

E53

# V8 Common Service Layer Overview

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# Common Service Layer (CSL)...

- Set of IMS address spaces, built on BPE, which provide infrastructure for systems management
- Operations Manager (OM)
  - ▶ IMSplex-wide command entry and response
- Resource Manager (RM)
  - ▶ Global resource management
  - ▶ IMSplex-wide process management
- Structured Call Interface (SCI)
  - ▶ IMSplex member registration and automation
  - ▶ Communications between IMSplex members

# Common Service Layer (CSL)...

- Infrastructure for future IMS architecture and sysplex enhancements
- Benefits
  - ▶ Improved systems management
  - ▶ Single system image
  - ▶ IMSplex commands with sysplex scope
  - ▶ Ease of use through Single Point of Control (SPOC)
  - ▶ Shared resources between IMSplex components
  - ▶ Failure isolation from IMS control region

# Common Service Layer (CSL)

- Exploited by IMS to provide systems management functions:
  - ▶ Sysplex Terminal Management (STM)
  - ▶ TSO SPOC for IMS commands
  - ▶ IMS Control Center workstation SPOC for IMS commands
  - ▶ Global Online Change
  - ▶ DBRC RECON Loss Notification

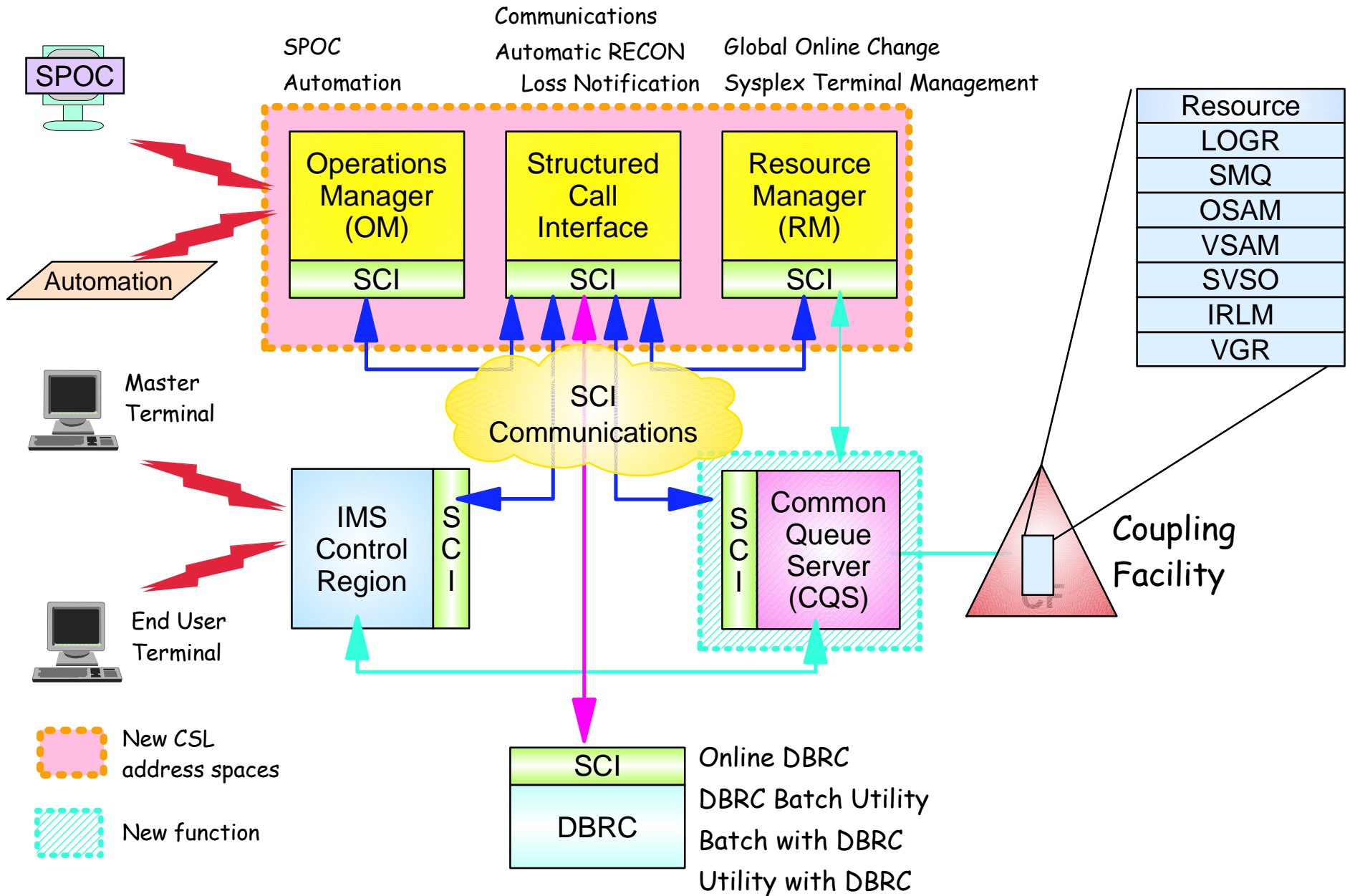
# IMSplex

- Collection of one or more IMS address spaces that work together and typically:
  - ▶ Share databases, resources, or messages (or any combination)
  - ▶ Runs in a S/390 or z/OS sysplex environment
  - ▶ Includes a Common Service Layer
- IMSplex can also mean one IMS on one OS image with no CSL and no sysplex

# IMSplex Components

- IMS address spaces that include:
  - ▶ Control region address spaces
    - IMS DB/DC, DBCTL, DCCTL
  - ▶ CSL address spaces
    - OM, RM, SCI
  - ▶ IMS service address spaces
    - CQS, DBRC
  - ▶ Single Point of Control address spaces
    - TSO SPOC
    - IMS Connect (for IMS Control Center)
  - ▶ Vendor or customer address spaces that register to SCI

