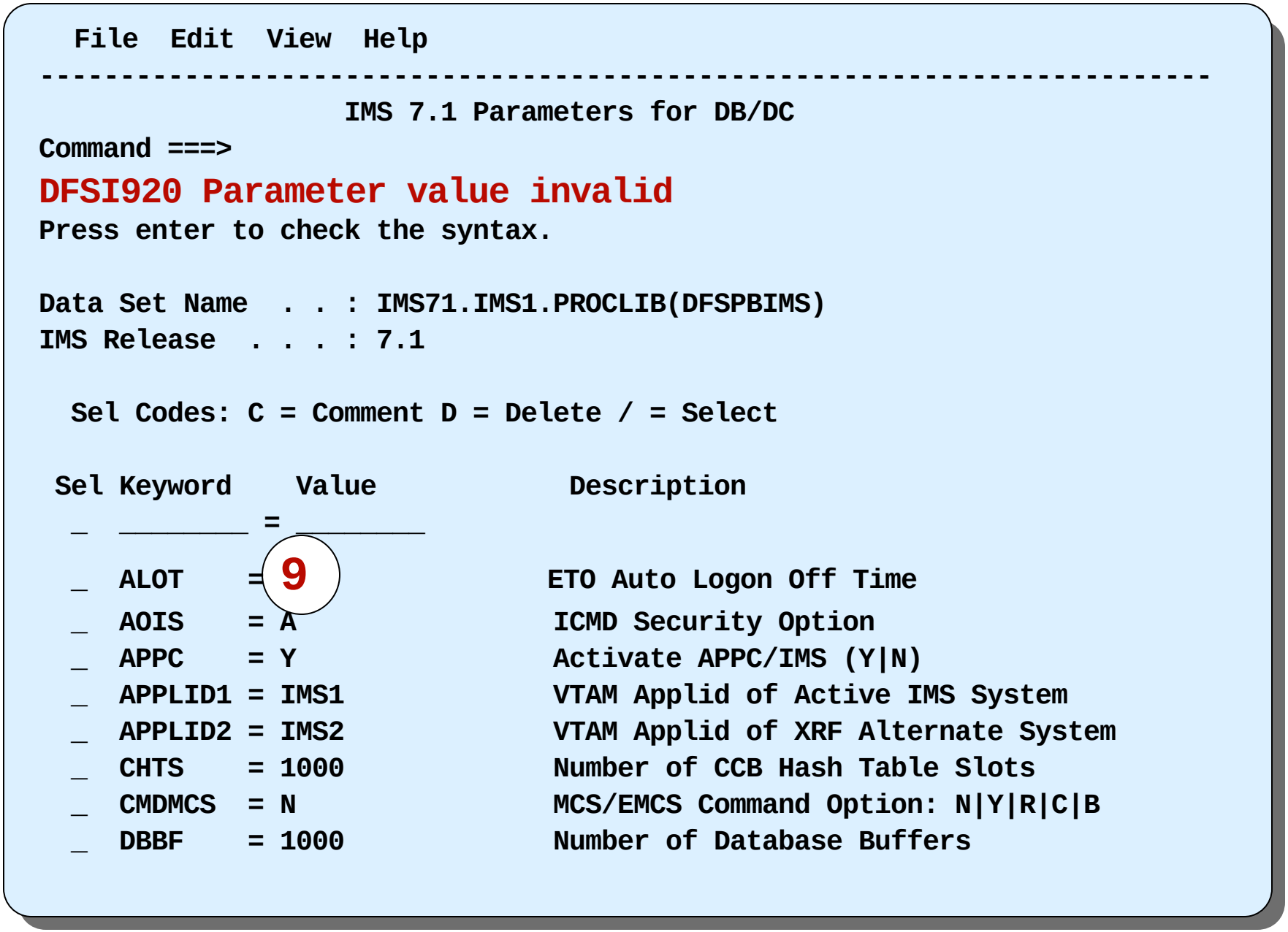
Syntax Checker

Syntax Checker is a new IMS ISPF application

Its primary functions are to

- *Define, verify, and validate* PROCLIB member DFSPBxxx parameters and value specifications prior to (re)starting IMS
  - Find errors before restarting IMS
- Identify *new and obsolete* parameters
  - Useful when migrating to new version of IMS
- Provide *detailed online help* text at the parameter level

Invalid Parameter



Keyword ALOT Help

```
  File  Edit  View  Help
+-------------------------------------------------------------------------+
|                          ALOT Autologoff Time                           |
|                                                                         |
|                                                          More:     +  |
| KEYWORD: ALOT                                                           |
|                                                                         |
| Specifies the autologoff time in minutes. Valid values are 0 and from 10  |
| to 1440. If the ALOT value is not specified, the value from the JCL member |
| is used except for FINANCE, SLU P, and ISC. If ALOT is not specified on   |
| the logon descriptor or overridden by the logon exit (DFSLGNX0) for       |
| FINANCE, SLU P, and ISC, a value of 1440 is used (the value from the JCL  |
| member is ignored).                                                     |
|                                                                         |
+-------------------------------------------------------------------------+
```

Not Valid in Release

```
  File  Edit  View  Help
-------------------------------------------------------------------
                    IMS 8.1 Parameters for DB/DC
Command ===>
DFSI926 Keyword CHTS not valid in Release 8.1
Press enter to check the syntax.

Data Set Name  . . : IMS71.IMS1.PROCLIB(DFSPBIMS)
IMS Release  . . . : 8.1

  Sel Codes: C = Comment D = Delete / = Select

 Sel Keyword    Value              Description                 More: -
  _   CHTS     =  1000             Number of CCB Hash Table Slots
  _   CMDMCS   =  N                MCS/EMCS Command Option: N|Y|R|C|B
  _   DBBF     =  1000             Number of Database Buffers
  _   DBFX     =  10               Num. DB Buffs available ...
  _   DBRCNM   =  DBCPROC          DBRC Problib Member Name
```

S/C - "DISPLAY NEW" Screen

```
  File  Edit  View  Help
-------------------------------------------------------------------------
                    IMS 8.1 Parameters for DB/DC
Command ===>

Press enter (without other input) to check for errors.

Data Set Name  . . : IMS71.IMS1.PROCLIB(DFSPBX71)
IMS Release  . . . : 8.1

  Sel Codes: C = Comment D = Delete / = Select

 Sel Keyword    Value          Description
  _  CSLG       =  _______     CSL Global Member (DFSCGXXX)
  _  IOVFI      =  _______     Timer Iterval: IOVF Control Intervals
  _  OTMAASY    =  _______     OTMA program switch for nonresp tran
```

DEDB Enhancements

Data Entry Database

- Support for more than 240 Areas
  - DEDBs can now be defined with up to 2048 Areas
    - 2048 * 4GB = 8TB
  - No change to DEDB externals (application interface)

- Non-recoverable DEDBs
    - INIT.DB or CHANGE.DB DBD(dbdname) NONRECOV ...

  - Database changes not logged
    - Reduces log volumes
  - Especially useful for ...
    - Work databases, scratch pad databases, temporary databases
  - Supported for ...
    - VSO and Non-VSO, shared and non-shared
  - Not supported for ...
    - DEDBs with SDEPs

Parallel DB Open/Close

During IMS V8 restart and termination

- For ***full function*** databases ....
  - DBRC database authorization (AUTH) processing
  - Data set allocation, open, close, and end-of-volume processing

Ten parallel TCBs for database processing during IMS warm or emergency restart, and during IMS shutdown

- Databases assigned to one of 10 TCBs for open/close/eov processing

- During restart
  - Single DBRC authorization request for all DBs assigned to that TCB
  - Parallel database data set ALLOCATION and OPEN processing

- During shutdown
  - Single DBRC request to unauthorize databases
  - Parallel close and deallocation of database data sets

Parallel DB Open/Close ...

```
.....
DATABASE DBX
DATABASE DBY
DATABASE DBZ
.....
```

```
PSBXYZ
    PCB DBX
    PCB DBY
    PCB DBZ
```

IMS V6/V7

```
/NRE
/STA REGION
SCHEDULE PSBXYZ
    AUTH DBX
    ALLOCATE DBDSX
    AUTH DBY
    ALLOC DBDSY
    AUTH DBZ
    ALLOC DBDSZ
DLI CALL TO DBX
    OPEN DBDSX
DLI CALL TO DBY
    OPEN DBDSY
DLI CALL TO DBZ
    OPEN DBDSZ
```

Items in red and indented contribute to the response time of that first transaction.

This occurs for every database until all are authorized, allocated, and opened.

Parallel DB Open/Close ...

```
.....
DATABASE DBX (TCB1)
DATABASE DBY (TCB2)
DATABASE DBZ (TCB3)
.....
```

```
PSBXYZ
   PCB DBX
   PCB DBY
   PCB DBZ
```

/NRE

TCB1

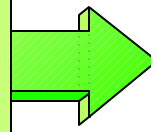
AUTH DBX ...
ALLOCATE DBDSX
OPEN DBDSX

TCB2

AUTH DBY ...
ALLOCATE DBDSY
OPEN DBDSY

TCB3

AUTH DBZ ...
ALLOCATE DBDSZ
OPEN DBDSZ



```
/START REGION
SCHEDULE PSBXYZ
```

```
DLI CALL TO DBX
DLI CALL TO DBY
DLI CALL TO DBZ
```

Application response time
not impacted by authorization,
allocation, or open processing.

