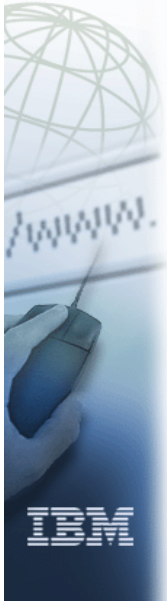


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Console Restructure Stage 1B



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Trademarks



eNetwork	DFSMS/MVS	IMS	RACF
geoManager	DFSMSdfp	IMS/ESA	RMF
AD/Cycle	DFSMSdss	IP PrintWay	RS/6000
ADSTAR	DFSMSshsm	IPDS	S/390
AFP	DFSMSrmm	Language Environment	S/390 Parallel Enterprise Server
APL2	DFSORT	Multiprise	SecureWay
APPN	Enterprise System 3090	MQSeries	StorWatch
BookManger	Enterprise System 4381	MVS/ESA	Sysplex Timer
BookMaster	Enterprise System 9000	Network Station	System/390
C/370	ES/3090	NetSpool	SystemView
CallPath	ES/4381	OfficeVision/MVS	SOM
CICS	ES/9000	Open Class	SOMobjects
CICS/ESA	ESA/390	OpenEdition	SP
CICS/MVS	ESCON	OS/2	VisualAge
CICSPlex	First Failure Support Technology	OS/390	VisualGen
COBOL/370	FLowMark	Parallel Sysplex	VisualLift
DataPropagator	FFST	Print Services Facility	VTAM
DisplayWrite	GDDM	PrintWay	WebSphere
DB2	ImagePlus	ProductPac	3090
DB2 Universal Database	Intelligent Miner	PR/SM	3890/XP
DFSMS/MVS	IBM	QMFr	z/OS
			z/OS.e

Domino (Lotus Development Corporation)
 DFS (Transarc Corporation)
 Java (Sun Microsystems, Inc.)
 Lotus (Lotus Development Corporation)

Tivoli (Tivoli Systems Inc.)
 Tivoli Management Framework
 (Tivoli Systems Inc.)
 Tivoli Manger (Tivoli Systems Inc.)

UNIX (X/Open Company Limited)
 Windows (Microsoft Corporation)
 Windows NT (Microsoft Corporation)



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Console Restructure Problems



- ❑ Stage 1a Problem 1 - Message delivery:
 - Buffer shortages
- ❑ Stage 1b Problem 2 - Synchronizing console state information:
 - Data replicated on every system in the sysplex
 - State changes, system join/leave cause flurries of activity
 - More systems => longer startup, shutdown and recovery time
- ❑ Stage 2 Problem 3 - Limit of 99 MCS/SMCS/Subsystem consoles in a sysplex:
 - Installation constraint

Console Restructure Stages

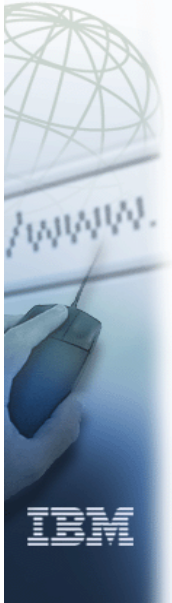


- ❑ Console enhancements in several stages:
 - Stage 1a solves problem 1
 - Delivery in z/OS: 1.4.2 feature, 1.5. base
 - Stage 1b delivers improved RAS, IPL/recovery time improvements
 - Delivery in z/OS 1.7
 - Stage 2 solves problems 2 & 3
 - Future release of z/OS

