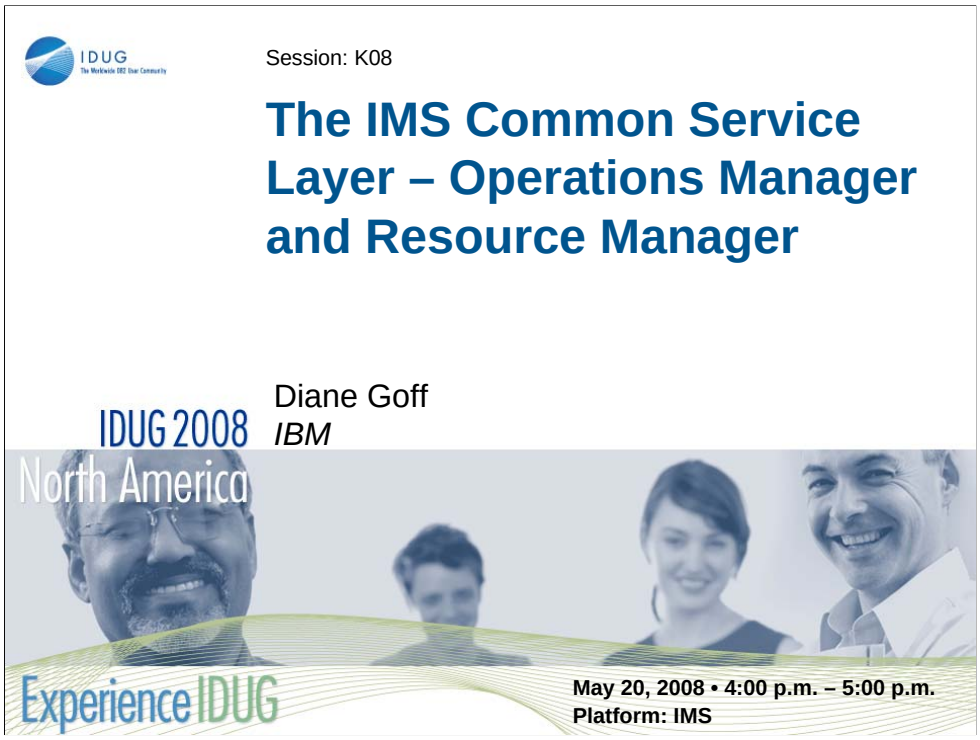
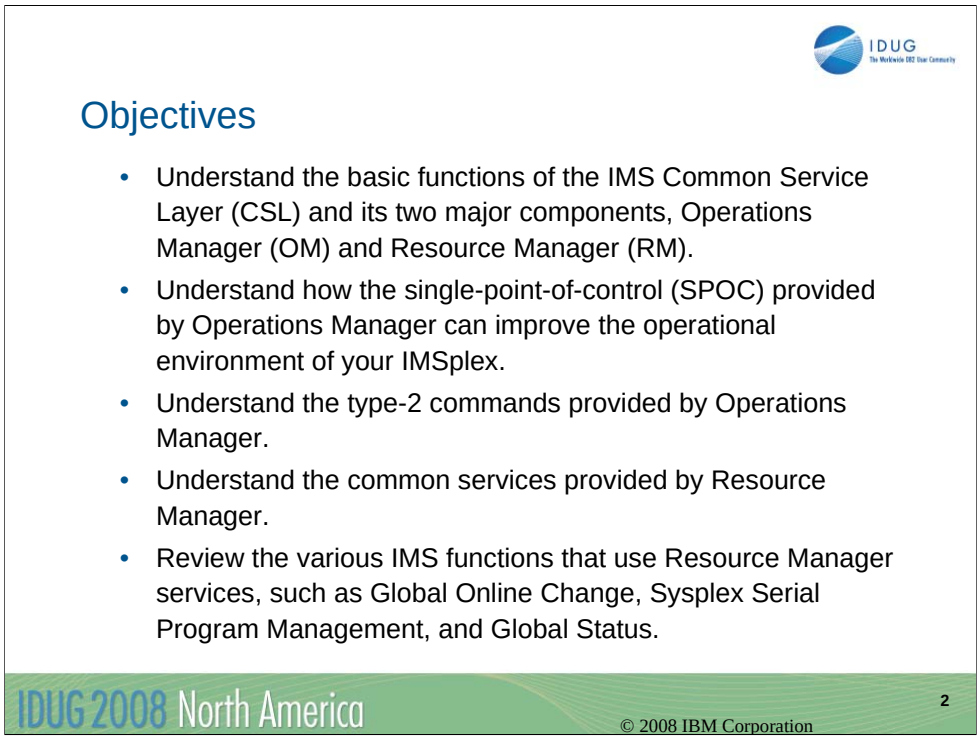
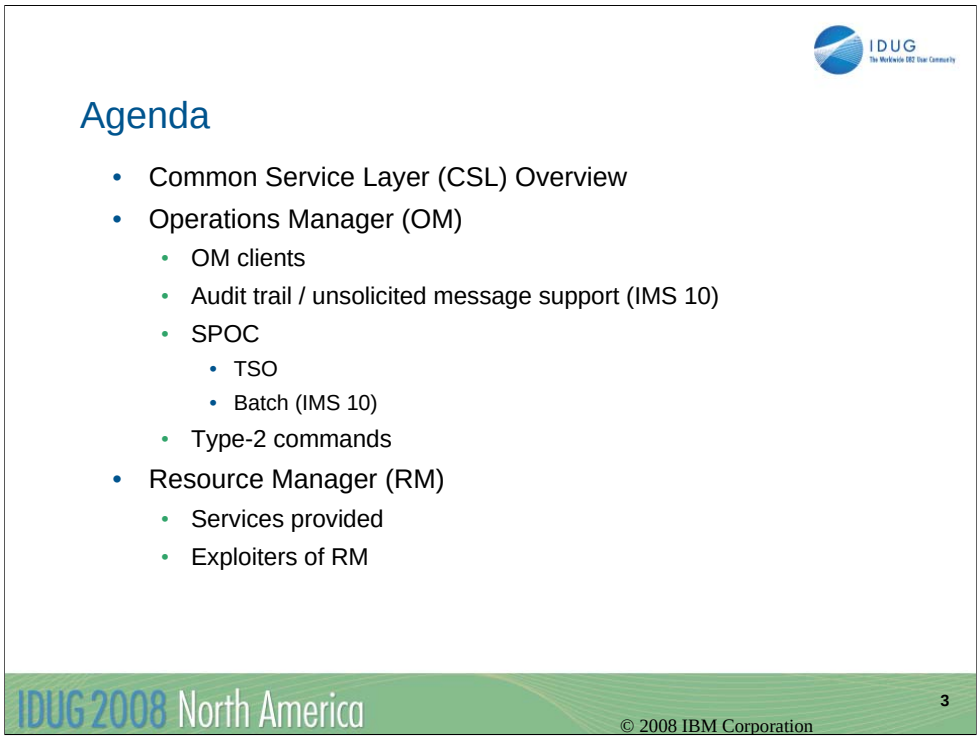


The IMS Common Service Layer (CSL) provides improved systems management, ease of operations, and sharing of resources for IMS systems. This session will discuss the two major components of CSL, Operations Manager (OM) and Resource Manager (RM), their functions and features, and how they can improve the manageability aspects of your IMS environments.



Listed above are the objectives of this session.



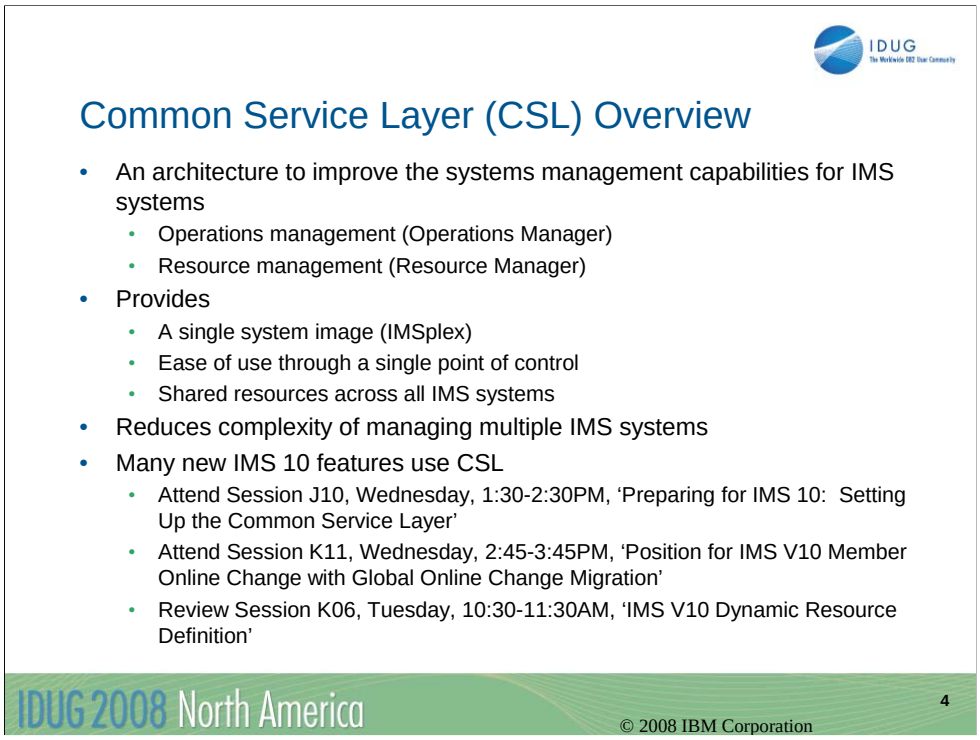
This presentation will cover the IMS Common Service Layer. This is the architecture that focuses on improving operations management and resource management for your IMS systems.

First I'll discuss an overview of the CSL, its functions and features.

Then I'll cover the two major CSL components, Operations Manager (OM) which focuses on improving operations management and Resource Manager (RM) which focuses on resource management.

For Operations Manager I'll cover the major functions of OM and then go into more detail on some of its features such as client support, the OM Audit Trail that became available with IMS 10, the SPOC for command input, and the new commands available with OM.

For Resource Manager I'll cover the major functions of RM, then discuss the services it provides, and review these RM facilities.

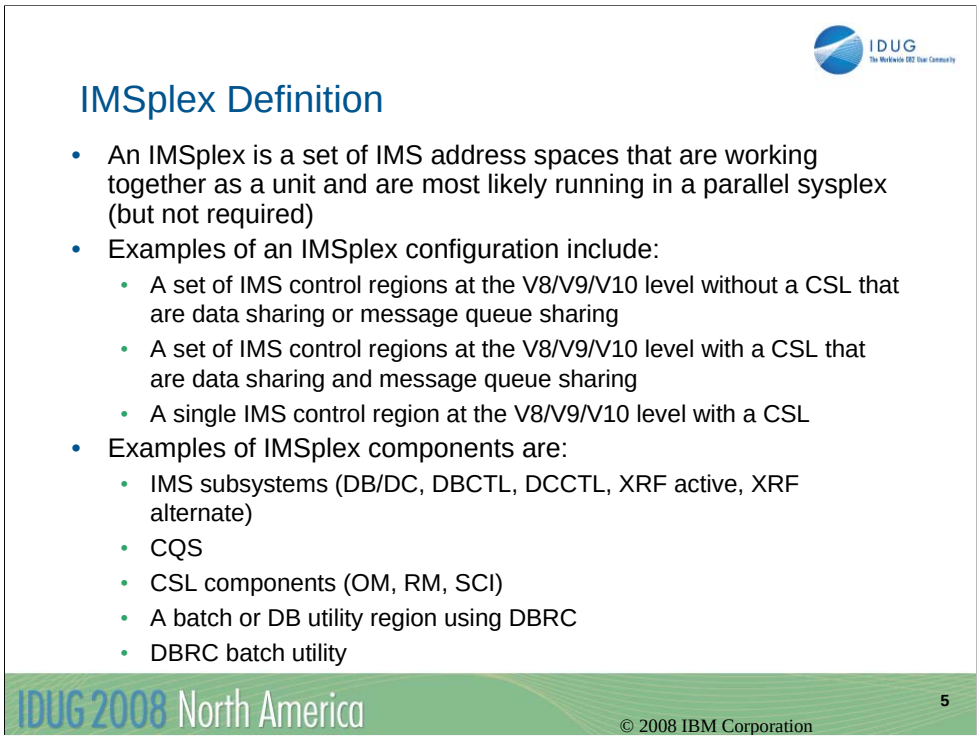


CSL is an architecture focused on improving IMS systems management. It was first available in IMS V8, was enhanced some in IMS V9, and now with IMS V10 there are many new enhancements/exploiters.

The two major focus areas are operations management via the Operations Manager (OM) component and resource management via the Resource Manager (RM) component.

CSL provides a single system image, particularly for an IMSplex, but also can be used with single IMS systems. It supports IMS TM configurations and DBCTL configurations.