What Else Is In Version 8?

APPC

- Add/delete descriptors dynamically
- CPU time limit for CPI-C driven transactions
- Enhanced "outbound LU" support

Java (also available in V7 by APAR)

- New Java IMS application and database class packages
- New dependent region types for Java applications
  [more about this in e-Business Update]

IMS Batch support for RRS

- Coordinated 2-phase commit with DB2 or MQSeries

What Else Is In Version 8?

IMS and DB2 coordinated remote disaster recovery

- Coordinate remote IMS/DB2 recovery using RSR and XRC

MSC

- MSC support for FICON CTC links

Parallel sysplex (also available in V7 by APAR)

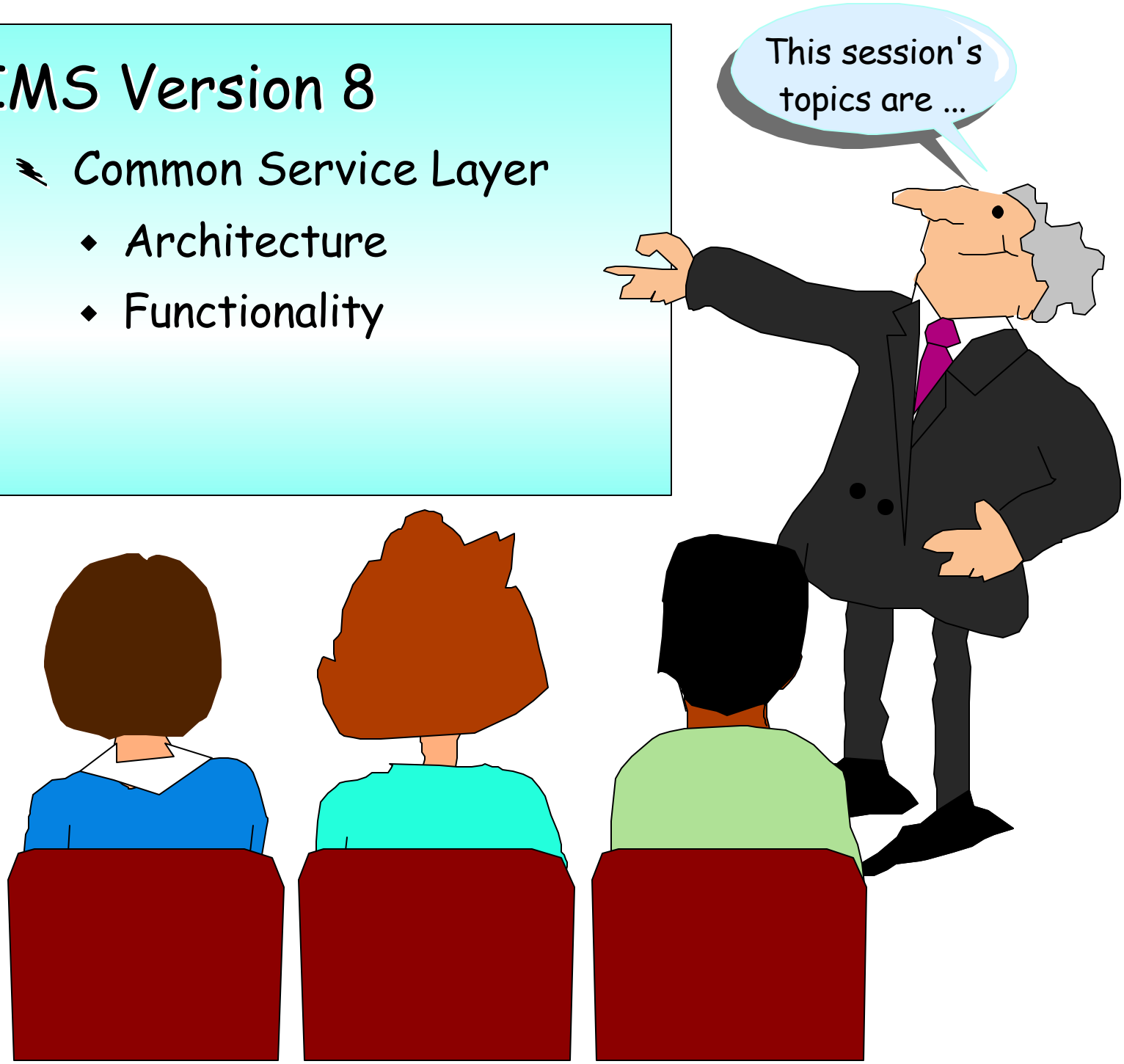
- Shared queues
  - Synchronous APPC and OTMA transactions
- Structure management
  - System managed functions
    - Autoalter
    - System managed rebuild
    - System managed duplexing

Enhanced IMS installation and IVP process

- Addressed in Migration presentation

IMS Version 8

- Common Service Layer
  - Architecture
  - Functionality



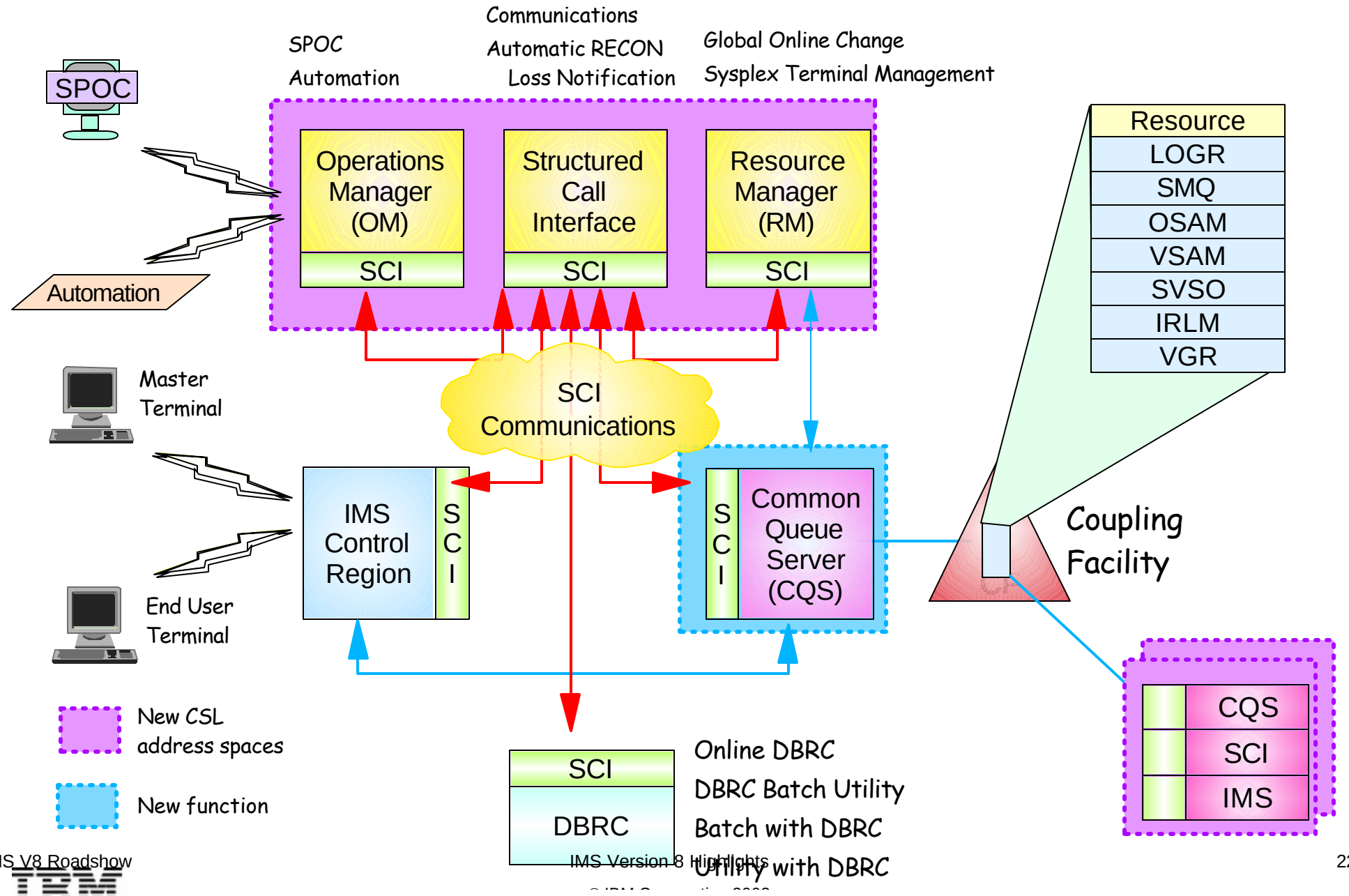
Common Service Layer (CSL)