# IMSplex Architecture

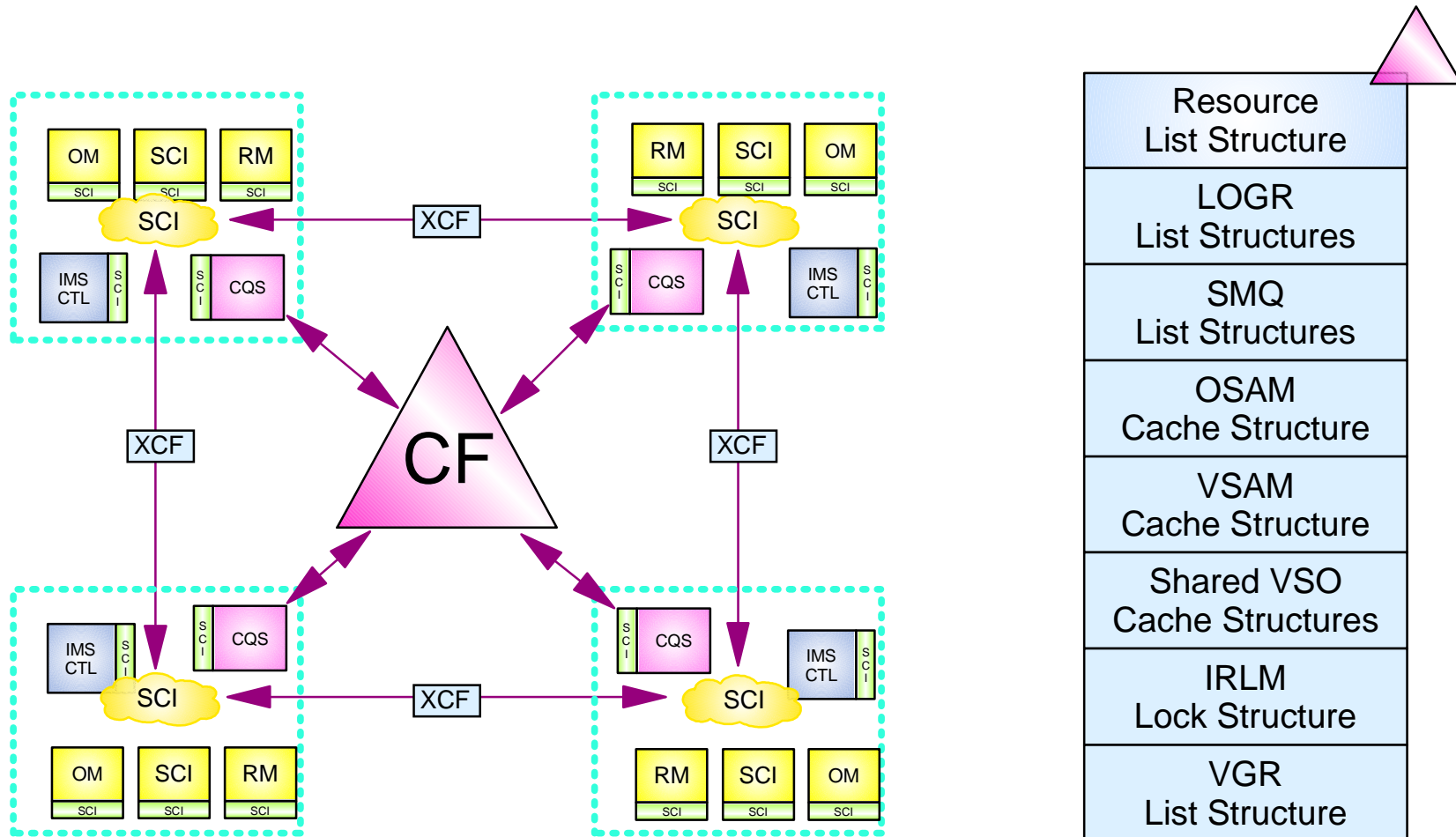


# CSL Configuration

- CSL is optional
  - ▶ If defined, SCI, OM, and RM are required
- SCI is required on every OS image with an IMSplex member
- At least one RM and OM must be defined somewhere in the IMSplex
  - ▶ More OMs and RMs are better for performance and reliability
  - ▶ Exception is DBRC RECON Loss Notification, which only requires SCI
- Only one RM allowed if no resource structure defined



# IMSpdex Configuration



★ In an IMSpdex

- ⚡ All members share the same CF structures
- ⚡ Intra-IMSpdex communications is implemented by SCI using XCF across OS images

# Structured Call Interface (SCI)

- Provides standardized communication between IMSplex members
  - ▶ IMSplex component that registers to SCI is called ***IMSplex member***
  - ▶ Cross-memory services used to communicate between members on the same OS image
  - ▶ XCF used to communicate between members on different OS images
- Provides security authorization for IMSplex members
- Notifies IMSplex members when a member joins or leaves the IMSplex

# SCI Interfaces

- SCI client interface provided by CSLSCxxx assembler macros
  - ▶ Register/deregister as member of IMSplex
  - ▶ Communicate with other members
- SCI user exits
  - ▶ BPE Initialization/Termination User Exit (SCI)
  - ▶ BPE Statistics User Exit (SCI)
  - ▶ SCI Initialization/Termination User Exit
  - ▶ SCI Client Connect User Exit

# Operations Manager (OM)...

- Provides API for ***command processing clients*** to register commands, receive commands, and return command responses
  - ▶ OM doesn't understand client command syntax
- Provides API for ***Automated Operator Programs (AOP)*** to automate IMS command input and output
- Provides a Single Point of Control (SPOC) for IMS commands
- Provides REXX SPOC API to automate IMS command input and output

# Operations Manager (OM)

- Routes commands to IMSplex members registered for the command
- Consolidates command responses from IMSplex members into a single response for the command originator
- Performs security checking on IMSplex and classic commands
  - ▶ RACF (command verb and first keyword)
  - ▶ OM security exit
  - ▶ None
- Provides user exits for command input and output modification and customizing security

# OM API

- OM client interface provided by CSLOMxxx assembler macros
  - ▶ Register/deregister commands
  - ▶ Issue a command
  - ▶ Send a command response
  - ▶ Send unsolicited output