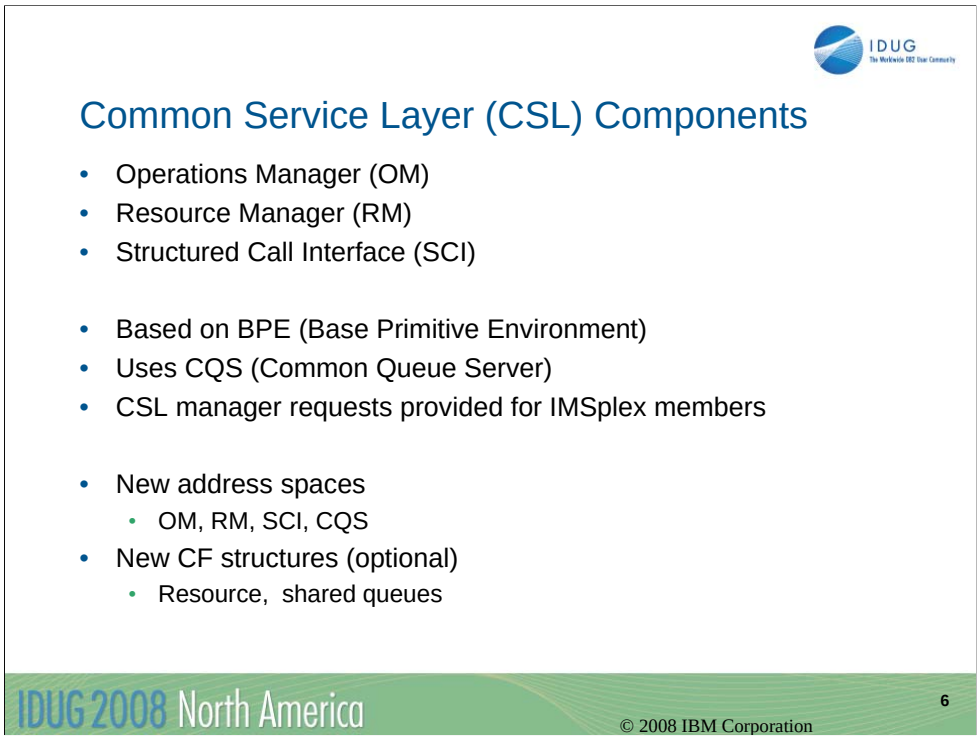
The goal of CSL is to reduce the complexity of managing multiple IMS systems.



An IMSplex is a set of IMS address spaces that are working together as a unit.

Examples of an IMSplex :

- without a CSL
- with a CSL
- single IMS with CSL



There are three components of CSL:

(1) Operations Manager (OM) for operational ease

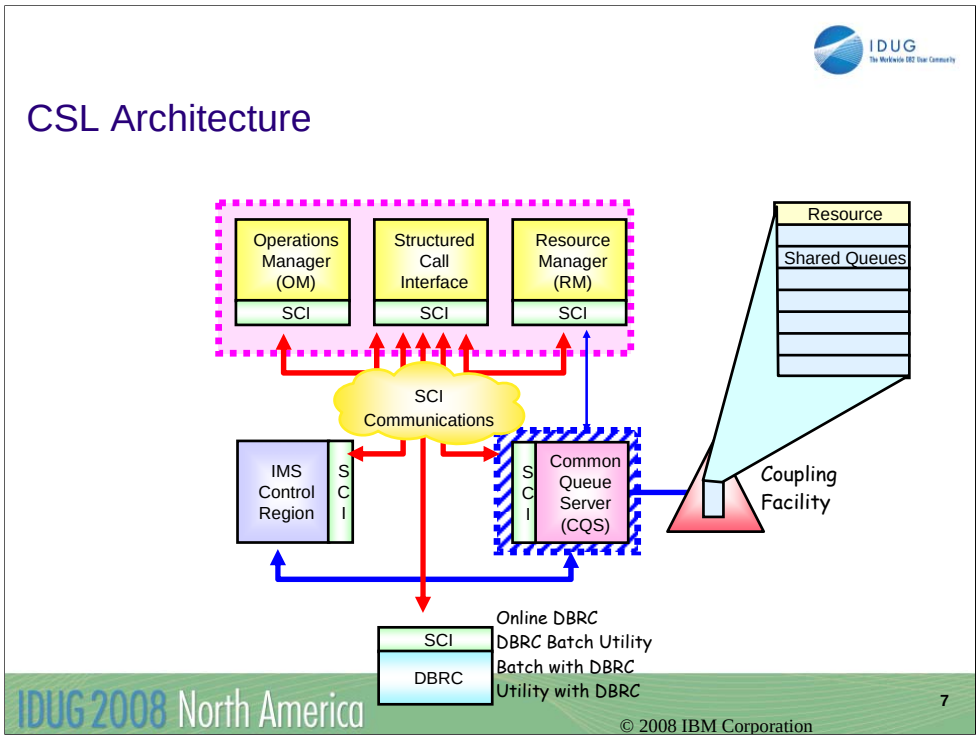
(2) Resource Manager (RM) for sharing resources and coordinating IMSplex-wide processes

(3) Structured Call Interface (SCI) for coordination and communications within the CSL among its participants

All CSL components use BPE services (available since IMS V6).

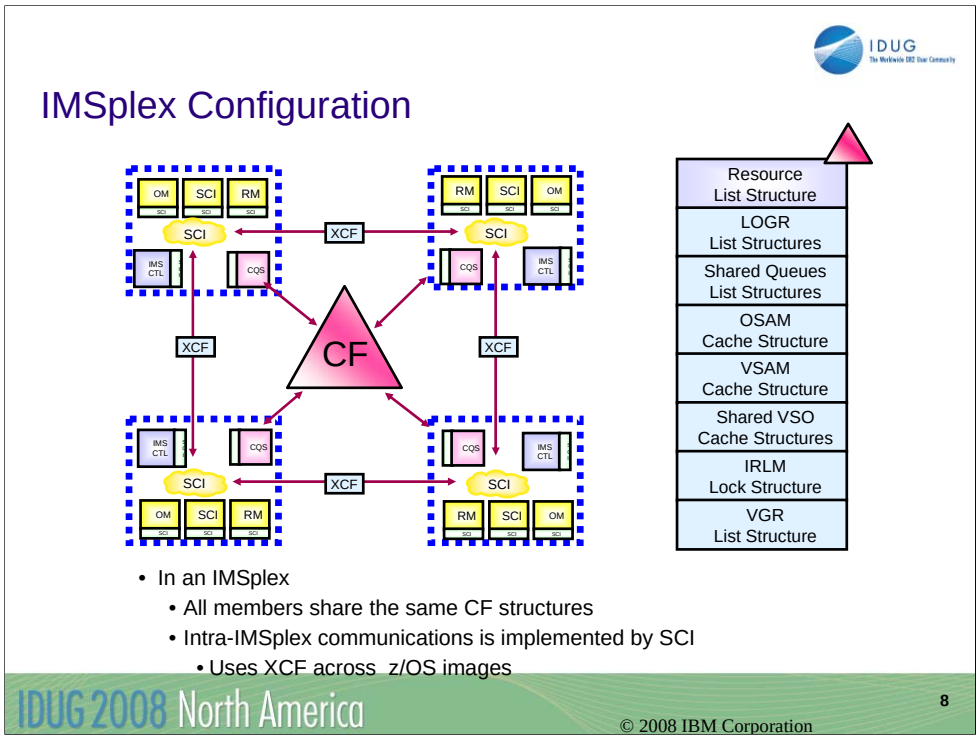
CQS can be used for RM functions (optional).

With CSL there are several new address spaces and an optional new coupling facility structure.

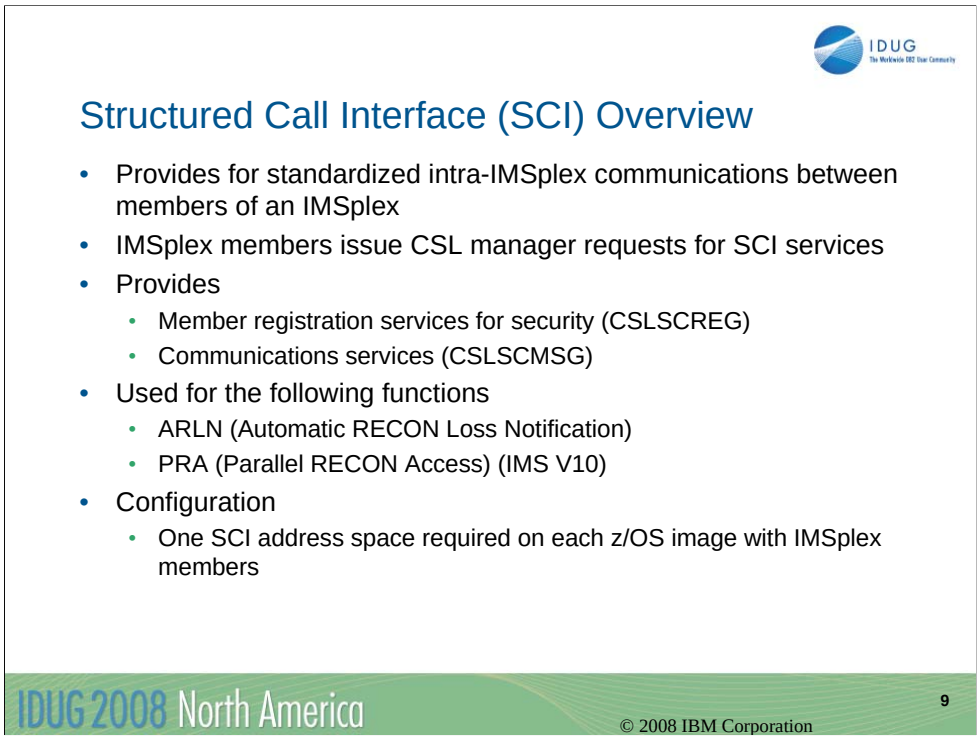


This is a diagram of a Common Service Layer environment, showing the new CSL address spaces (OM, SCI, RM, CQS) along with an IMS control region and a DBRC instance as part of single system IMSplex.

This CSL diagram also shows the addition of the optional coupling facility (CF) structures used by Resource Manager (RM). These optional structures are the resource structure and the shared queues structure.



For an IMSplex we have multiples of the previous configuration, all communicating through SCI and optionally sharing CF resources.



I want to spend just a few minutes on Structured Call Interface (SCI). It doesn't have as many external functions as OM or RM but it is very important in an IMSplex.

The major function of SCI is to provide communications among IMSplex members.

It provides two services:

•member registration services for security

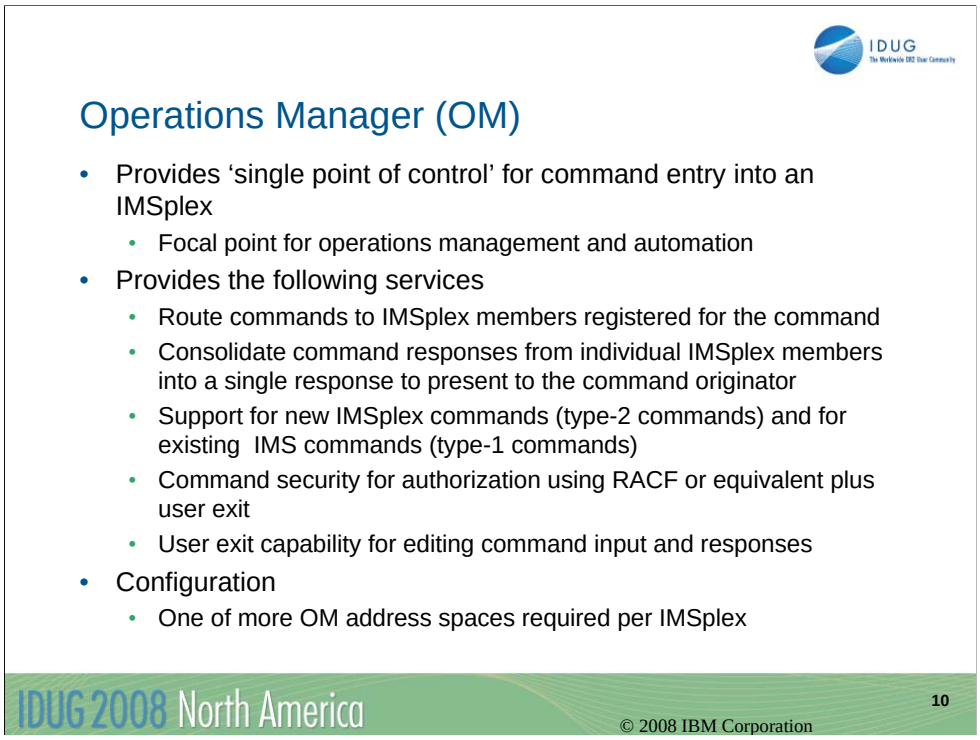
•communications services between members using z/OS XCF

Additional functions that use SCI:

• ARLN – capability that all members of the IMSplex sharing the same RECON are automatically notified of any configuration change (IMS V8)

• PRA - new IMS V10 function for improved RECON sharing

SCI is an important CSL function, therefore we require an SCI address space on each z/OS image where CSL is active.