The next step in IMS architectural evolution

- New *address spaces* built on Base Primitive Environment
  - *Structured Call Interface (SCI)*
    - IMSplex member registration
    - Communications between IMSplex members
  - *Operations Manager (OM)*
    - Interface to IMSplex for command entry and response
  - *Resource Manager (RM)*
    - Global resource and process management
    - VTAM terminal/user status recovery

- Enables new systems management *functions* in IMSplex
  - *Sysplex Terminal Management (STM)*
    - Uses SCI and RM services
  - *Single point of control (SPOC) and user-provided automation (AOP)*
    - Uses SCI and OM services
  - *Coordinated Online Change (Global Online Change)*
    - Uses SCI, OM, and RM services

CSL Architecture



Structured Call Interface (SCI)

SCI address space

- Provides for standardized intra-IMSplex communications between members of an IMSplex
- Provides security authorization for IMSplex membership
- SCI address space provides SCI services to registered members

Stuctured call interface services

- Used by SCI clients to
  - Register/deregister as member of IMSplex
  - Communicate with other members
- SCI client issues CSL macros to request SCI services
  - Macros documented in ***CSL Guide and Reference*** manual

SCI configuration

- One SCI address space is *required on each OS/390 or z/OS image* with IMSplex members

Operations Manager (OM)

Operations Manager

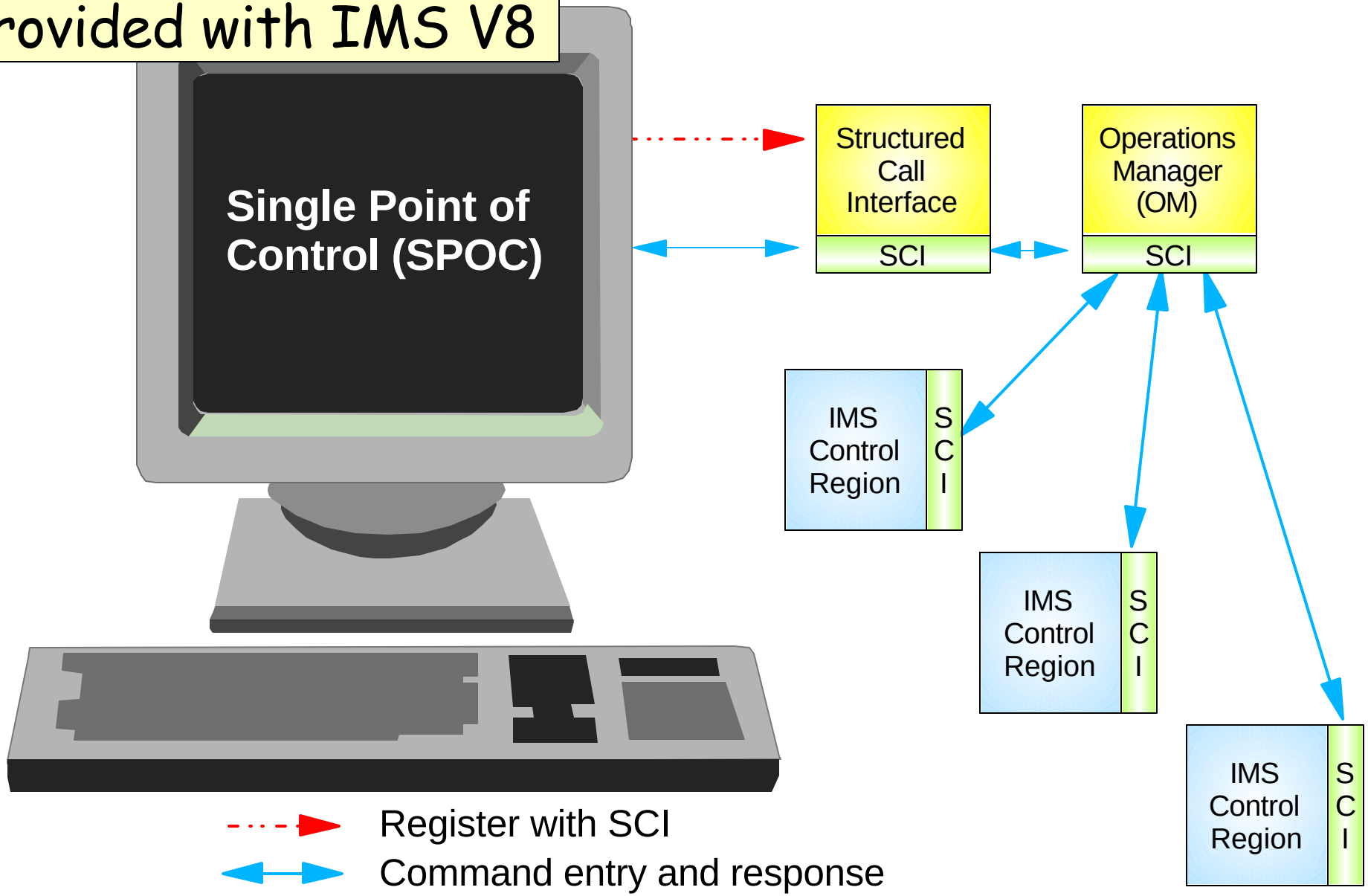
- Provides an API allowing single point of command entry into IMSplex
  - Focal point for operations management and automation
  - Command responses from multiple IMSs are consolidated
- Provides the following services to members and clients of an IMSplex
  - *Route commands* to IMSplex members registered for command
  - *Consolidate command responses* from individual IMSplex members into a single response to present to the command originator
  - *Provide an API* for IMS commands for automation
  - Provide a general use interface for *command registration* to support any command processing client
  - Provide *user exit capability* for command and response edit and for command security

OM configuration

- One or more OM address spaces required per IMSplex
- Parallel sysplex not required!!!

TSO Single Point of Control

Provided with IMS V8



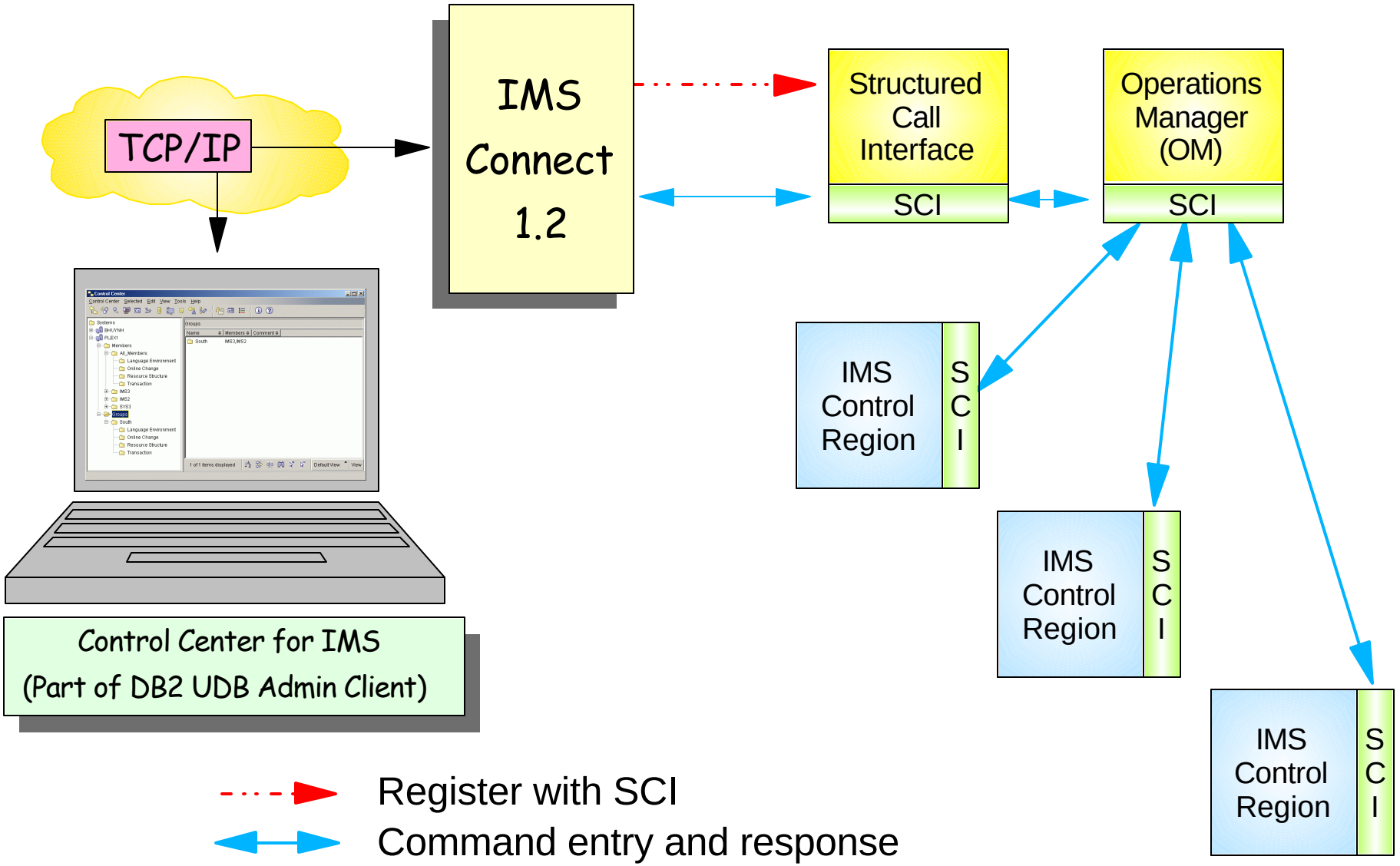
TSO SPOC Sample Screen

```
  File  Display  View  Options  Help
-------------------------------------------------------------------------
                    IMS Single Point of Control
Command ===> QRY TRAN NAME(A*) SHOW(ALL)
---------------------- Plex . _____ Route . IMS13____ Wait . ____
Response for: QRY TRAN NAME(A*) SHOW(ALL)                  More:   +>
Trancode MbrName    CC PSBname      QCnt LCls    LQCnt  LLCT LPLCT
ADDINV   IMS1        0                 0
ADDINV   IMS1        0 DFSSAM04            4        0     2 65535
ADDPART  IMS3        0                 0
ADDPART  IMS3        0 DFSSAM04            4        0     2 65535
AOBMP    IMS1        0                 0
AOBMP    IMS1        0 TS2IAOB0           23        0 65535 65535
etc.
```