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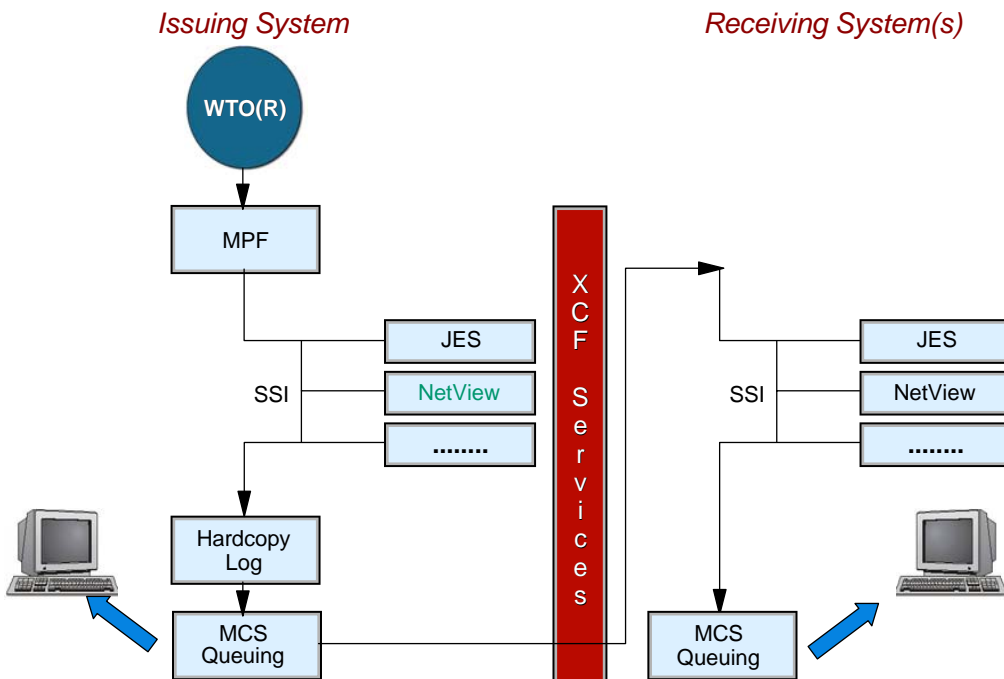
Console Restructure Stage 1a



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Message Flow in a Sysplex



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Reasons for Console Restructure



- ❑ Problems seen with current console implementation
 - Runaway application can kill a system
 - Large systems can overwhelm small systems
 - All queuing decisions are made from a single task
- ❑ Prone to backups and storage overloads
 - Traffic to a particular console
 - SYSLOG
 - Un-ended multiline WTOs
- ❑ Inflated importance on a single message
 - Delivery of all messages considered the overriding responsibility
- ❑ Inflated importance of MCS consoles



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CONSOLxx - CONSOLE Statement



Receiving messages not explicitly routed to it

```
MSCOPE {(sysname)*[,sysname]...}
          {(*ALL) }
```

If a console has *ALL or multiple sysnames

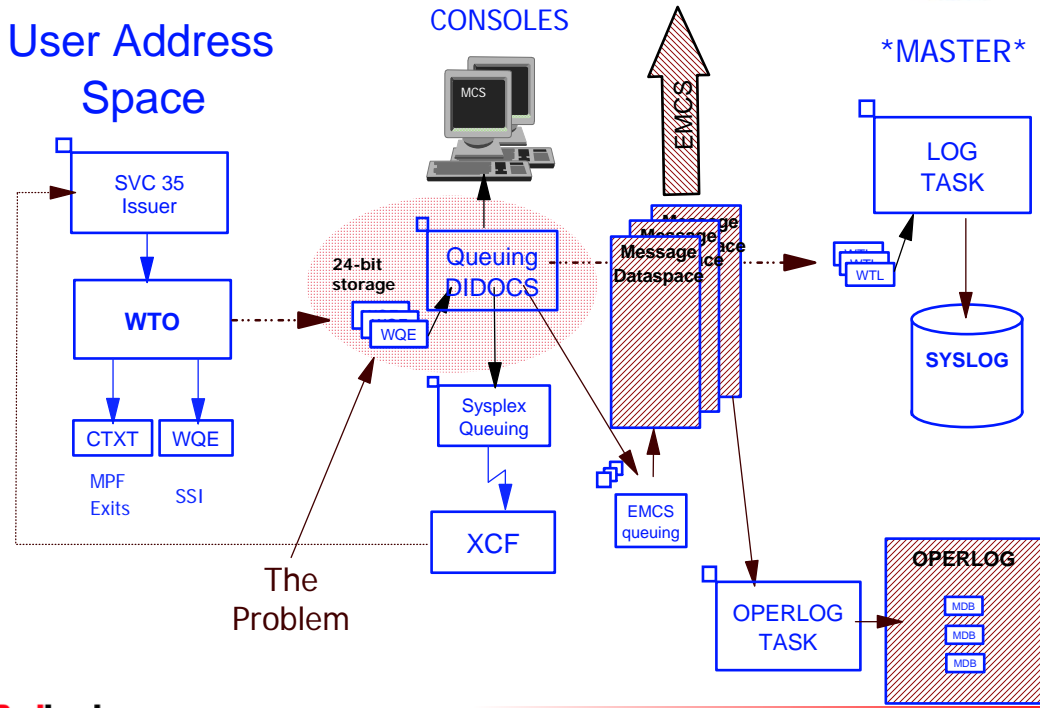
```
VARY CN(ROGERS),MSCOPE=SC50
```

The MSCOPE of the system console now defaults to * instead of *ALL (**Console restructure**)