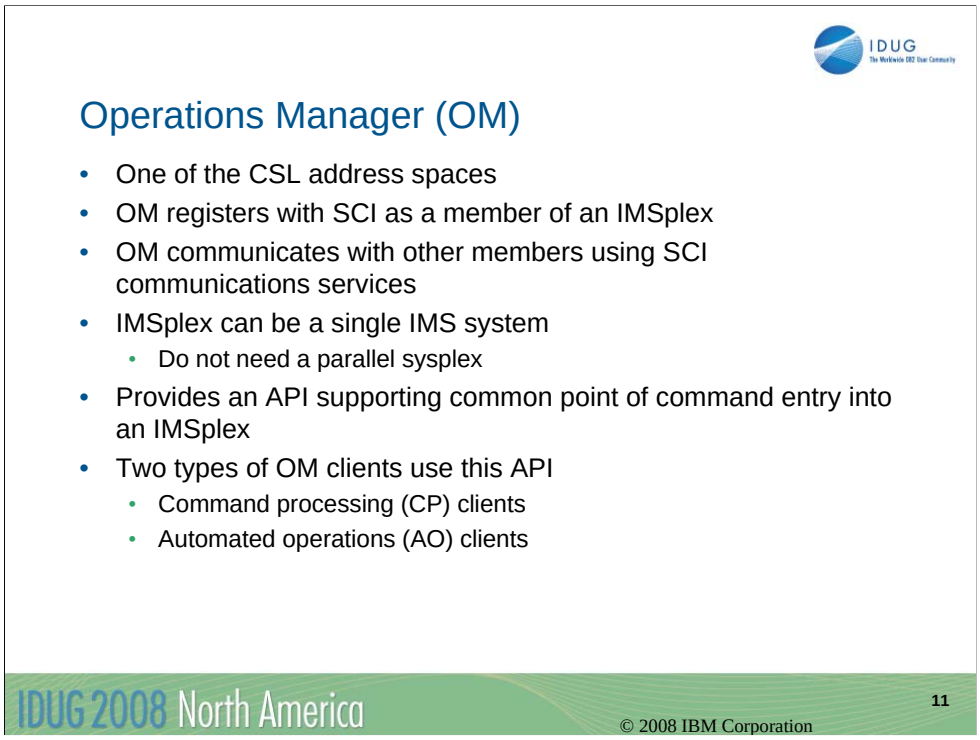


Operations Manager (OM) is the CSL component that focuses on operations management and automation.

It provides the 'single point of control' or SPOC for command entry.

OM provides several services listed above.

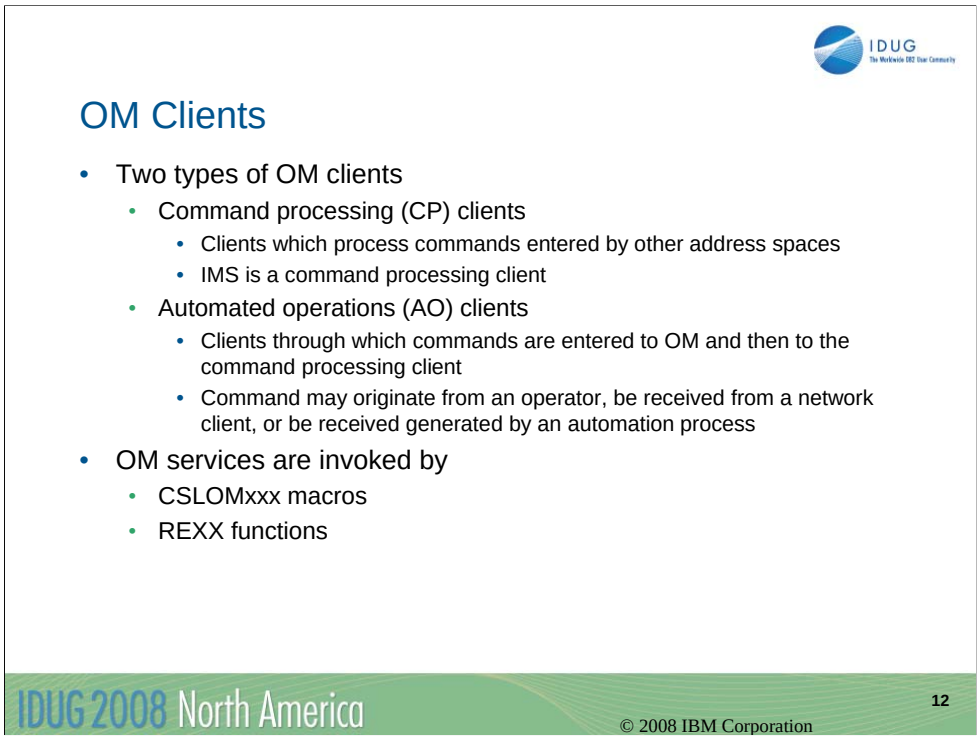
One of more OM address spaces are required for an IMSplex (two recommended for backup purposes).



OM has its own address space and uses SCI for communications to other members of the IMSplex, whether multiple IMS systems are in the IMSplex or only a single IMS is in the IMSplex.

OM provides an API that can be used as an entry point into OM.

OM supports two type of clients, command processing clients (CP) and automated operations clients (AO).



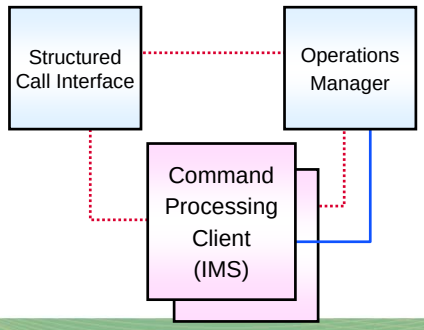
Command processing (CP) clients process commands entered by other address spaces. IMS is the most common command processing client.

Automated operations (AO) clients are clients that receive commands and pass them on to a command processing client.

An example of an AO client is the TSO SPOC provided with IMS.

Command Processing (CP) Client

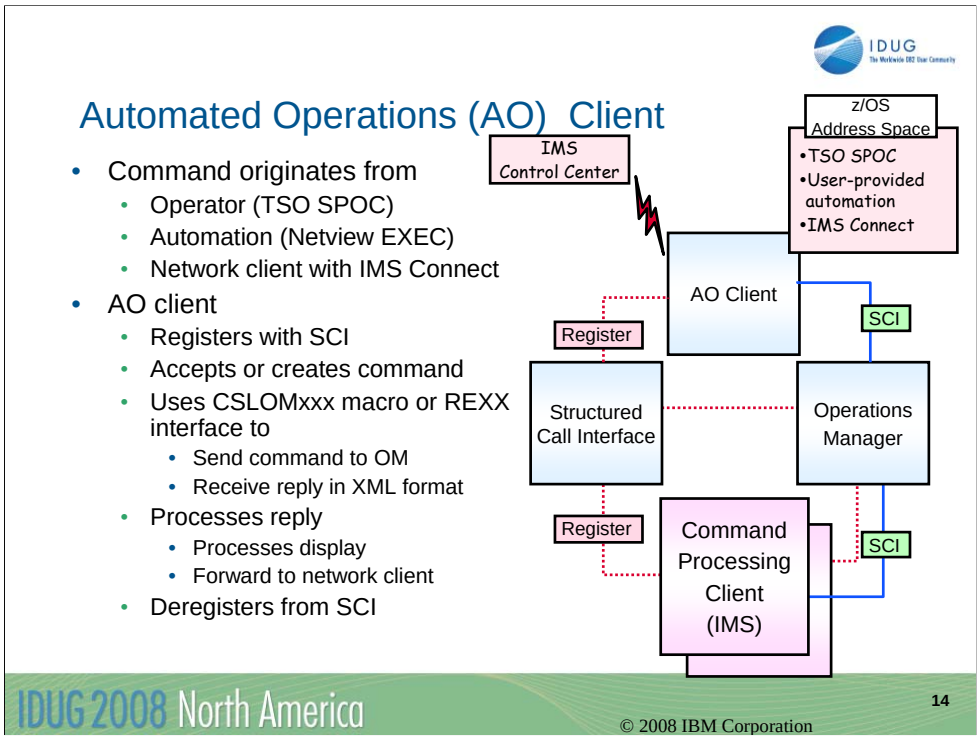
- OM client that processes commands
  - IMS and RM are CP clients of OM
- CP client
  - Registers with SCI
    - Must be on same z/OS image
  - Registers with OM
    - Identifies commands that it can process
    - Any OM in IMSplex
  - Processes commands received from OM
  - Sends command responses back to OM
  - Deregisters from OM
  - Deregisters from SCI



This chart describes the steps used by a command processing client such as IMS.

The CP client registers with SCI for communications,. It then registers with OM, specifying the commands that it can process.

When a CP client receives a command from OM, it processes that command and sends responses back to OM.



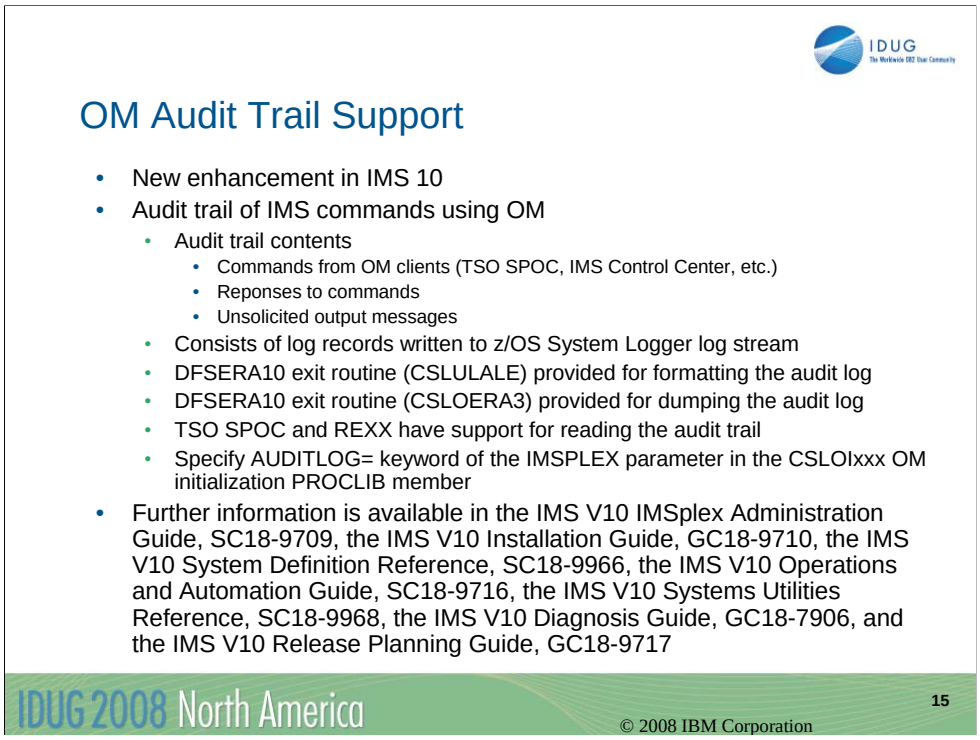
Examples of AO Clients are the TSO SPOC, the IMS Control Center which uses IMS Connect, and user/vendor-written programs for automation.

This chart describes the steps used by a automated operations client.

The AO client registers with SCI for communications,. It then accepts a command from either an operator, a network client such as IMS Connect, or an automation program.

The AO client that sends the command to OM (using CSLOMxxx macros or the REXX interface). OM will process that command by sending it to a CP client. When the CP client sends the results back to OM, OM then formats and sends the results in XML format back to the AO client.

The AO client then formats the responses for display.