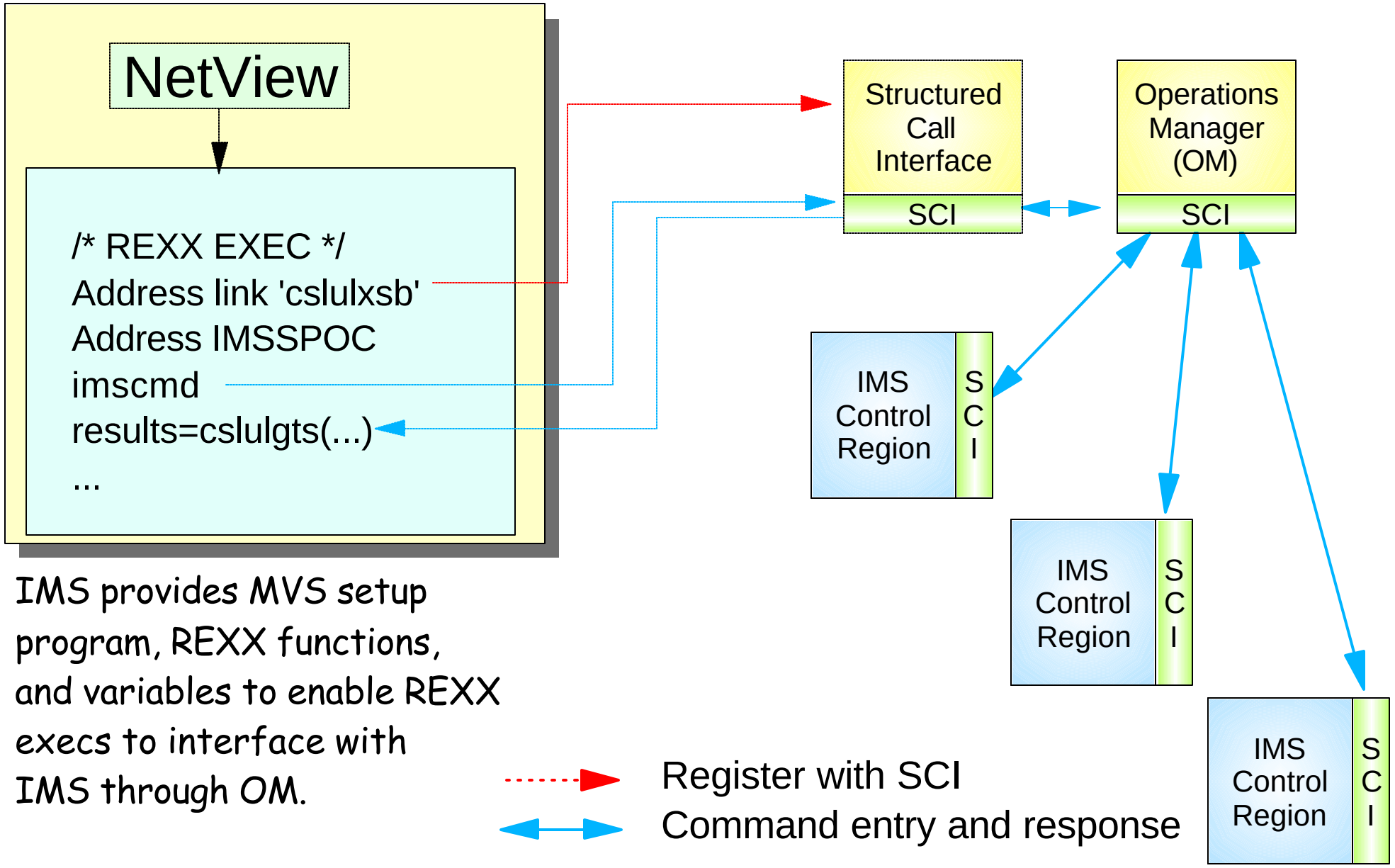
Display formatted by SPOC from XML response.

```
F13=Help F15=Exit F16=Showlog F18=Expand  F21=Retrieve  F24=Cancel
```

Control Center for IMS

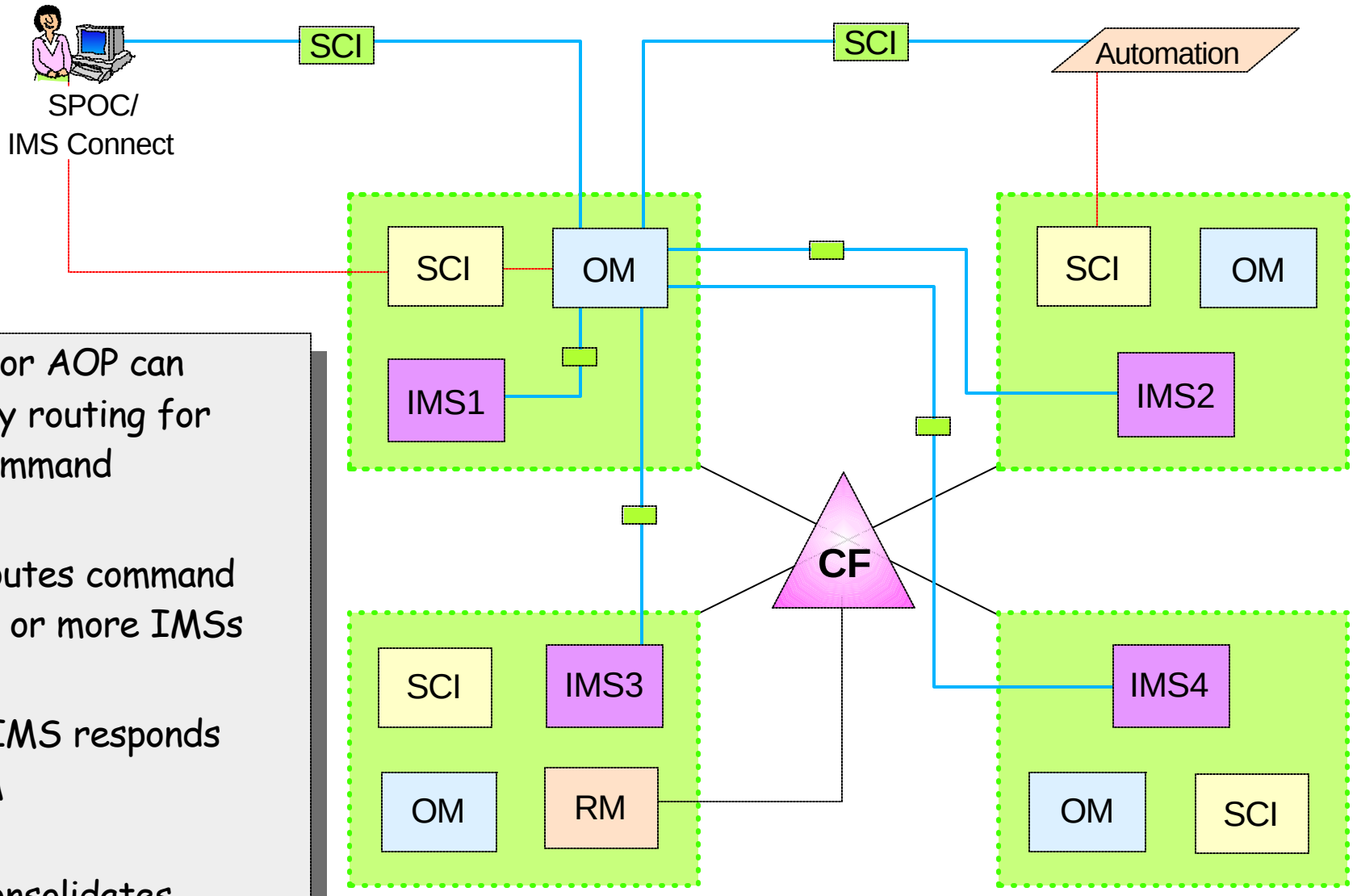


User-provided Automation Programs



IMS provides MVS setup program, REXX functions, and variables to enable REXX execs to interface with IMS through OM.