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Message Processing before Restructure

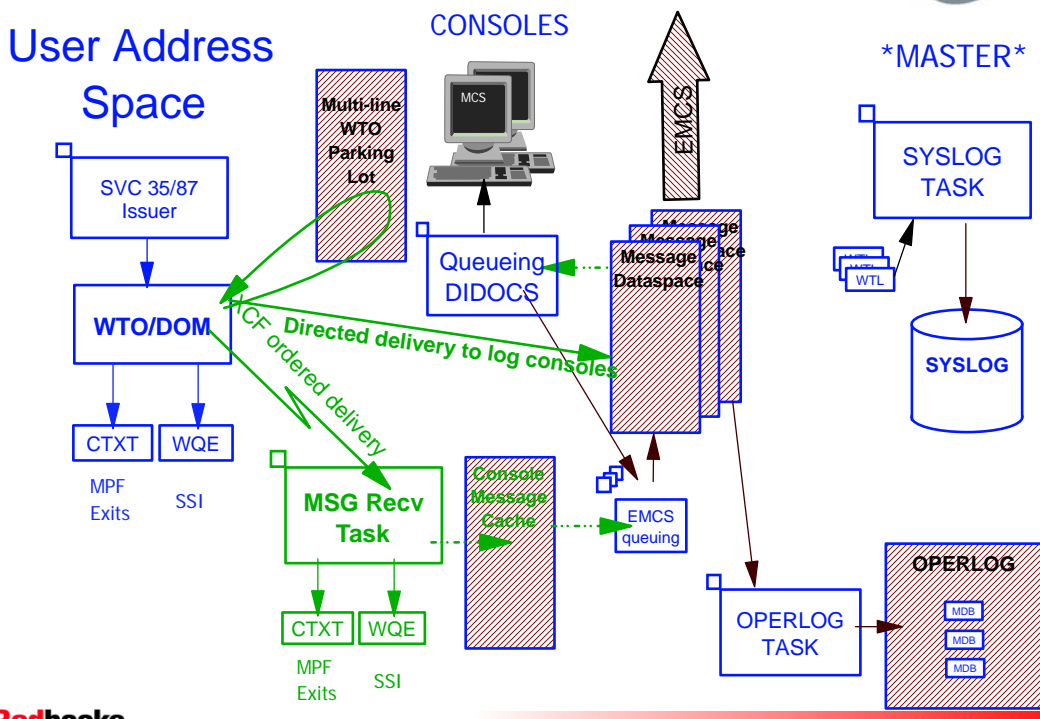


The Problem



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Message Processing after Restructure



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Console Restructure



- ❑ Console Restructure Stage 1a (delivered in z/OS V1R4.2) was a Reliability, Availability and Serviceability (RAS)
- ❑ Consoles components one of first exploiters of sysplex
 - Exploitation occurred before much of the suite of sysplex software and hardware had been developed (e.g. ordered delivery, coupling facility)
 - Infrastructure of message processing (WTO and DOM) has been updated and enhanced to provide greater reliability and availability of the system and sysplex and to remove/reduce system outages caused by message floods

Phase 1a APARs

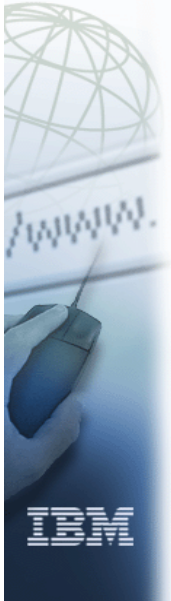


- ❑ Two APARs taken to address CPU consumption:
 - OA08482: New Function
 - Enables installations to prevent foreign WTOs from being presented on the Subsystem Interface (SSI)
 - OA09229: High CPU utilization in the CONSOLE address space after Console Restructure
- ❑ OA09229 improvements:
 - With consoles set to MSCOPE=*, CPU and message counts for messages from other system reduced
 - Messages are still received via the XCF group, as the new WTO function still uses XCF to pass the message from issuing address space to the CONSOLE address space