# Command Processing Client

- OM client that
  - ▶ Registers commands it can process to every OM active in the IMSplex
    - Registers verb and 1st keyword
  - ▶ Processes commands routed by OM
  - ▶ Returns command responses to OM
- OS/390 address space examples:
  - ▶ IMS DB/TM, DBCTL, DCCTL, RM

# AOP Client

- OM client that
  - ▶ Sends commands to OM
  - ▶ Receives command responses in XML format and processes them (i.e., formats for display)
- Host SPOC (OS/390 address space)
  - ▶ TSO SPOC
  - ▶ IMS Connect
  - ▶ Vendor/customer
- Workstation SPOC (accesses OM through OS/390-based OM client)
  - ▶ IMS Control Center (using IMS Connect)
  - ▶ Vendor/customer



# OM User Exits...

- BPE Initialization/Termination User Exit (OM)
- BPE Statistics User Exit (OM)
- OM Client Connection User Exit

# OM User Exits

- ▶ OM input user exit
  - Called with command input
  - Can view and manipulate a command before it's processed
- ▶ OM output user exit
  - Called with command output
    - command responses, unsolicited output, undeliverable output
  - Can view and manipulate output before it is returned
- ▶ OM security user exit
  - Permits user security checking for a command

# OM Command Input

- AOP client sends command to OM
  - ▶ Routing information
  - ▶ Wait time
- OM validates command syntax
  - ▶ Verb and primary keyword for classic commands
  - ▶ Entire IMSplex command syntax
- OM designates one client as the command "master"
  - ▶ Command master performs global tasks
- OM routes command to one or more registered clients

# OM Command Response

- Command processing client processes command, builds response, and returns response to OM
- Command response in XML format designed as API, not in message format
  - ▶ permits AOP to manipulate response (sort, scroll, etc)
- OM consolidates all command responses from clients and returns a consolidated response to the AOP
  - ▶ Command times out if response not returned

# Resource Manager (RM)

- Manages global resource information on a resource structure on behalf of clients
  - ▶ IMS uses RM to keep message destination names to ensure name uniqueness
  - ▶ IMS uses RM to keep global terminal and user information
    - User can logon to another IMS with VTAM generic resources and resume user state
- Coordinates IMSplex-wide processes on behalf of clients
  - ▶ IMS uses RM to coordinate global online change process

# RM Interfaces

- RM client interface provided by CSLRMxxx assembler macros
  - ▶ Register/deregister to RM
  - ▶ Create, update, query, or delete global resources
  - ▶ Initiate, perform a step, or terminate an IMSplex-wide process
- RM user exits
  - ▶ BPE Initialization/Termination User Exit (RM)
  - ▶ BPE Statistics User Exit (RM)
  - ▶ RM Client Connect User Exit

# IMS Single Point of Control (SPOC)

- Single point of control for IMS commands and command responses
  - ▶ Multiple SPOC instances supported
- IMS provides a TSO SPOC application for IMS commands
  - ▶ Output displayed in table format (IMSpIex cmd)
  - ▶ Output can be sorted by column (IMSpIex cmd)
  - ▶ Output supports scrolling up/down left/right
- IMS Control Center provides a workstation SPOC for IMS commands
- Any vendor or customer can write a SPOC

# IMSplex Command Syntax...

- IMS introduces new IMSplex command syntax that exploits OM's command parsing functions
- Designed to improve systems management and automation
- Simplified set of command verbs
  - ▶ DELETE
  - ▶ INITIATE
  - ▶ QUERY
  - ▶ TERMINATE
  - ▶ UPDATE



# IMSplex Command Syntax...

- Simplified parse rules  
Action\_Verb Resource\_Type Keyword(*parameter*)
- IMS keywords are distinguished from user defined resource names, eliminating conflict
- No command recognition character (e.g., "/")
- Wildcard parameters select resource names to process  
QUERY TRAN NAME(APOL\*)
- Filters select resource names to process  
QUERY TRAN NAME(APOL\*) STATUS(STOSCHD,STOQ)
- SHOW filter selects data to return  
QUERY TRAN NAME(APOL\*) SHOW(CLASS,STATUS)