OM in an IMSplex



SPOC or AOP can specify routing for any command

OM routes command to one or more IMSs

Each IMS responds to OM

OM consolidates responses for SPOC

Additional OM address spaces are optional.

Resource Manager (RM)

Resource Manager

- *Provides infrastructure* for managing global resources and IMSplex-wide processes (e.g. coordinated global onine change)

- *Maintains global resource information* for clients using a Resource Structure in the Coupling Facility
  - IMSplex global and local member information
  - Resource names and types
  - Terminal and user status
  - Global process status

- If resource structure not defined
  - Global resource management not enabled

RM configuration

- One or more RM address spaces required per IMSplex

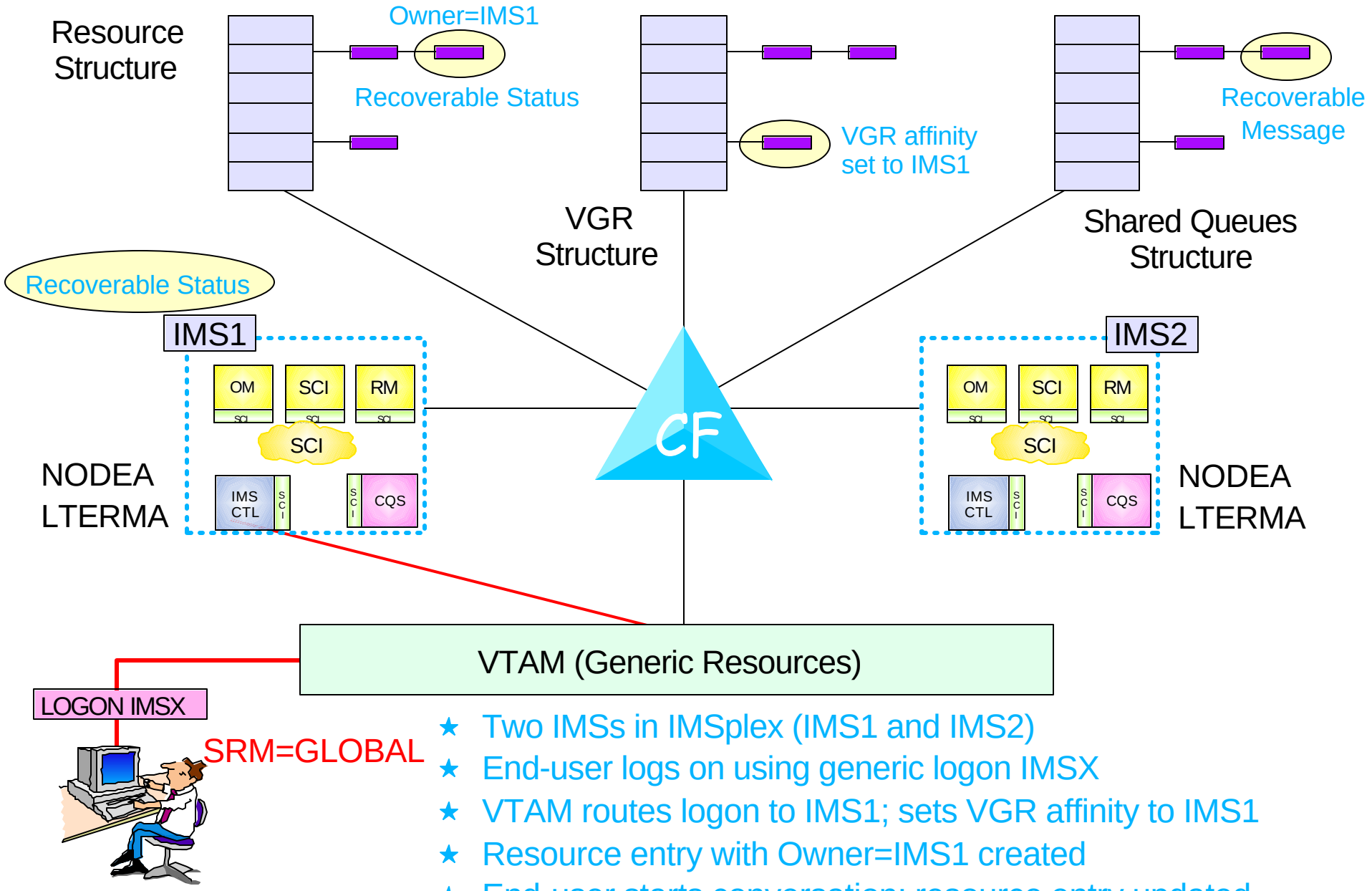
Sysplex Terminal Management (STM)

IMS uses RM to provide STM functions

- Enforce global *resource type consistency*
  - Prevent naming inconsistencies between IMSs
  - Example: can't define same name for LTERM and TRANSACT
- Enforce global *resource name uniqueness*
  - Prevent same resource from being active on multiple IMSs
  - Example: prevent multiple logon / signon within the IMSplex
- Enable *terminal and user resource status recovery* across IMSplex
  - Resume significant status on another IMS after failure
  - Example: continue conversation on another IMS

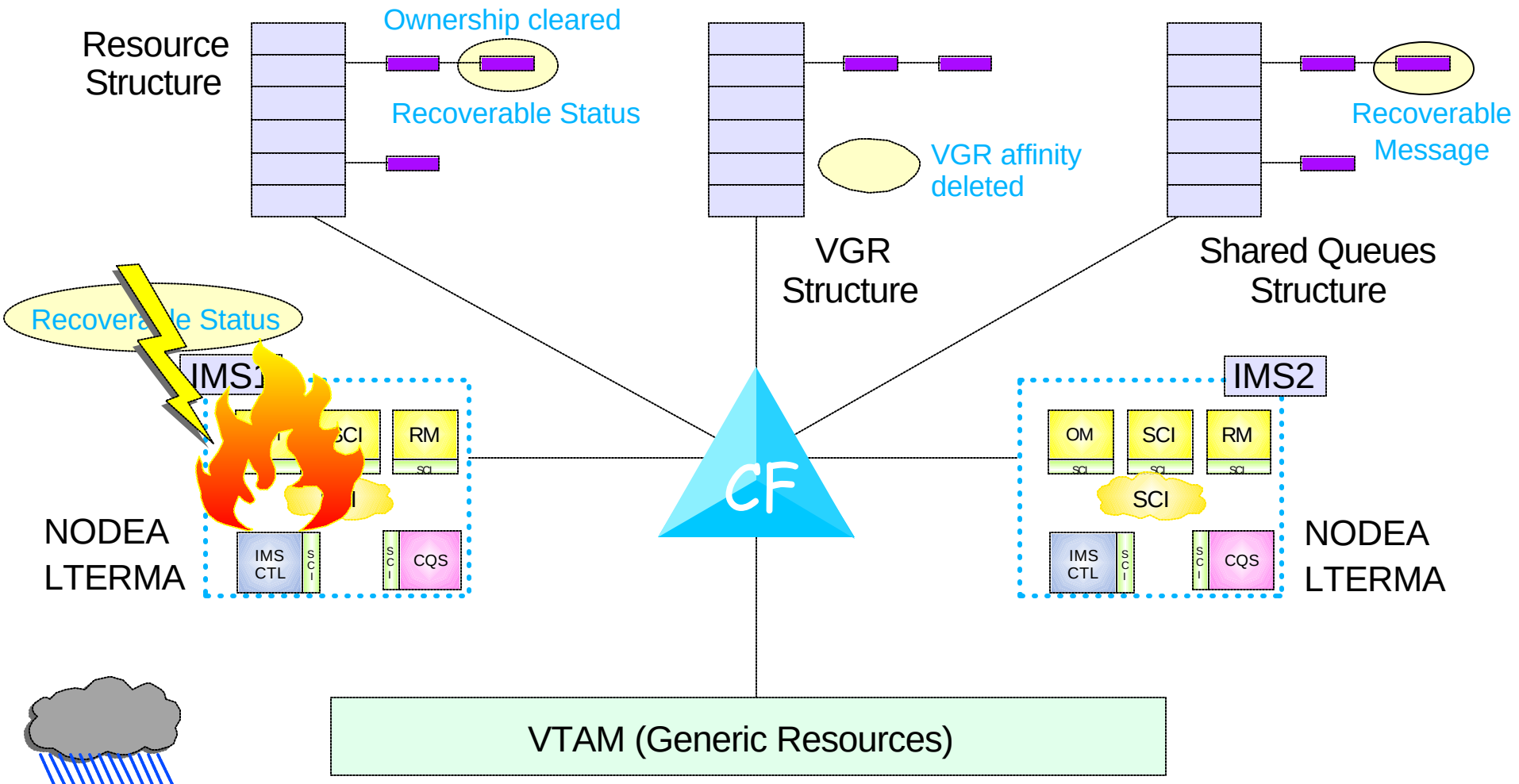
STM requires shared queues

Status Recovery - SRM=GLOBAL



- ★ Two IMSs in IMSplex (IMS1 and IMS2)
- ★ End-user logs on using generic logon IMSX
- ★ VTAM routes logon to IMS1; sets VGR affinity to IMS1
- ★ Resource entry with Owner=IMS1 created
- ★ End-user starts conversation; resource entry updated