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Console Restructure Stage 1b



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Console Restructure Enhancements



- EMCS console removal support
- Monitor message independence
- Consoles query interface
- 1-byte console ID elimination
- TRACK command elimination

EMCS Console Removal



- ❑ Long IPLs and console data refresh times in a sysplex
 - Information on all EMCS consoles is sent across systems, including inactive EMCS consoles that are no longer needed
- ❑ Changes in z/OS V1R7
 - Give the ability to remove inactive EMCS consoles that are no longer needed
 - Reduced system refresh and IPL times in a sysplex



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EMCS Consoles Removal



- ❑ A sample program (IEARELEC) is provided to show how to use the service that removes EMCS consoles
 - IEARELEC is in SYS1.SAMPLIB
 - Assemble and Link-edit
- ❑ Similar to IEARELCN which is used for MCS consoles
- ❑ The service supports the wildcarding of console names
- ❑ Must be APF-authorized
- ❑ Can be modified to pass a CART and/or console name (to direct any system messages issued by the service)



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Wildcard Characters for IEARELEC



- ❑ Sample program supports following wildcard types:
 - Multiple-character asterisk (*) within the value:
 - The * indicates zero, one, or more characters, up to the maximum length of the string - This * can be in any position and can appear alone to indicate all values
 - Single-character question mark (?):
 - The ? indicates any single character - The ? can be in any position
 - Combinations of more than one type of wildcard
 - IEARELEC is implemented as a reentrant program



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Sample JCL to Invoke IEARELEC



```
//JOBA JOB ...
//sss EXEC PGM=IEARELEC,PARM='CONSNAME(consol01)'
      JOBA will attempt to remove the console named 'CONSOL01'.

//JOB B JOB ...
//sss EXEC PGM=IEARELEC,PARM='CONSNAME(consol*)'
      JOBB will attempt to remove any console with a name that begins with
      'CONSOL' (for example, CONSOL01, CONSOL02, etc.)

//JOB C JOB ...
//sss EXEC PGM=IEARELEC,PARM='CONSNAME(sy?con*)'
      JOBC will attempt to remove any console whose name has as its first two
      characters, 'SY', and its fourth thru sixth characters, 'CON' (for
      example, SY1CON1, SY1CON2, SY2CON1, SY2CON2, etc.)

CNZ4002I EMCS CONSOLE REMOVAL FOR WILDCARD PATTERN SY?CON*
          FOUND: 4 REMOVED: 4 NOT REMOVED: 0
          THE FOLLOWING EMCS CONSOLES WERE REMOVED:
          SY1CON1 SY1CON2 SY2CON1 SY2CON2

MRC104I ALL EMCS CONSOLES MATCHING THE WILDCARD PATTERN OF SY?CON*
HAVE BEEN REMOVED
```

hardcopy-only
message

Job log



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EMCS Console Removal Support



- ❑ The impact of an IPL and systems to join a sysplex when removing EMCS consoles on z/OS V1R7 was tested in four different situations, as follows:
 - Started with 100K consoles defined and had a system join the sysplex
 - Removed 36.5K consoles and had a system join the sysplex with 63.5K consoles defined
 - Removed another 30K and had a system join the sysplex with 33.5K consoles defined
 - Removed 33484 consoles and had a system join the sysplex with only 16 consoles defined



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EMCS Console Removal Support



- ❑ Migration considerations
 - All systems in a sysplex must be either:
 - z/OS V1R7 or...
 - Have APAR OA06857 installed on any level between z/OS V1R4 and z/OS V1R6

RELEASE	PTF Number
z/OS V1R4	UA16035
z/OS V1R4.2	UA16037
z/OS V1R5	UA16038
z/OS V1R6	UA16036

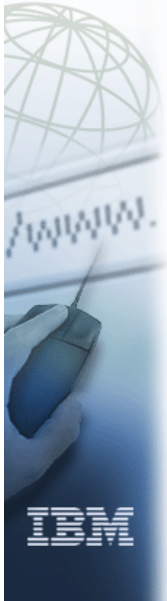


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Migration/Coexistence Considerations