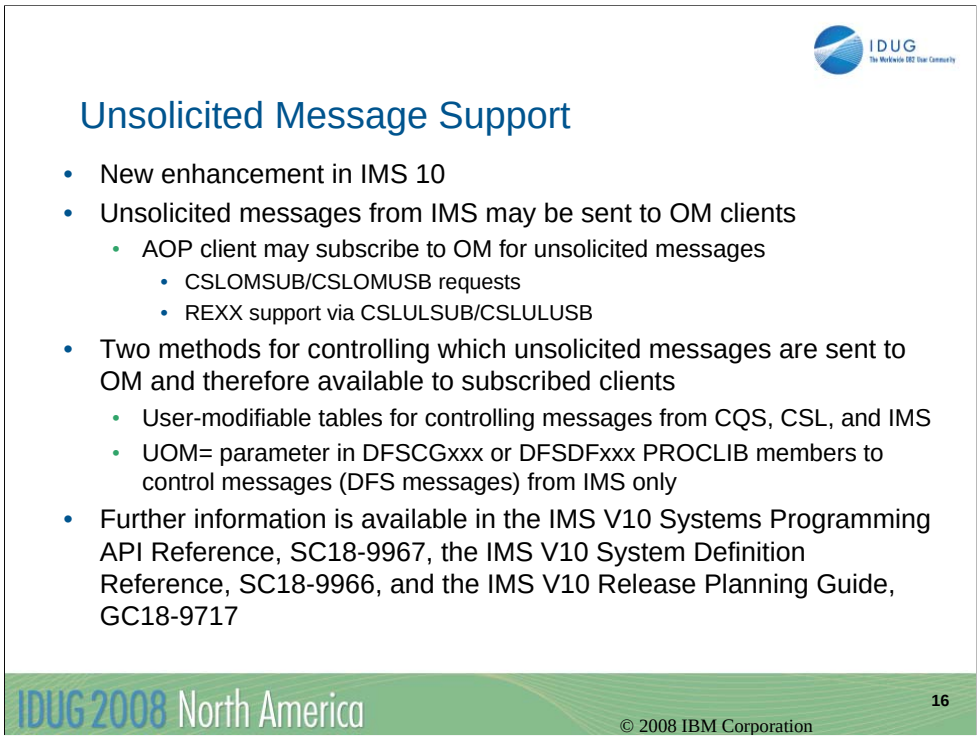
The addition of support for an OM Audit Trail in IMS V10 enhances the auditability of commands that are processed in the OM environment. In concept the audit trail for OM is like the secondary master for the IMS master terminal.

The OM audit trail contains all command input, command responses, and unsolicited output messages for messages that are processed by OM.

OM uses a z/OS System Logger log stream to contain this message data. This log stream can either reside in a coupling facility (CF) or can be a DASD-only log stream.

The log stream can be printed in two formats, formatted or dump, and can be viewed via the TSO SPOC or the REXX API.

The log stream name is specified in the AUDITLOG= keyword of the IMSPLEX parameter in the CSLOIxxx OM initialization PROCLIB member.



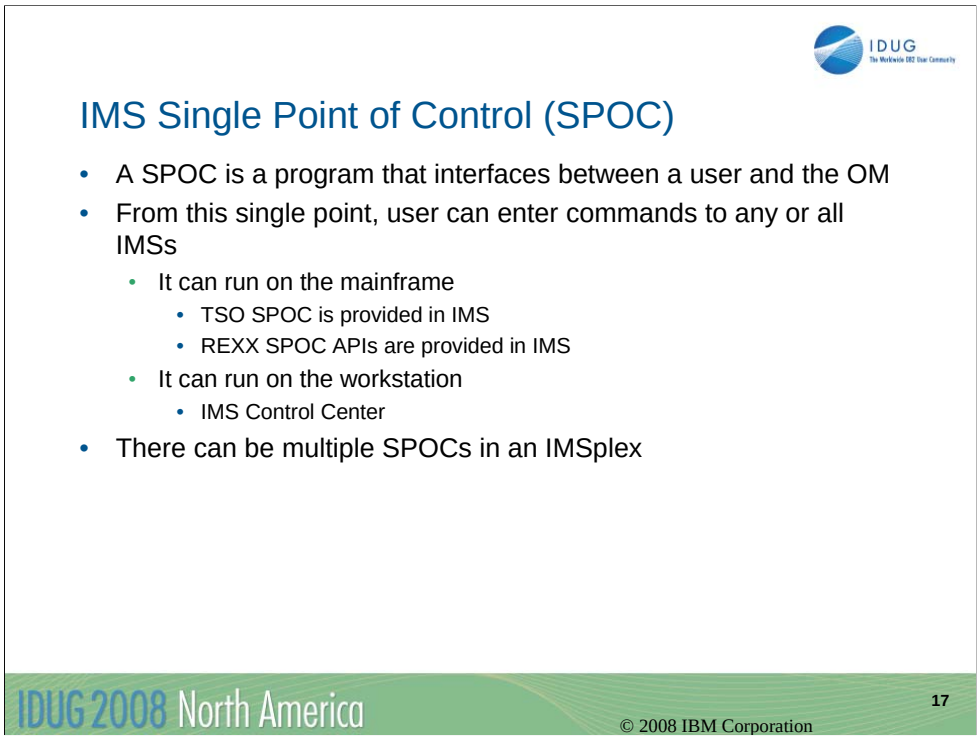
There are two enhancements for unsolicited message support in IMS V10.

1) An AOP client can now 'subscribe' to OM so that it will receive unsolicited output messages. Previously unsolicited output was not available.

2) There are two ways to control which unsolicited output messages are sent to OM:

•via user-modifiable tables to indicate which messages should not be included for CQS, CSL, and IMS

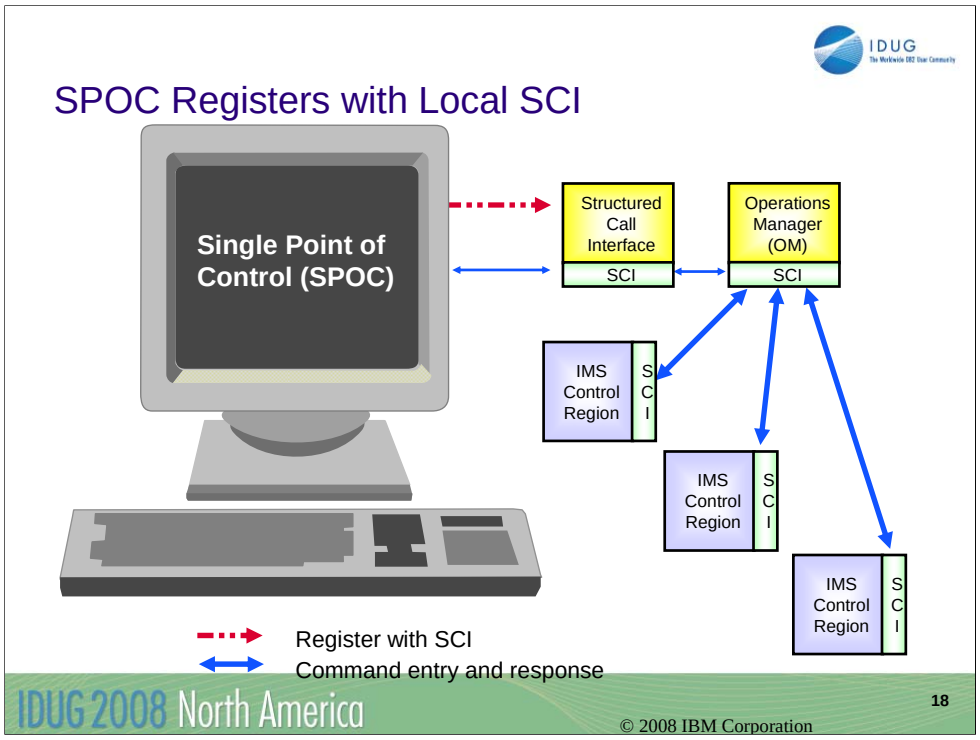
•for IMS messages, the UOM= parameter can be used to control unsolicited output messages from IMS only



An IMS SPOC is actually a program that interfaces between a user and OM so that the user can enter commands.

It can run on z/OS – TSO SPOC or REXX SPOC API. These two are provided as part of the IMS product.

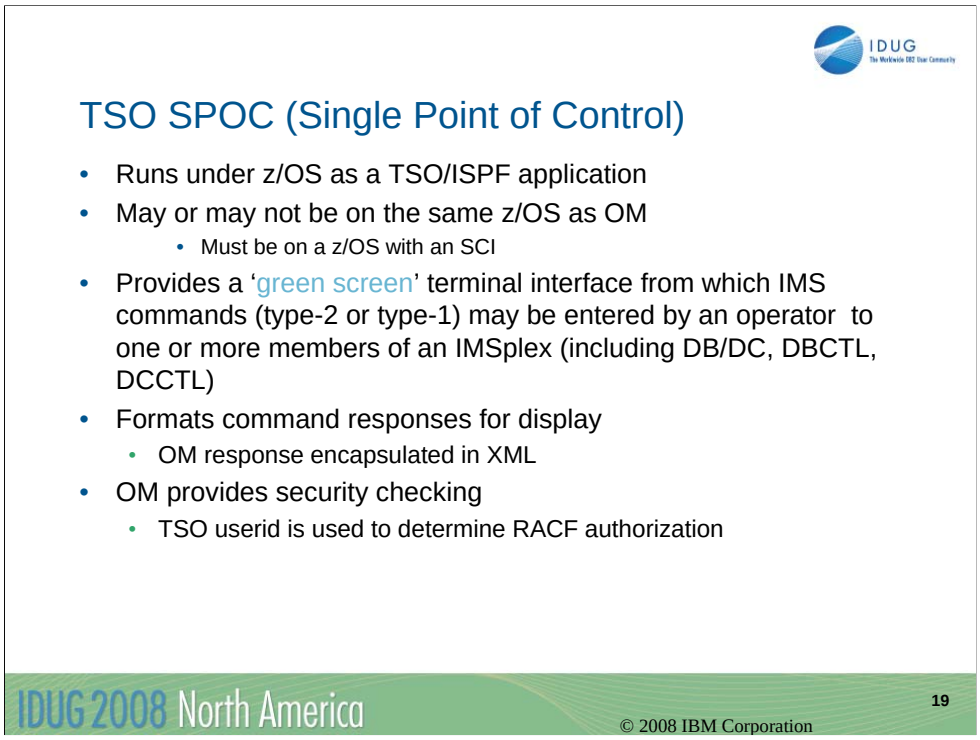
It can run on a workstation – the IMS Control Center , which is part of the DB2 UDB Administrative Client and uses IMS Connect for connectivity.



The SPOC uses the CSL component SCI (Structured Call Interface) to

- route commands to IMSplex members from a single console

- consolidate command responses from multiple IMSplex members into a single response



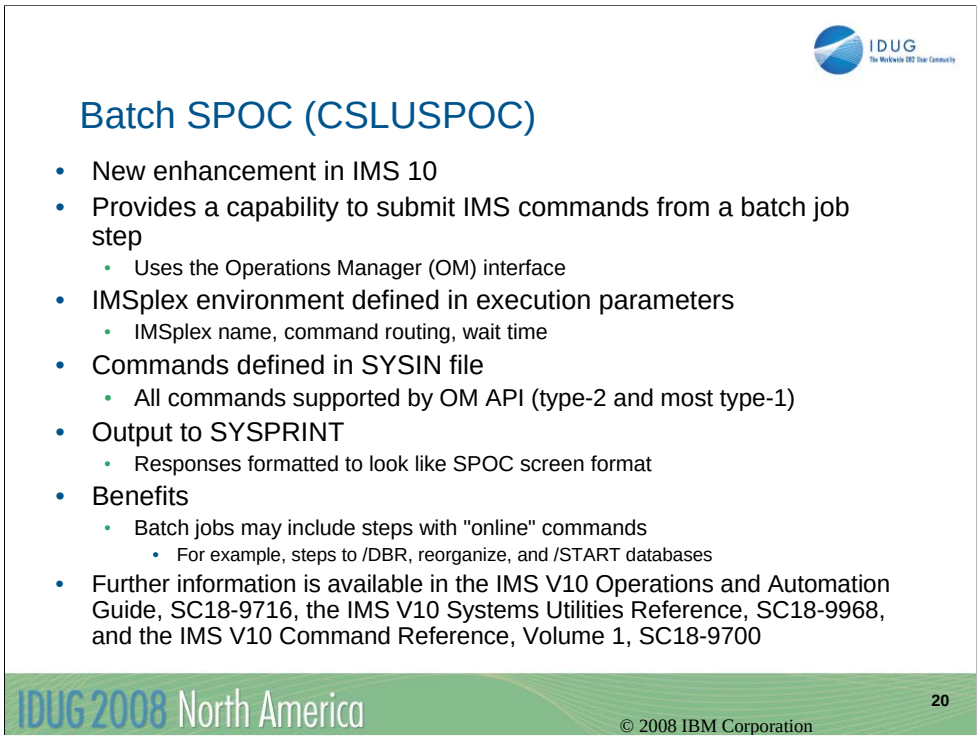
The TSO SPOC is the typical 'SPOC' used by most customers.

It is provided by IMS and can be started from the IMS Application Menu.

It provides the 'single system image'.

TSO SPOC

- reformats XML from OM
- type-2 command output displayed in tabular format
- type-1 command output displayed in sequential format



The batch SPOC enhancement in IMS V10 allows the OM environment to be able to run as a batch job. You can then submit IMS commands from batch rather than needing a TSO SPOC.

The IMSplex environment is specified via execution parameters, commands are in the SYSIN file and the output goes to SYSPRINT.

This batch SPOC can now be used as a step in jobs where you would like to run a program, then execute a series of commands, then run another program in the same job.

Type-1 commands not supported by the OM API: /CANCEL, /COMPT, /DIAGNOSE, /FORMAT, /HOLD, /IAM, /LOOPTEST, /MSVERIFY, /RCLSDST, /RCOMPT, /RELEASE, /SET, /SIGN.