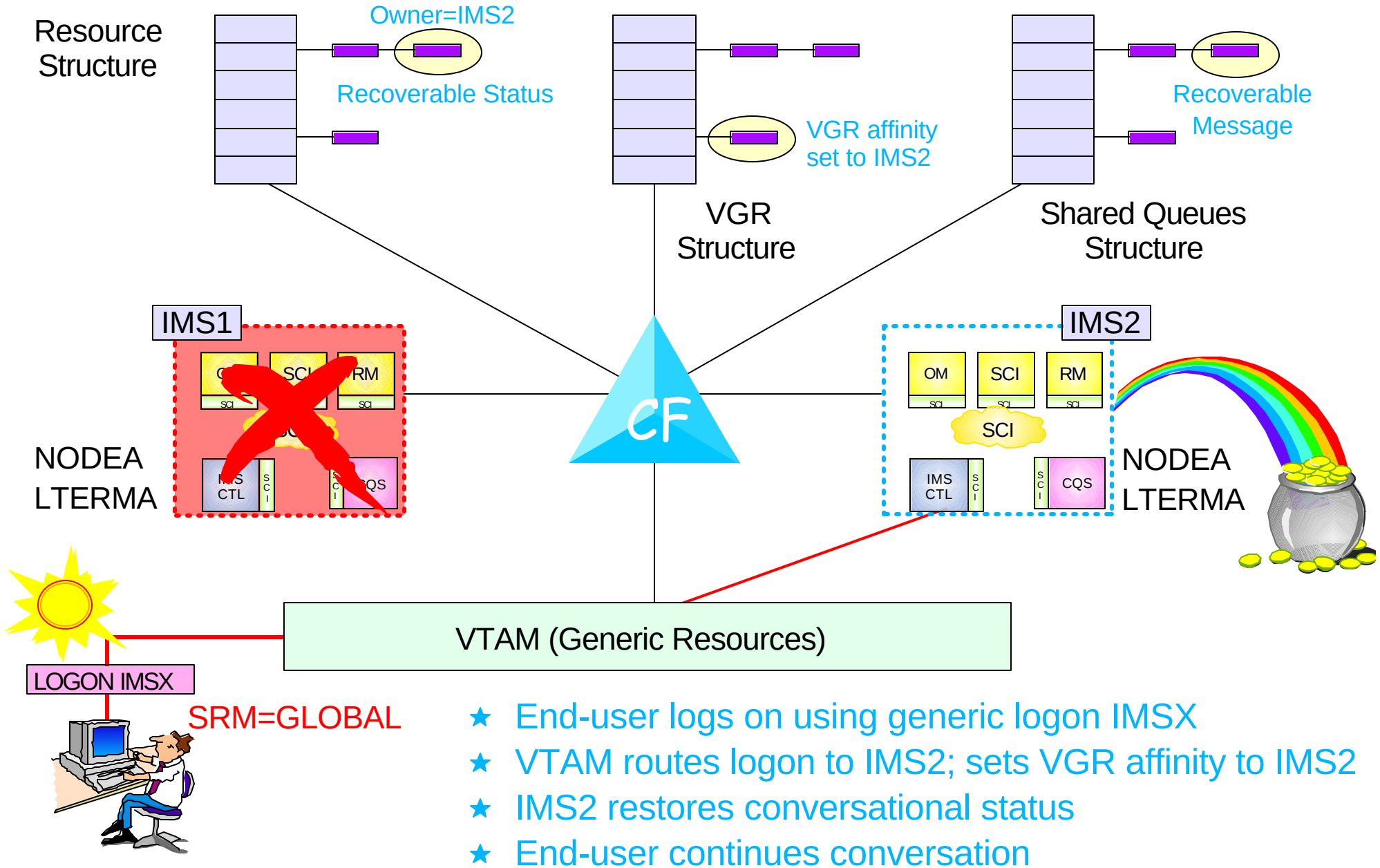
Status Recovery - SRM=GLOBAL ...



SRM=GLOBAL

- ★ IMS1 fails; IMS2 queries structure for IMS1 entries
- ★ IMS2 does not delete resource entry (user in conversation)
- ★ IMS2 clears ownership (SRM=GLOBAL)
- ★ VTAM deletes VGR affinity

Status Recovery - SRM=GLOBAL ...



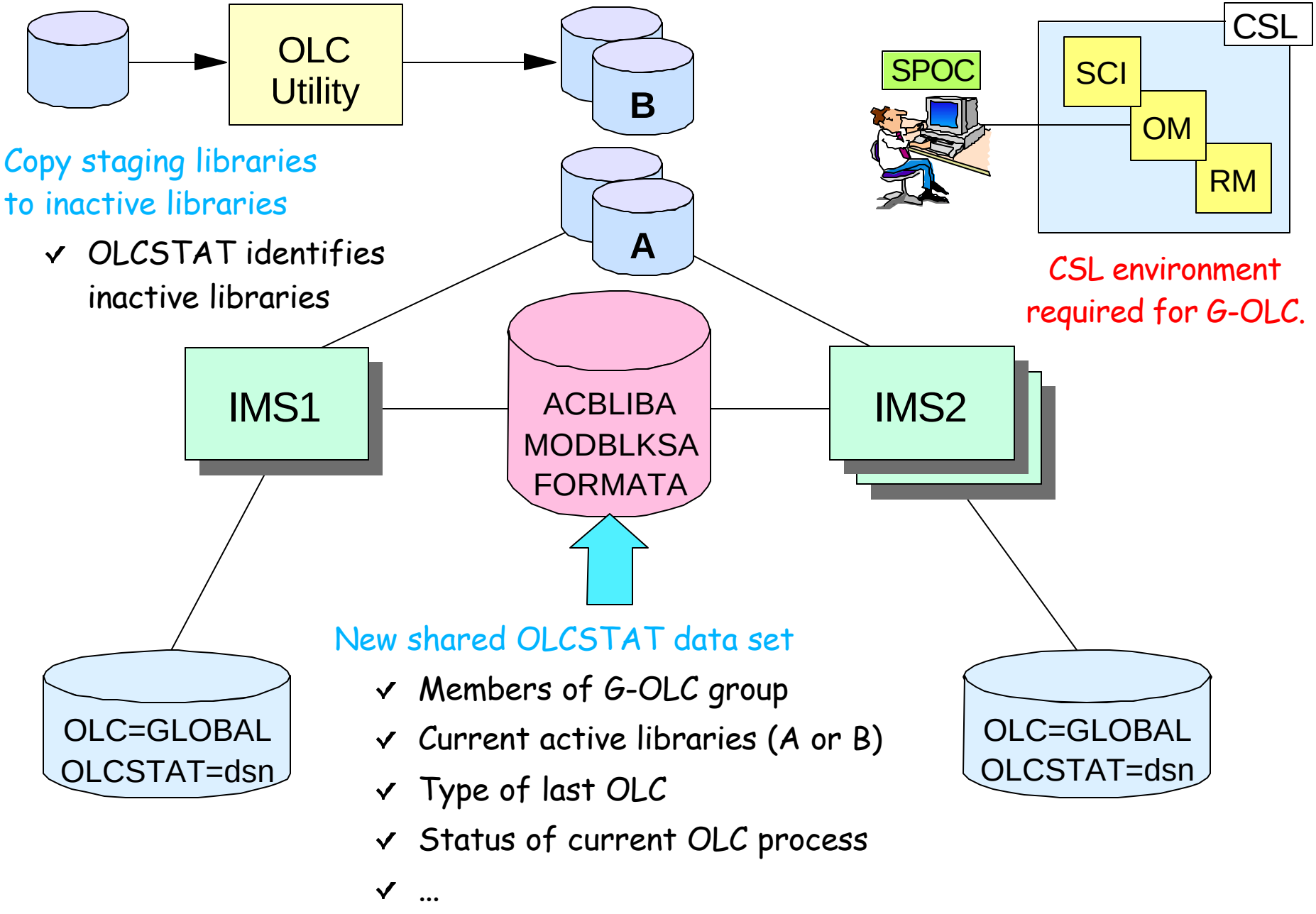
- ★ End-user logs on using generic logon IMSX
- ★ VTAM routes logon to IMS2; sets VGR affinity to IMS2
- ★ IMS2 restores conversational status
- ★ End-user continues conversation

Global Online Change

IMS uses OM and RM to coordinate the online change process across multiple IMSs in the IMSplex

- Optional
  - OLC=GLOBAL in DFSCGxxx
- New OLCSTAT data set
  - Replaces MODSTAT data set
  - Contains OLC status for all IMSs
- OLC commands (new with V8 and CSL)
  - **INIT OLC** commands entered through Operations Manager
  - Master IMS uses Resource Manager to coordinate all phases of G-OLC
    - OMS decides which IMS is Master
- Everybody succeeds or everybody backs out