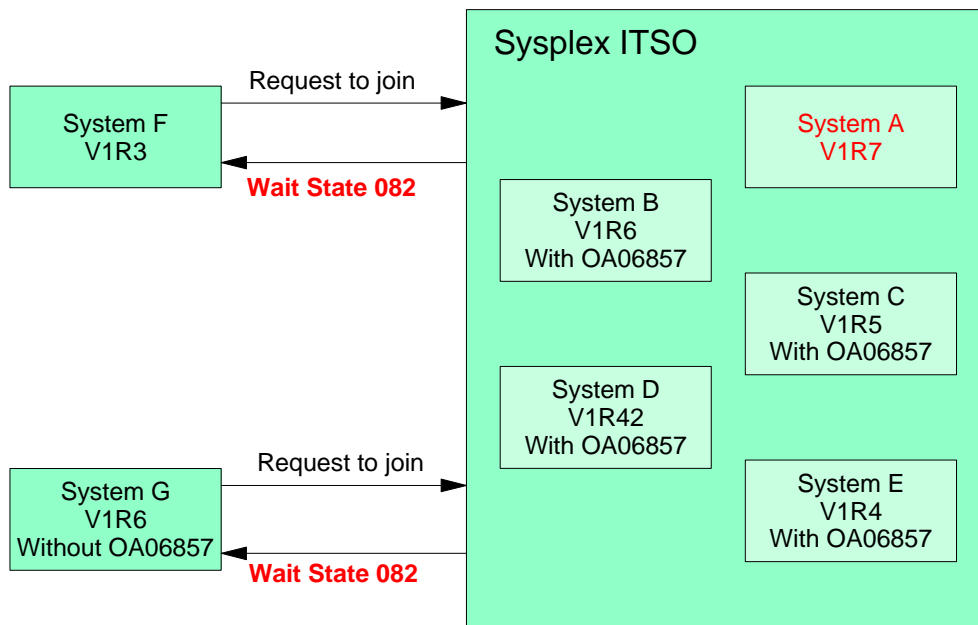


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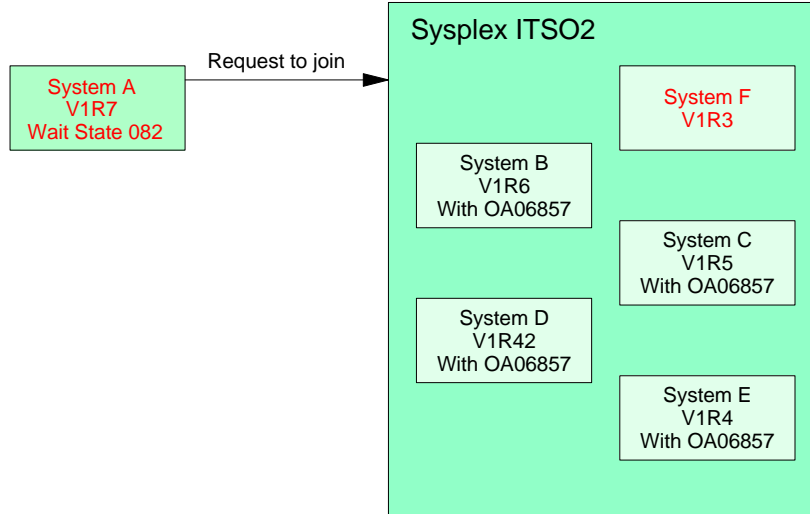
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Migration Scenario 1



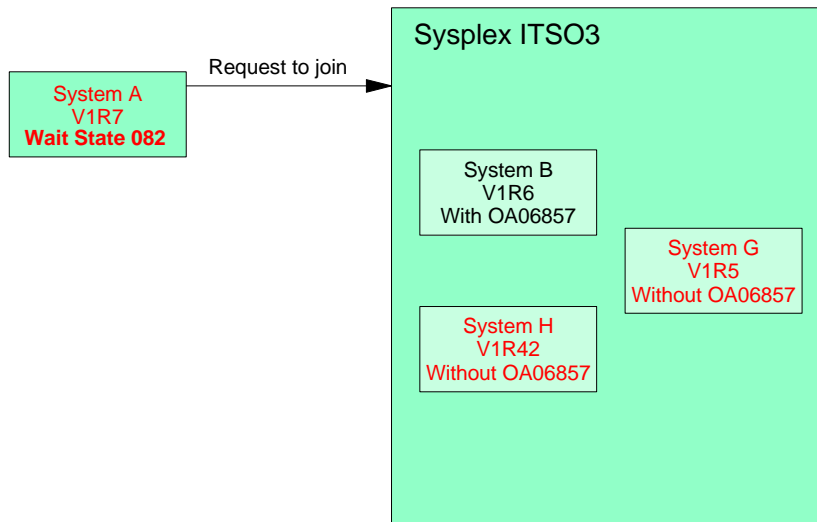
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Migration Scenario 2