Here is a list of the Type-2 commands provided by OM:

•INIT - used for Global Online Change (V8), HALDB Online Reorg (V9). ACBLIB Member Online Change (V10)

•TERM – used with INIT

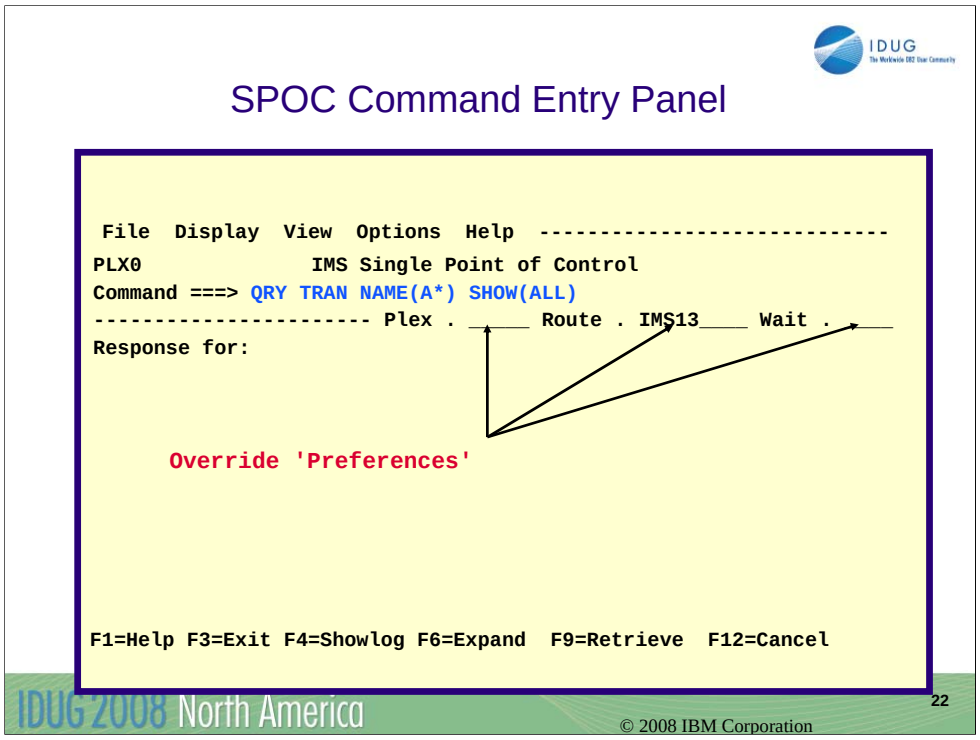
•UPD - used to update status of resources (V9), for DRD resources (V10)

•DEL - used for LE options (V9), for DRD resources (V10)

•QRY - used for displaying information

•CRE - new command in IMS V10 for DRD

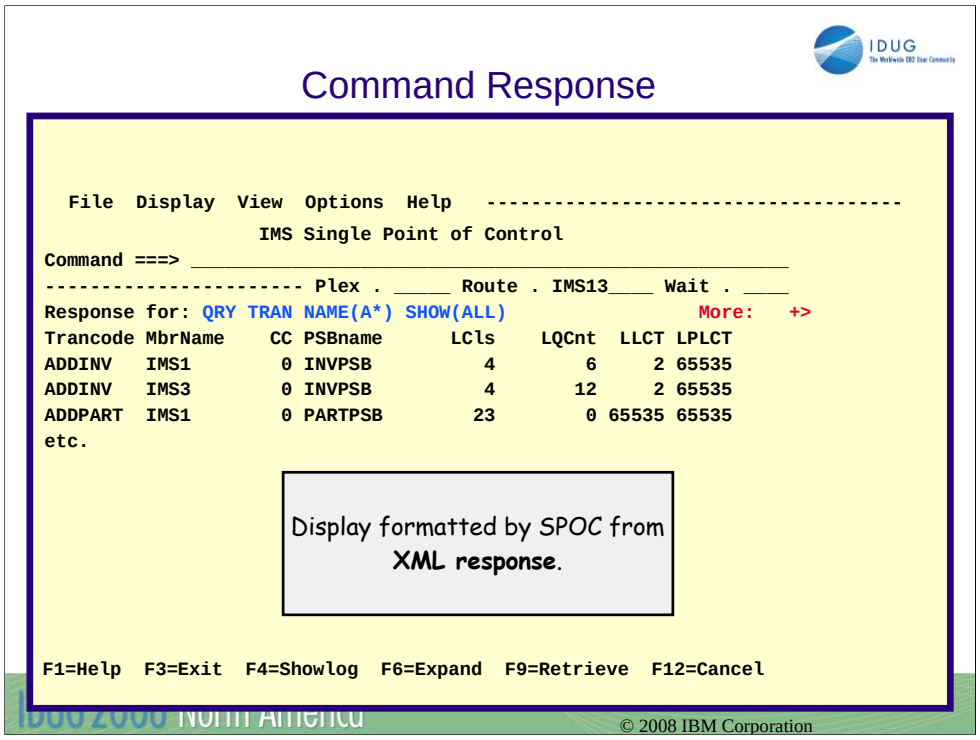
•QUE - new command in IMS V10 to enqueue or dequeue a message for an LTERM or transaction



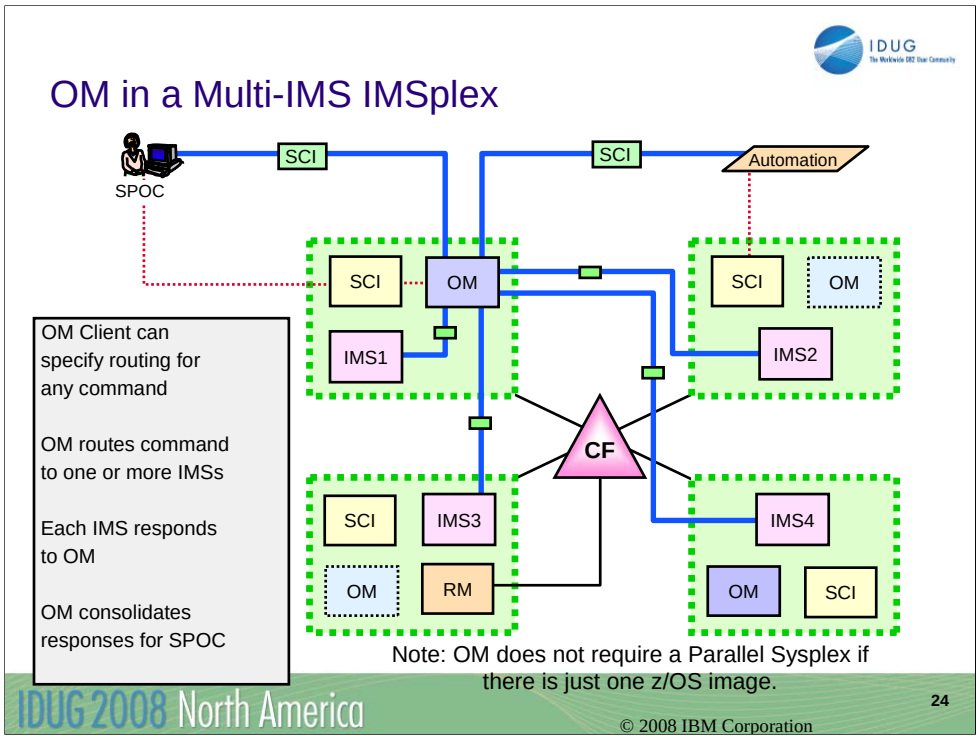
This is an example of the TSO SPOC command entry panel.

You can set preferences for plexname, routing, and the wait interval.

Commands are submitted on the command line. This example shows issuing a QRY TRAN NAME(A*) SHOW(ALL) to display information about all transactions whose names start with ‘A’.



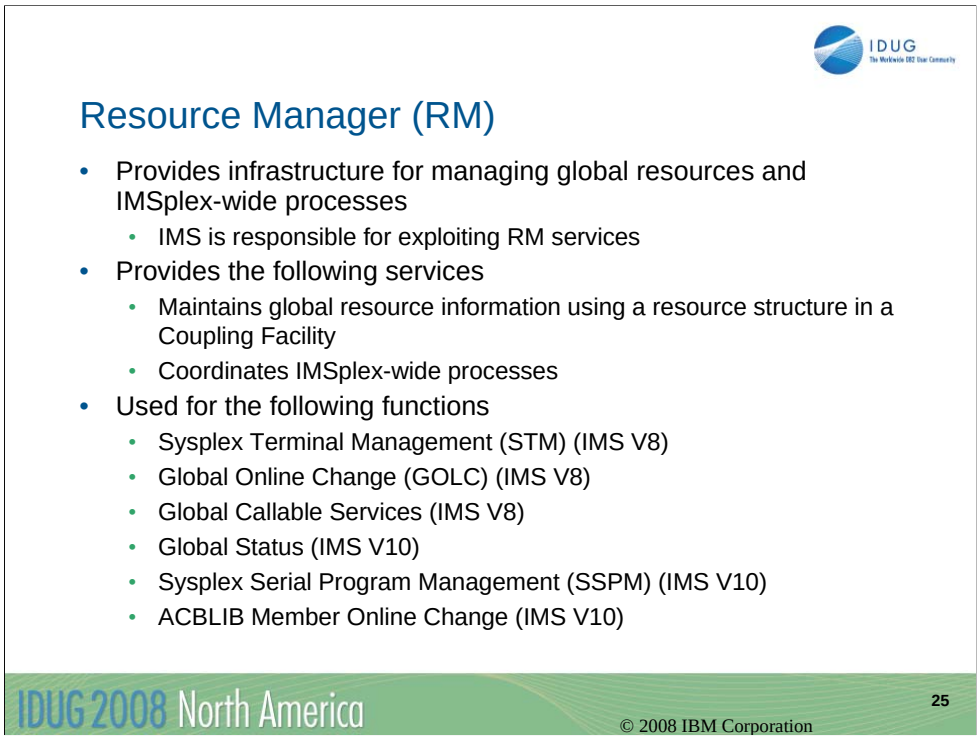
Type-2 command output is displayed in tabular format.



Here is an example of an IMSplex with multiple IMSs in an OM configuration.

Here we have 4 z/OS LPARs. Only 1 OM address space is required (on IMS1) for the IMSplex, though this shows a second OM on IMS4 for backup. IMS2 and IMS3 could also have OM address spaces.

This IMSplex could only have a single IMS, for example, to use OM for DRD for a single system.



Resource Manager (RM) is the CSL component that focuses on managing global resources in the IMSplex and coordinating IMSplex-wide processes in the IMSplex. IMS is the exploiter of these services.

RM maintains its global resource and process information in the resource structure in the coupling facility.

There are 6 functions in IMS that use these RM facilities:

•STM – manages significant status for VTAM terminals and user resources (IMS V8)

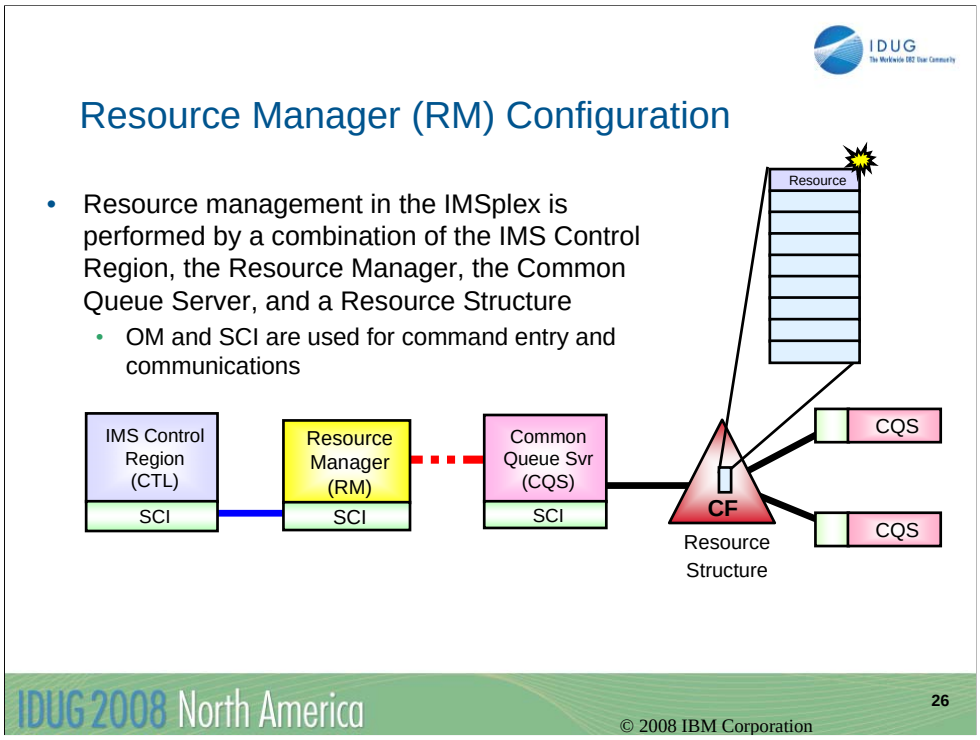
•GOLC – coordinates global online change throughout an IMSplex (IMS V8)