# IMSplex Command Syntax

- Long range direction is to convert classic commands to use IMSplex command syntax
- New IMSplex command UPDATE TRAN is equivalent to:
  - ▶ /ASSIGN TRAN
  - ▶ /CHANGE TRAN
  - ▶ /PSTOP TRAN
  - ▶ /PURGE TRAN
  - ▶ /START TRAN
  - ▶ /STOP TRAN
  - ▶ /TRACE SET ON/OFF TRAN

# IMS V8 IMSplex 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

# IMSpIex Command Support

- Supported through the OM API
- Not supported from system console, MTO, E-MCS console, CMD or ICMD DL/I Calls
- Not passed to the AOI exits in the IMS control region (DFSAOE00 or DFSAOUE0)

# Asynchronous Responses

- IMS introduces a new direction for returning asynchronous command responses synchronously, to improve automation
- Some classic database commands changed to return responses synchronously through OM API, instead of DFS058I COMMAND IN PROGRESS:

- ▶ /DBD DB
- ▶ /DBR AREA|DB
- ▶ /LOCK DB
- ▶ /STA AREA|DB|MADSIOT
- ▶ /STO ADS|AREA|DB|MADSIOT
- ▶ /UNL DB
- ▶ /VUNLOAD AREA

# QUERY TRAN example

## TSO SPOC INPUT:

```
QRY TRAN NAME(OLCFT117,OLCTB136,OLCTB148,OLCTMSA*) SHOW(QCNT,CLASS,STATUS)
```

## TSO SPOC OUTPUT:

Trancode	MbrName	CC	QCnt	LClS	LQCnt	LclStat
OLCFT117	IMS3	0	0			
OLCFT117	IMS2	0		1	0	FPE,RESP
OLCFT117	IMS3	0		1	0	FPE,RESP
OLCFT117	SYS3	0		1	0	FPE,RESP
OLCTB136	IMS3	0	0			
OLCTB136	IMS2	0		1	0	RESP
OLCTB136	IMS3	0		1	0	RESP
OLCTB136	SYS3	0		1	0	RESP
OLCTB148	IMS3	0	0			
OLCTB148	IMS2	0		1	0	CONV
OLCTB148	IMS3	0		1	0	CONV
OLCTB148	SYS3	0		1	0	CONV
OLCTMSA1	IMS3	0	0			
OLCTMSA1	IMS2	0		1	0	RMT
OLCTMSA1	IMS3	0		1	0	RMT

# QUERY IMSPLEX example

## TSO SPOC INPUT:

```
QUERY IMSPLEX NAME(CSLRPLEX1) SHOW (JOB, TYPE, SUBTYPE, STATUS)
```

## TSO SPOC OUTPUT:

IMSpIex	MbrName	CC	Member	JobName	Type	Subtype	Status
CSLPLEX1	OM1OM	0	IMS2	IMS2	IMS	DBDC	READY, ACTIVE
CSLPLEX1	OM1OM	0	CQS1CQS	CQSRE1	CQS		ACTIVE
CSLPLEX1	OM1OM	0	SYS3	IMS1	IMS	DBDC	READY, ACTIVE
CSLPLEX1	OM1OM	0	OM1OM	OM1	OM		READY, ACTIVE
CSLPLEX1	OM1OM	0	IMS3	IMS3	IMS	DBDC	READY, ACTIVE
CSLPLEX1	OM1OM	0	USRT011	USRT011	AOP		ACTIVE
CSLPLEX1	OM1OM	0	RM1RM	RM1	RM	MULTRM	READY, ACTIVE
CSLPLEX1	OM1OM	0	SCI1SC	SCI1	SCI		READY, ACTIVE

# Classic Command example

TSO SPOC INPUT:

```
/DBR DB IVPDB1 IVPDB2
```

TSO SPOC OUTPUT:

Member Name	Messages
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SYS3	DFS0488I DBR COMMAND COMPLETED. DBN= IVPDB1 RC= 0
SYS3	DFS0488I DBR COMMAND COMPLETED. DBN= IVPDB2 RC= 0