G-OLC: Before OLC Begins



Copy staging libraries to inactive libraries

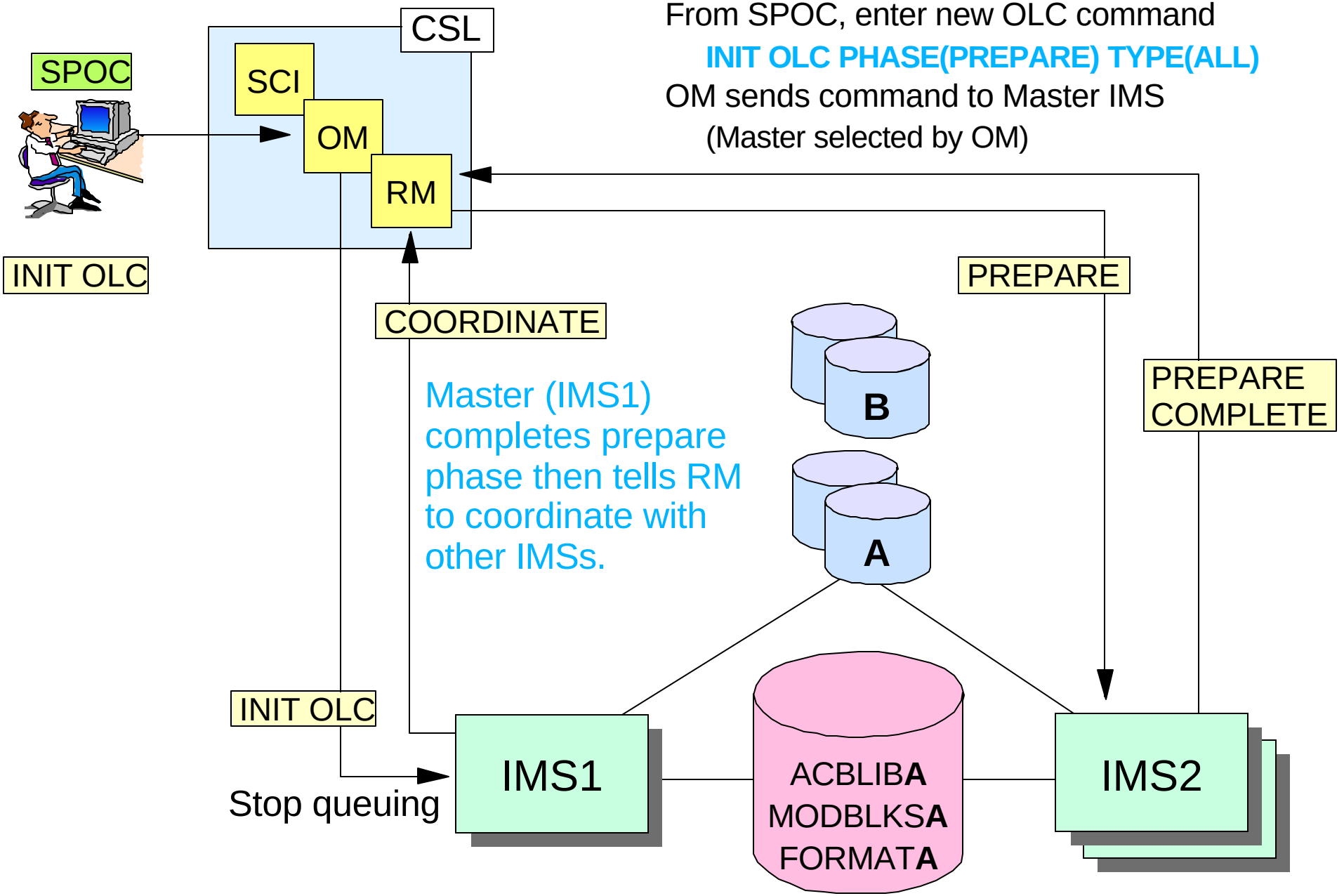
- ✓ OLCSTAT identifies inactive libraries

CSL environment required for G-OLC.

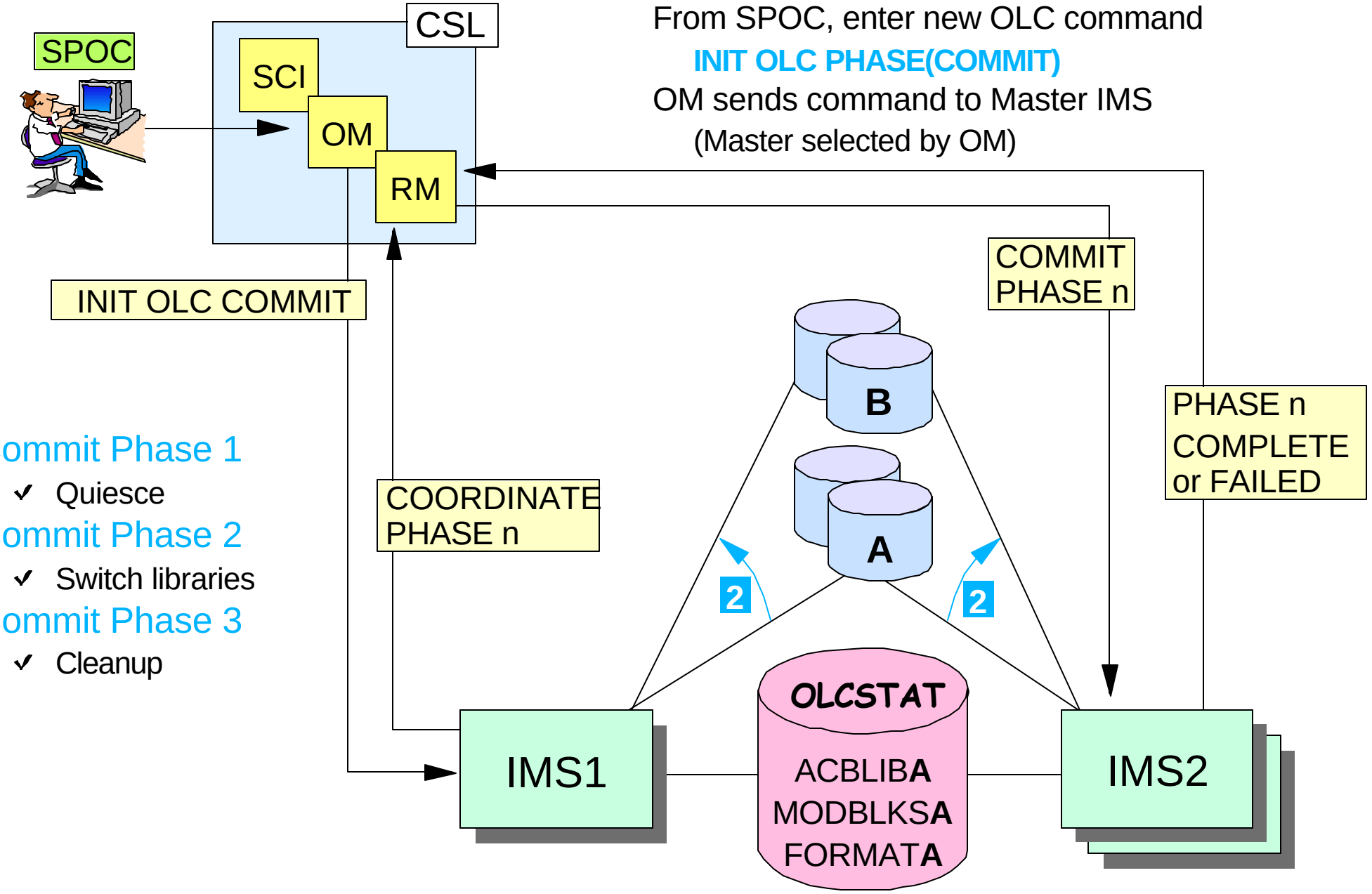
New shared OLCSTAT data set

- ✓ Members of G-OLC group
- ✓ Current active libraries (A or B)
- ✓ Type of last OLC
- ✓ Status of current OLC process
- ✓ ...