•Global callable services – provides global services for exits (IMS V8)

•Global status – similar to STM but for databases, areas, and transactions (IMS V10)

•SSPM – serial program enforcement across an IMSplex using shared queues (IMS V10)

•ACBLIB MOLC – add/change individual ACBLIB members dynamically (based on GOLC) (IMS V10)

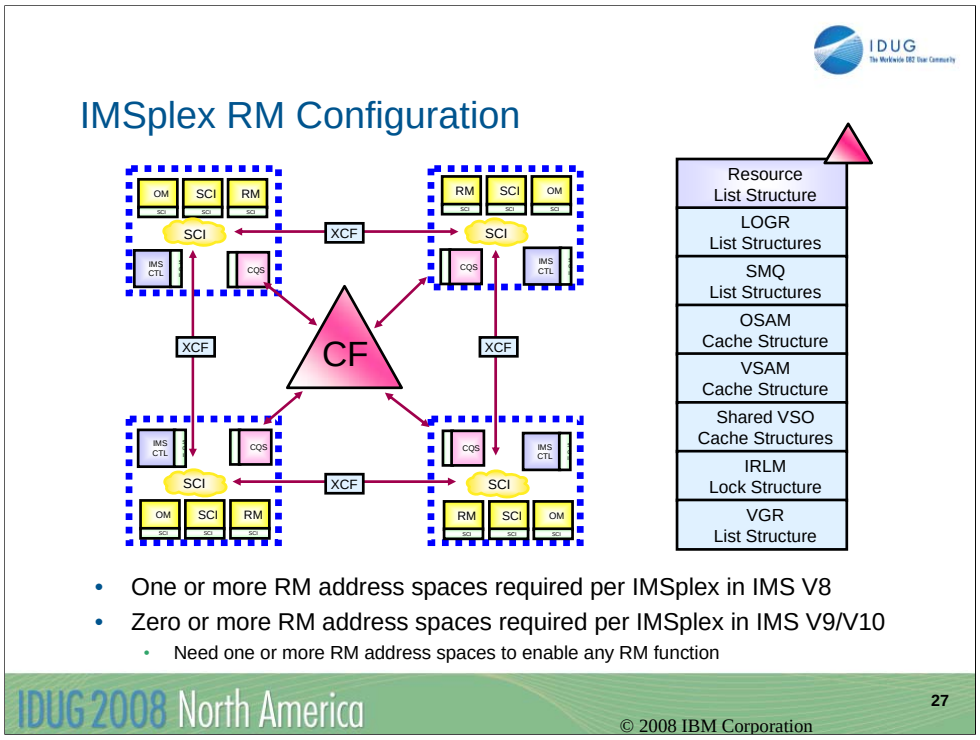


The IMS Control Region is the exploiter of RM services.

CTL interfaces with RM address space for some global processes such as GOLC.

RM address space interfaces with the CQS address space to access the Resource Structure to maintain global resource information.

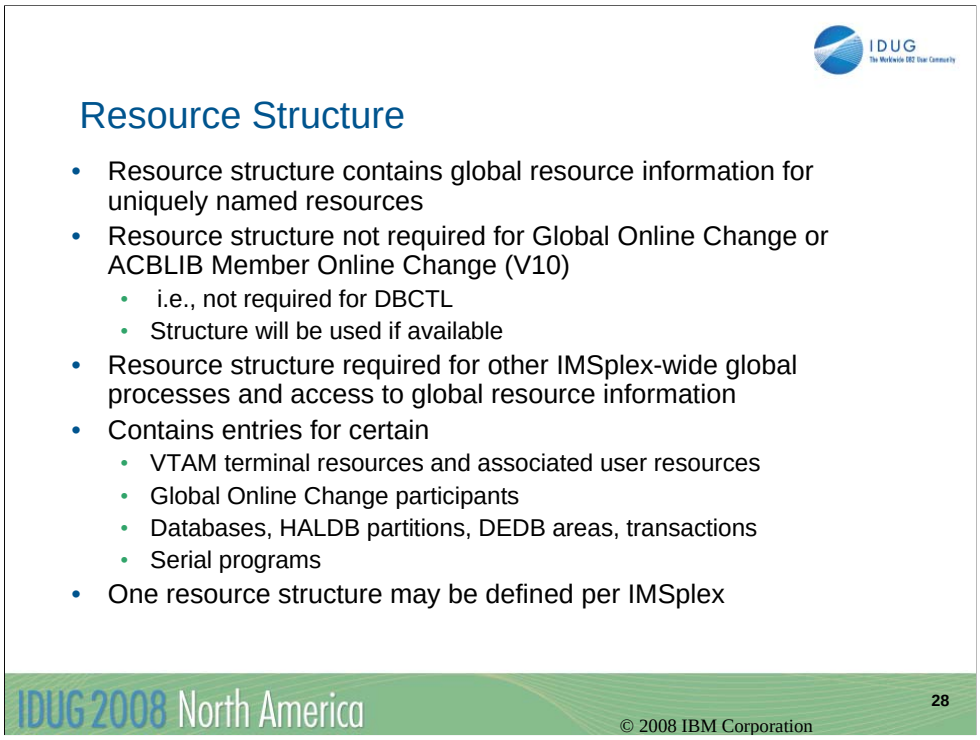
CQS address space uses shared queues structure if shared queues is implemented.



Here is a diagram of a configuration using RM in an IMSplex showing the RM address space requirements.

With IMS V8, one of more RM address spaces are required in the IMSplex even if not using any RM functions.

With IMS V9 and IMS V10, zero or more RM address spaces are required in the IMSplex; however to enable any RM function, one or more RM address spaces are required in an IMSplex (second recommended for backup).

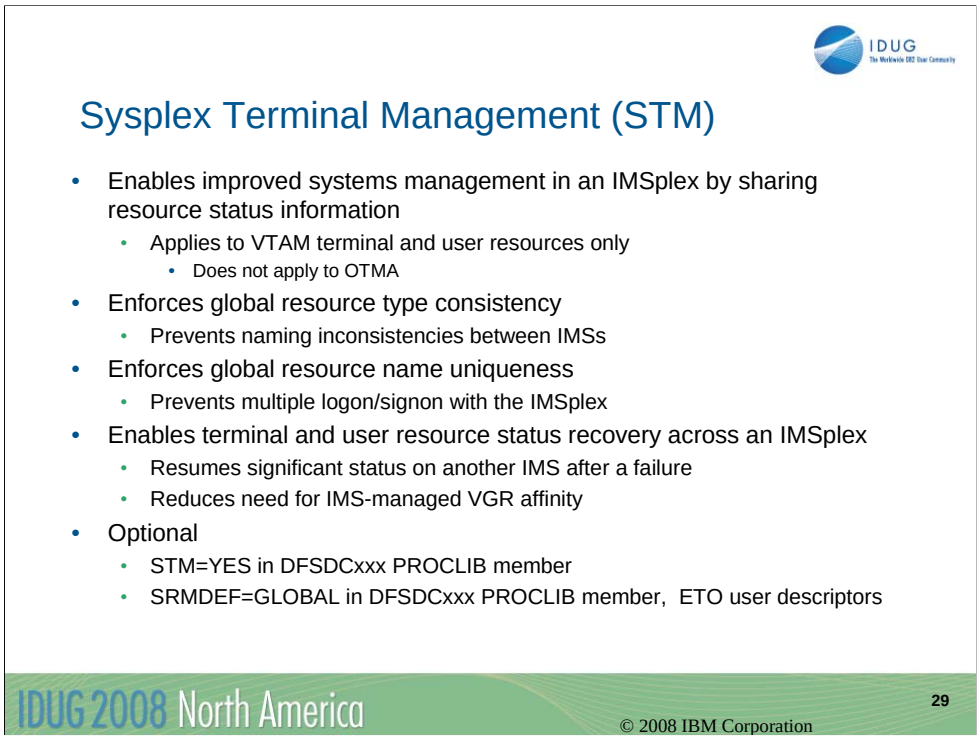


Here are the structure requirements for RM.

Remember that the resource structure contains global information for resources and processes and is managed for RM by CQS.

The resource structure is not required for GOLC and MOLC but you do need to have an RM address space. However, the resource structure will be used if it exists.

If you are using any other global information or global process, then a resource structure is required (STM, Global Status, SSPM).



Sysplex Terminal Management focuses on improved systems management in an IMSplex by sharing resource status information across the members of an IMSplex. It applies only to VTAM resources.

There are three functions provided:

•Resource type consistency

•IMS ensures that a resource defined as a message destination is consistent across the IMSplex

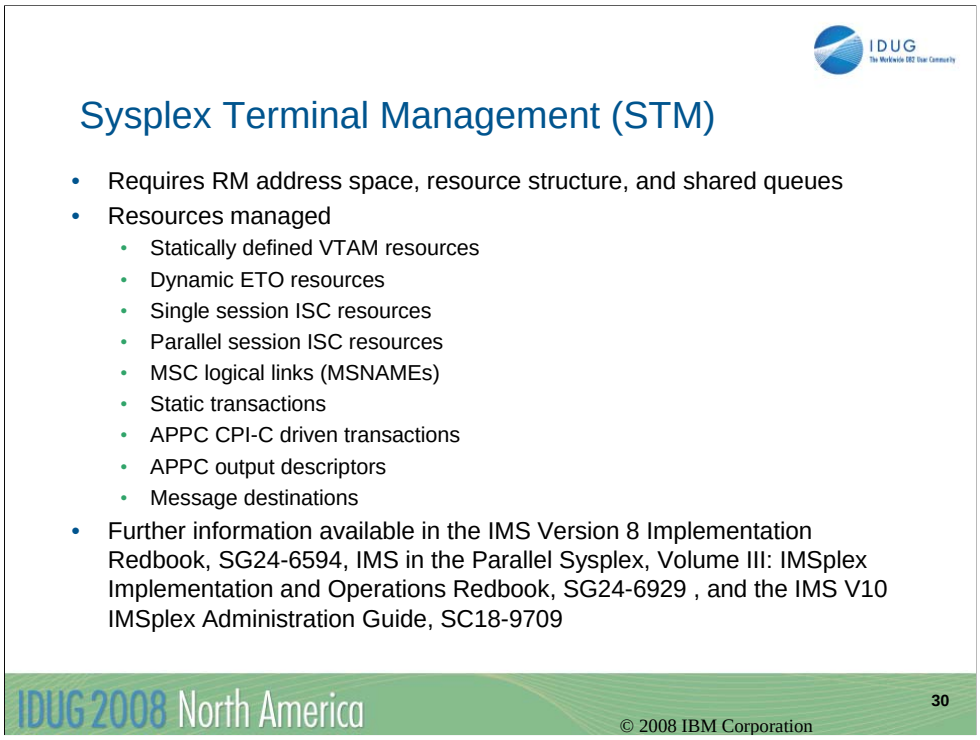
•Resource name uniqueness

•IMS ensures that a resource name is active only once in the IMSplex at any particular time.

•Resource status recovery

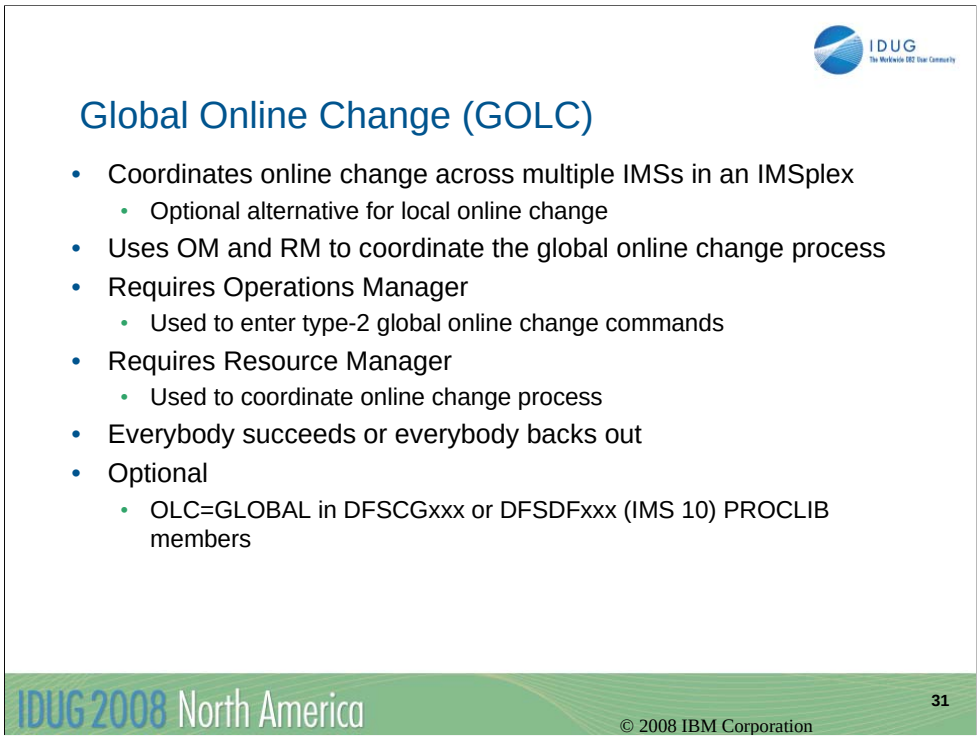
•After a successful session or IMS restart, recoverable status will be restored by IMS if it is known

STM is optional.



Using STM requires a RM address space, a resource structure, and shared queues.

Listed above are the various VTAM-related resource types managed by STM.

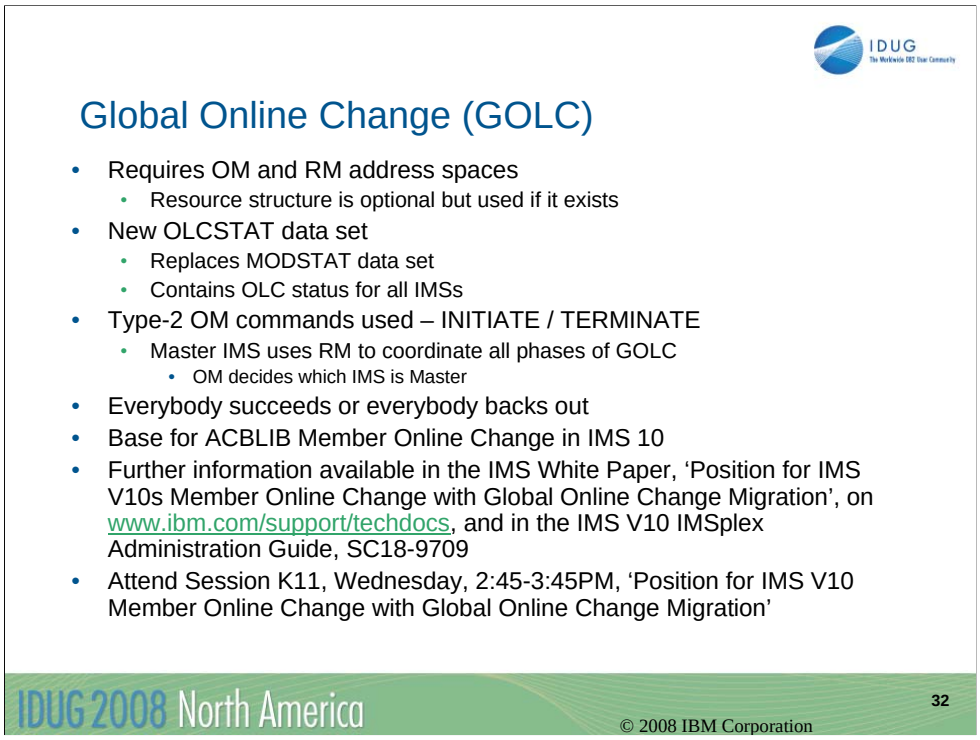


Global online change coordinates the online change process across the members of an IMSplex (versus local online change for a single IMS). The goal is to be able make system definition changes across an IMSplex without shutting down the IMSplex.

OM is required because the GOLC process uses type-2 commands.

RM is required for process coordination in the IMSplex.

Online change is optional. It is enabled via the OLC=GLOBAL parameter in the DFSCGxxx PROCLIB member or the DFSDFxxx (IMS 10) PROCLIB member.

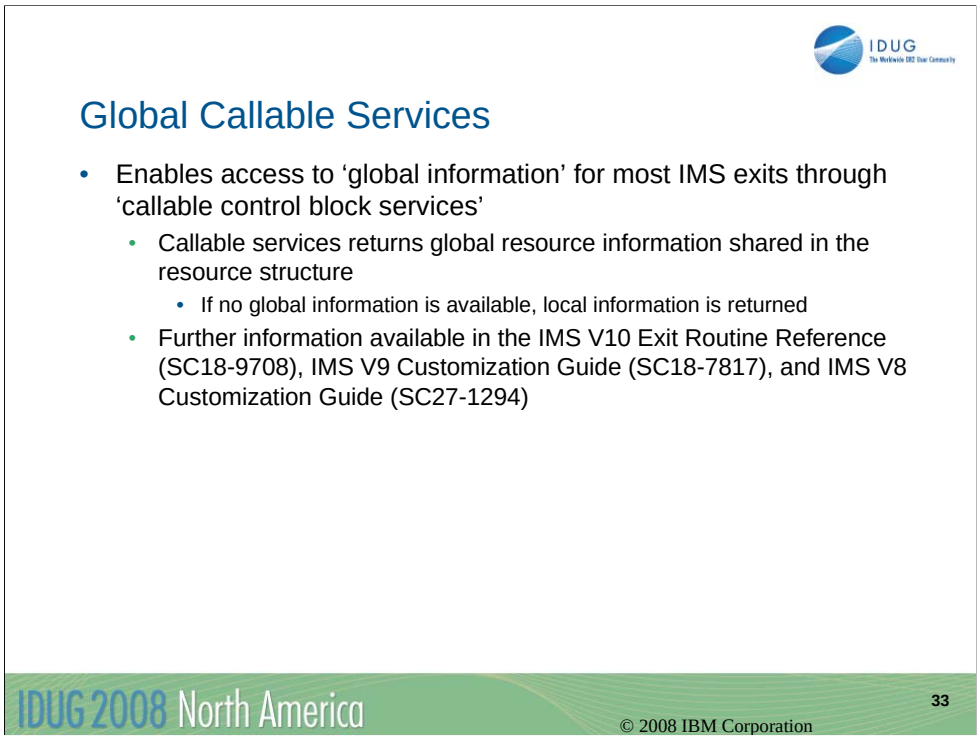


An OM address space and an RM address space must be available. A resource structure is optional, though it will be used if it exists.

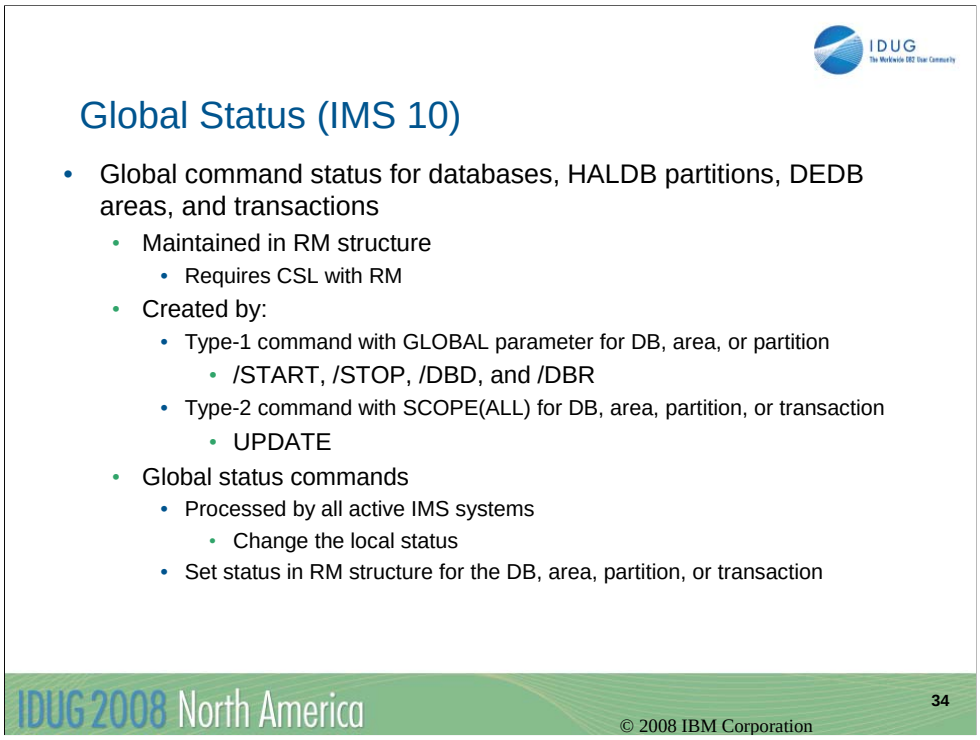
GOLC uses a new OLCSTAT data set to maintain online change status. This replaces the MODSTAT data set used with local online change.

The type-2 INITIATE and TERMINATE commands are used for GOLC. OM chooses a Master IMS that uses RM to coordinate the GOLC processing.

GOLC is required if using the new ACBLIB Member Online Change in IMS 10.



Global callable services allow an IMS exit using callable services to determine the status of a resource anywhere within the IMSplex.



The global status function maintains global command status for the following resources:

•Databases

•HALDB partitions

•DEDB areas

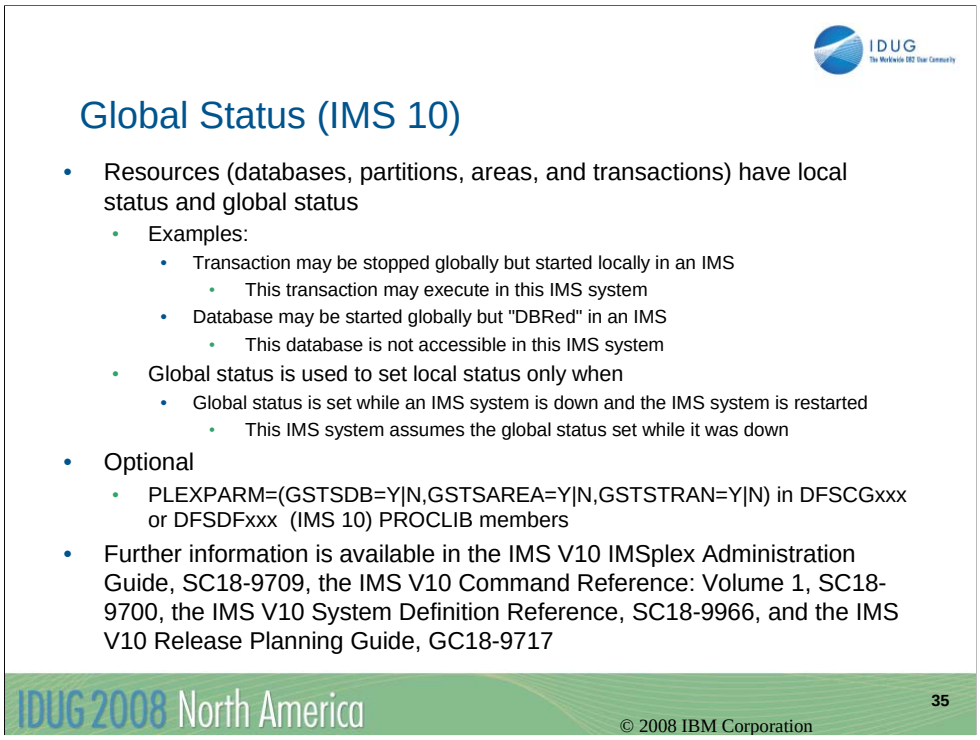
•Transactions

This command status is maintained by RM in the resource structure.

Similar to STM for TM resources (discussed previously).

Certain type-1 and type-2 global commands set the global status.

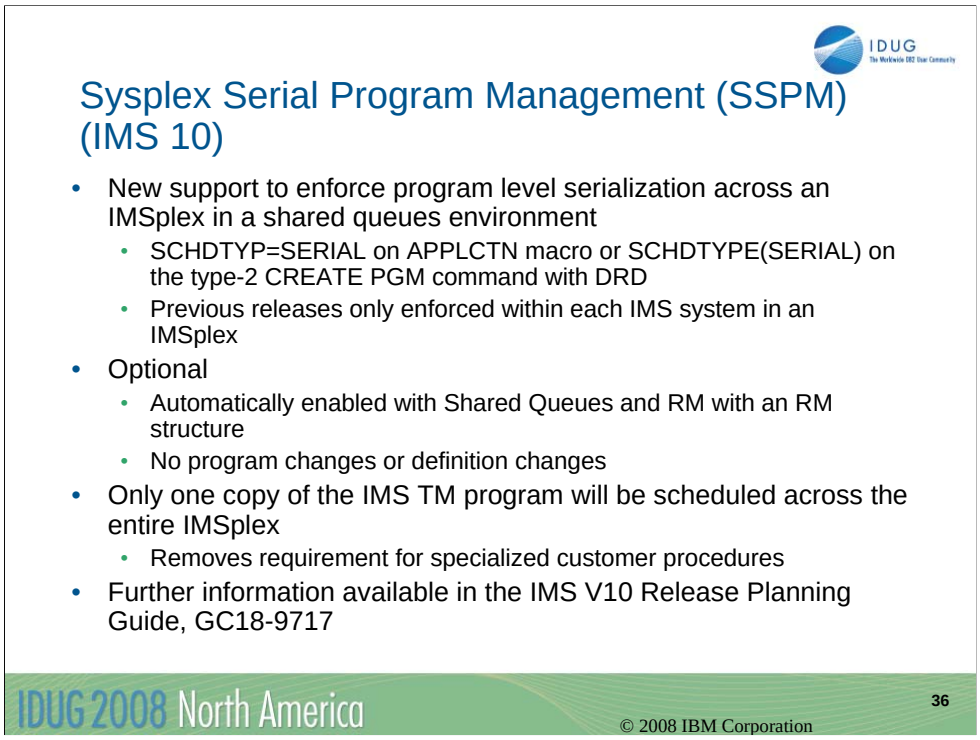
Both a global and local status is maintained by each IMSplex member.