G-OLC: Prepare Phase



G-OLC: Commit Phase n



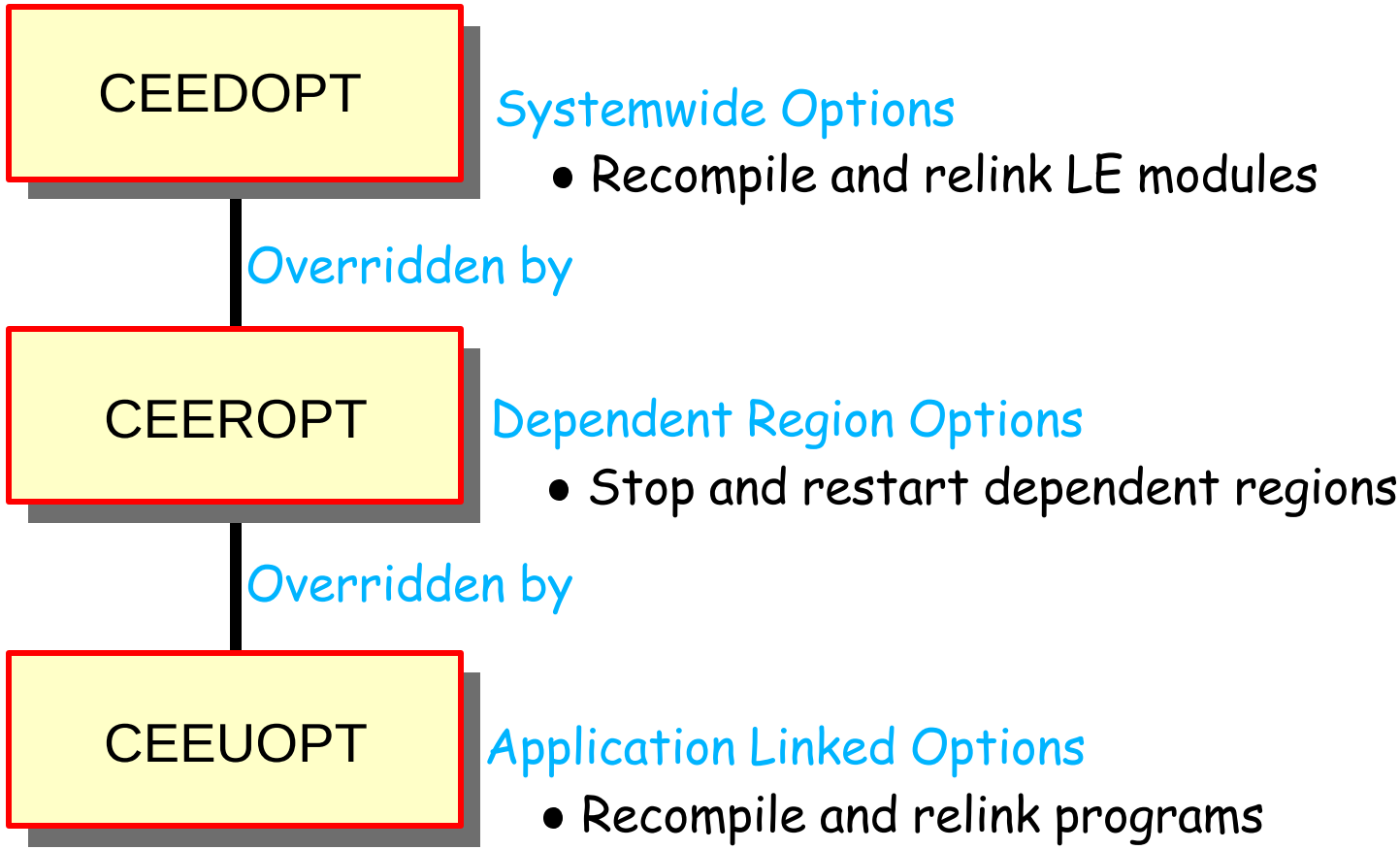
Commit Phase 1
- ✓ Quiesce

Commit Phase 2
- ✓ Switch libraries

Commit Phase 3
- ✓ Cleanup

LE RunTime Options

LE runtime options for IMS programs are set at the system, dependent region, or application program level



LE Dynamic Run-Time Options

Three new IMSplex commands

- UPDATE LE and DELETE LE
  - Commands used to enter/delete the run-time option *overrides* for a transaction, logical terminal (LTERM), userid, and/or program

```
UPD LE TRAN(TRXN1) SET(LERUNOPTS(TERMTHDACT))
```

- QUERY LE
  - Command used to show the run-time option *overrides* for a transaction, logical terminal, userid, and/or program

New version of CEEBXITA

- Delivered with IMS as DFSBXITA
  - Retrieves and causes LE to use the run-time option *overrides* supplied by the UPDATE LE and DELETE LE commands

Automatic RECON Loss Notification

When a RECON fails

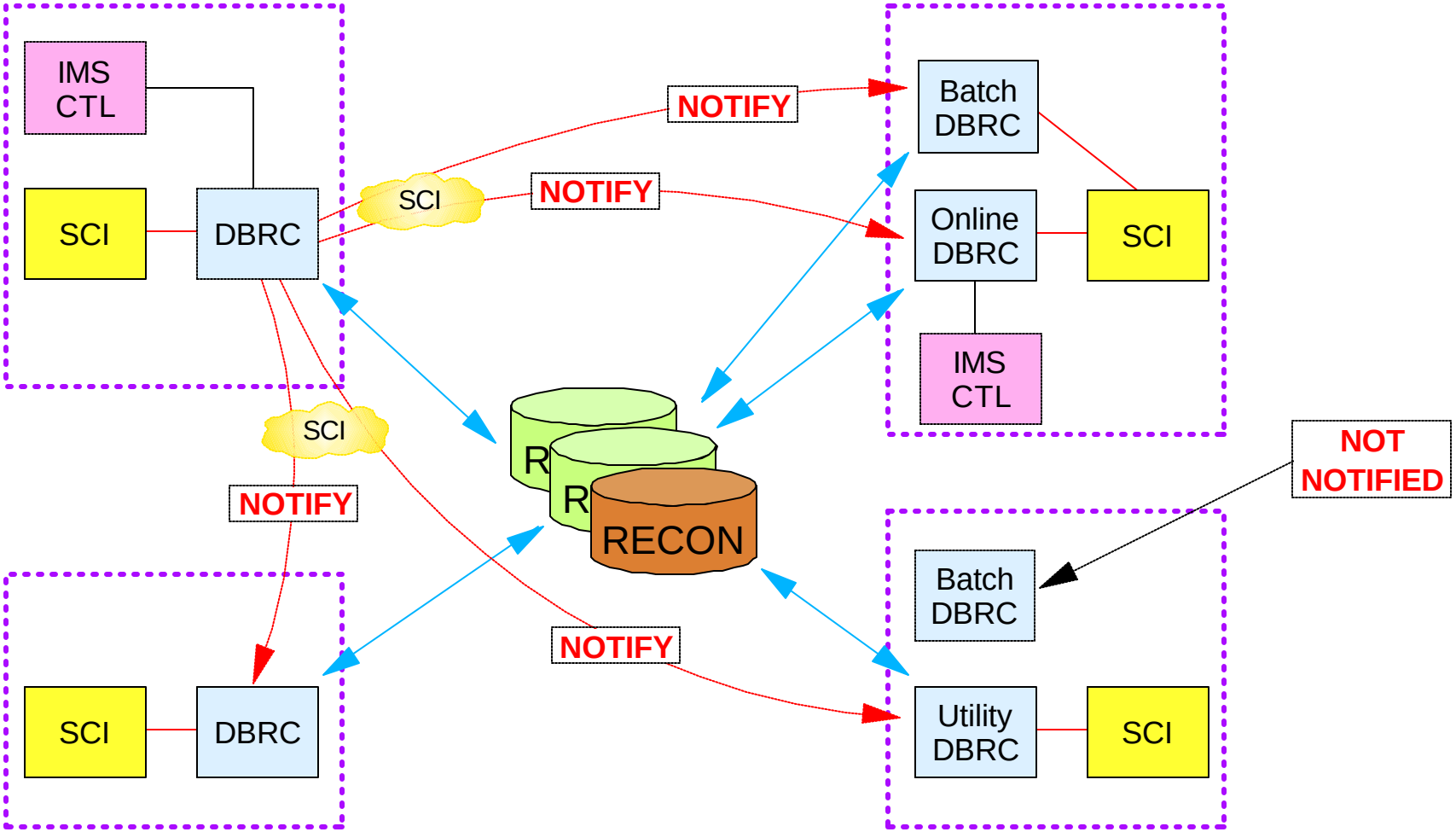
- First DBRC to recognize failure copies good RECON to SPARE
- Other DBRCs (e.g., batch or utility running with DBRC) switch the next time they access RECONs
  - *Cannot delete and redefine new SPARE until all DBRCs deallocate bad RECON*
    - May be a long time
  - Prior to V8, no way to force DBRC to access RECONs (except for online DBRC)

Version 8

- When DBRC registers with Structured Call Interface
  - DBRC reconfiguring RECONs notify all other registered DBRCs as soon as reconfiguration complete
  - All DBRCs switch to good RECON and deallocate bad RECON
  - Lets user re-establish SPARE quickly
- Structured Call Interface is part of Common Service Layer
  - Discussed later

ARLN - IMSplex Configuration

DBRC detecting error notifies other DBRCs using SCI communications services



Some Key Dates

Product	Date	Announcement Letters
IMS V8 (5655-C56)	October 16, 2001 October 25, 2002	**201-296** IMS V8 announced ***202-229 IMS V8 GA***
IMS V7 (5655-B01)	October 27, 2000	200-290 IMS V7 GA ***No announced withdrawal from marketing*** ***No announced withdrawal from service***
IMS V6 (5655-158)	December 26, 1997 September 4, 2002 ***September 30, 2003***	297-443 IMS V6 GA 902-118 IMS V6 withdrawn from marketing **902-160** ***IMS V6 withdrawn from service***
IMS V5 (5695-176)	December 5, 2000 ***September 30, 2001***	900-222 IMS V5 withdrawn from marketing **900-220** ***IMS V5 withdrawn from service***

IMS V8

Availability

Usability

Capacity

Function

Connectivity

Management