Global and local status are typically the same; however, they can be different as in the examples above.

Global status is used to set local status only when global status has been set while an IMS system is down and that IMS system is restarted.

Global status is controlled via the PLEXPARM= parameter in the DFSCGxxx or DFSDFxxx PROCLIB members. You can separately control whether or not global status is maintained for databases, areas, and transactions.

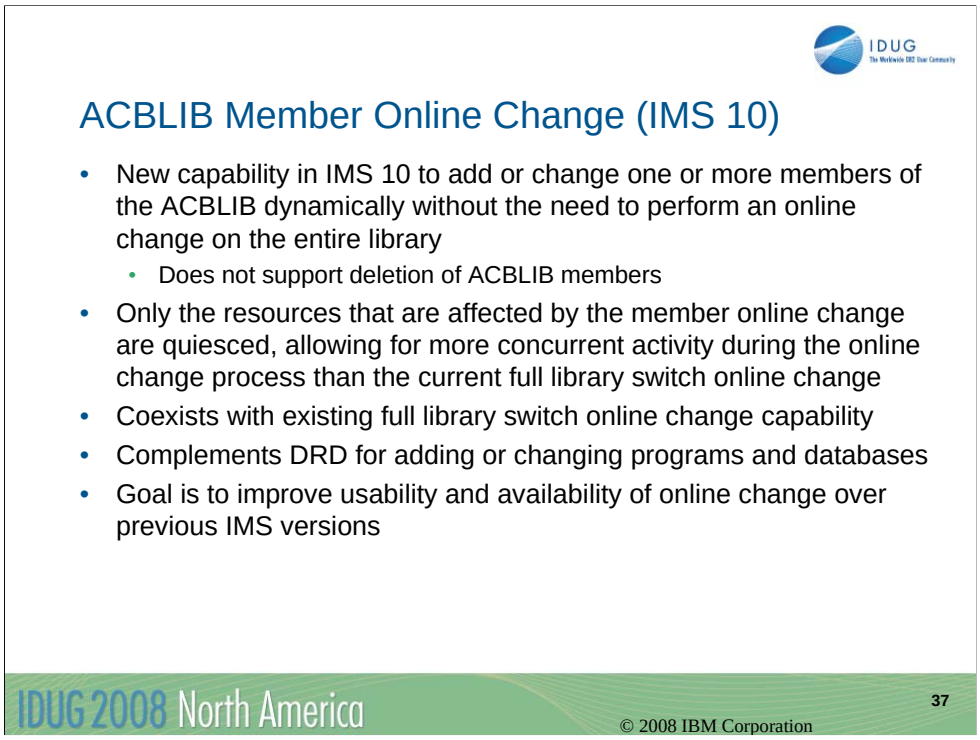


SSPM is a new enhancement in IMS 10 that provides for the enforcement of program level serialization across an IMSplex using shared queues. This means that only one copy of a particular serial program will be scheduled across the entire IMSplex at any point in time. Previous releases only supported serial programs within a single IMS system in the IMSplex.

Serial programs are those that are defined with the SCHDTYP=SERIAL parameter on the APPLCTN macro or the SCHDTYPE(SERIAL) attribute on the type-2 DRD CREATE PGM command.

SSPM is automatically enabled in a shared queues environment that has an RM address space and a resource structure.

SSPM applies only to IMS TM programs; it does not apply to CCTL and ODBA applications.

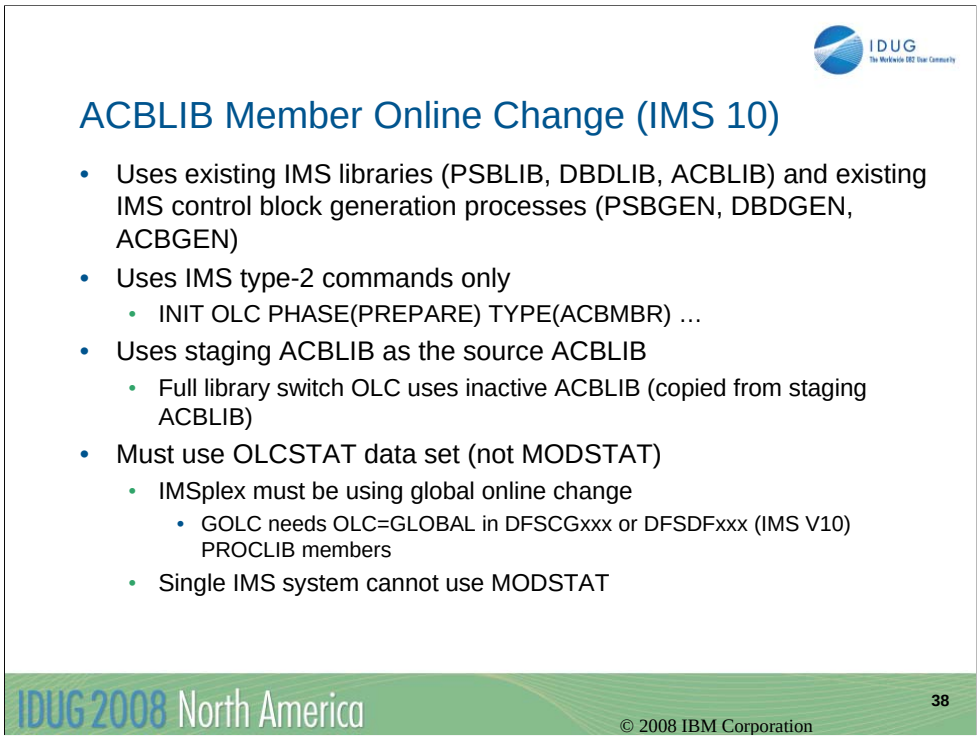


ACBLIB member online change is a new IMS 10 enhancement that allows you to add or change one or more members of ACBLIB while your system is up and running. An entire library online change is not required. ACBLIB members can only be added or changed; they cannot be deleted.

There will be more concurrent transaction activity with ACBLIB member online change because only those resources affected by the ACBLIB member online change are quiesced.

You can still use the full library switch online change capability.

This complements the DRD process where you can dynamically define a new program and/or database and then use ACBLIB member online change to activate the ACBLIB members needed for the new program and/or database.



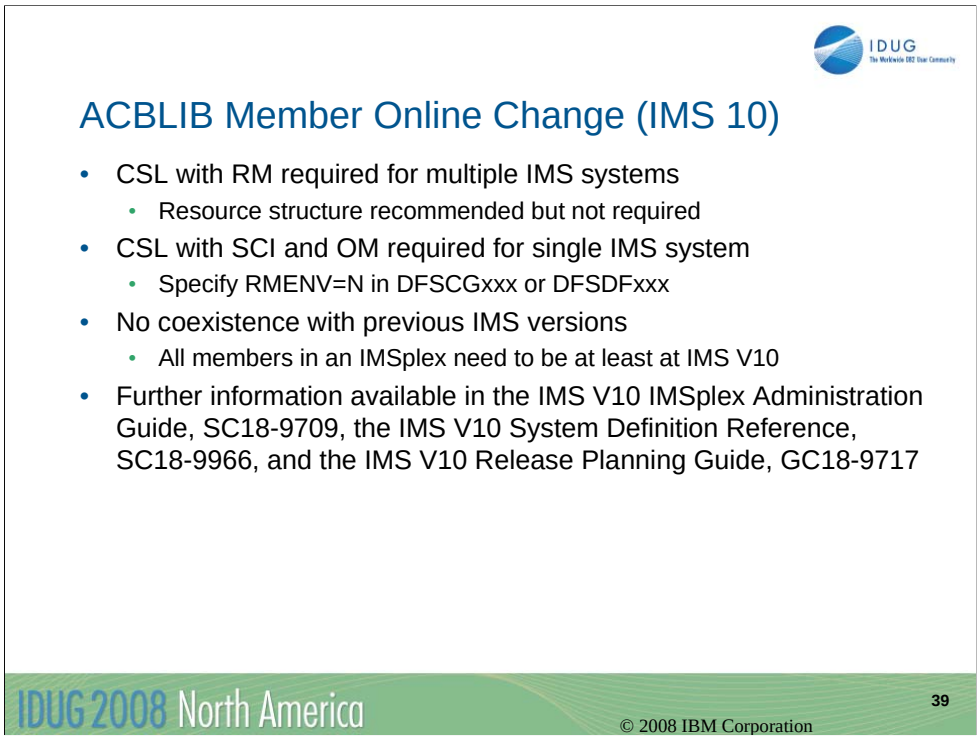
Existing IMS libraries – PSBLIB, DBDLIB, ACBLIB) as well as existing control block generation procedures – PSBGEN, DBDGEN, ACBGEN – are used.

Type-2 commands are used for ACBLIB member online change (INITIATE / TERMINATE).

For example, use the INIT OLC PHASE(PREPARE) TYPE(ACBMBR) where TYPE(ACBMBR) specifies using ACBLIB member online change.

The staging ACBLIB is used as the source ACBLIB and the new/changed members are placed directly into the online active ACBLIB.

The ACBLIB member online change process is based upon the global online change process; therefore, you must use the OLCSTAT data set rather than MODSTAT.

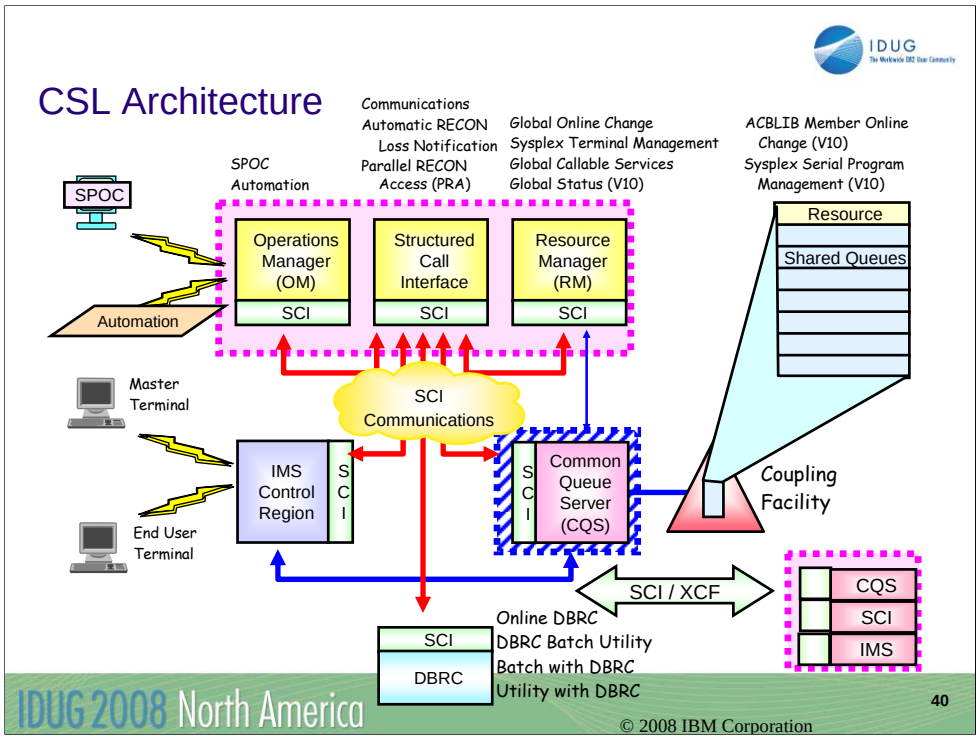


This chart lists the requirements for using ACBLIB member online change.

If in an IMSplex, you need to have a CSL with an OM and RM address space; a resource structure is recommended but not required.

For a single IMS system, you need to have a CSL with SCI and OM; however, RM is not required. You need to specify RMENV=N is the DFSCGXXX or DFSDFXXX PROCLIB members to indicate there is no RM.

All members in an IMSplex must be at IMS 10 to participate in ACBLIB member online change.



This session has discussed the architecture of CSL. I've described the main components and features, focusing on using Operations Manager features and Resource Manager features to improve the systems management characteristics of your IMS environments.

Many new enhancements in IMS 10 require having a CSL environment. You can begin setting up CSL now in your existing IMS V8 and IMS V9 systems so that you can more quickly exploit the new enhancements in IMS 10.

Session K08

The IMS Common Service Layer – Operations Manager and Resource Manager

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