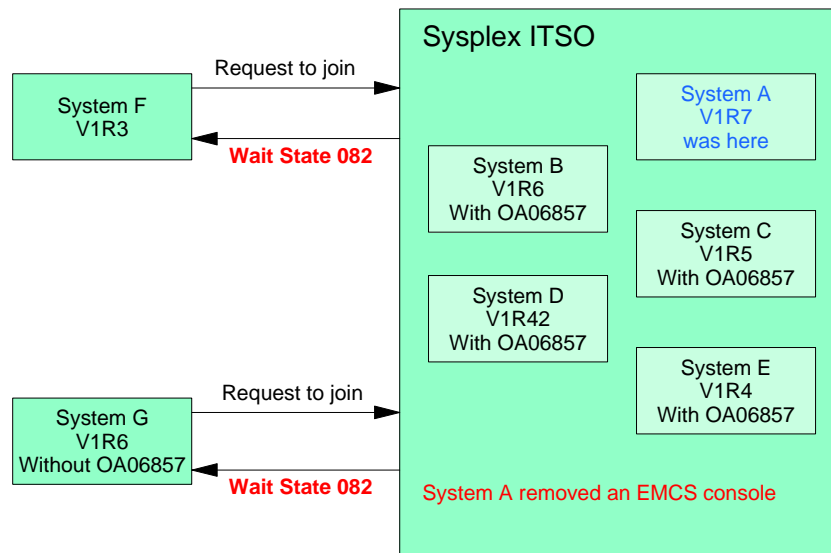
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Migration Scenario 3



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Migration Scenario 4



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EMCS Console Implementation

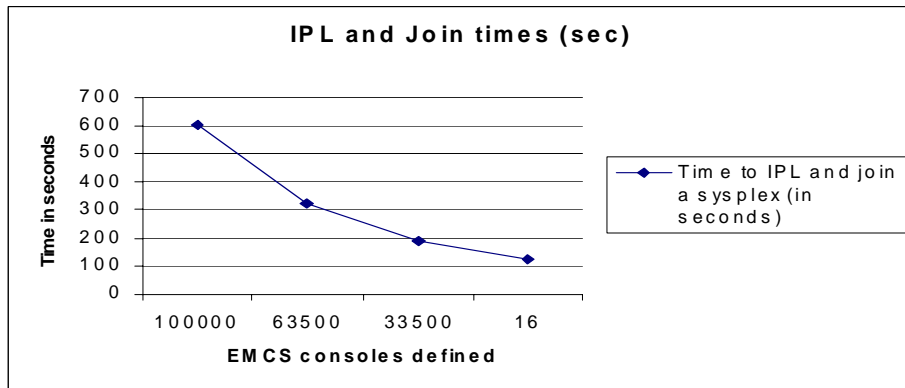


- ❑ A sample program (IEARELEC) is provided to show how to use the service that removes EMCS consoles
- ❑ Similar to IEARELCN which is used for MCS consoles
- ❑ The service supports the wildcarding of console names
- ❑ Must be APF-authorized
- ❑ Can be modified to pass a CART and/or console name (to direct any system messages issued by the service)



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Tests done on EMCS Consoles



Number of EMCS consoles defined	100000	63500	33500	16
Time to IPL and join a sysplex (sec)	605	324	187	122



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MONITOR Message Independence



- ❑ Enhancement allows monitor messages to be produced without requiring that messages be sent to a console
 - Produce messages and not use console routing attributes
- ❑ New MONITOR keyword for SETCON command
 - Enable or disable MONITOR message production
 - Control whether specific message types are logged
- ❑ New MONITOR keyword for DISPLAY OPDATA command
 - Displays overall MONITOR message production status



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MONITOR Message Independence



- ❑ SETCON MONITOR command new keyword options:
 - JOB NAMES = ON | ON,LOG | ON,NOLOG | OFF
 - SESS = ON | ON,LOG | ON,NOLOG | OFF
 - STATUS = ON | ON,LOG | ON,NOLOG | OFF
 - T = ON | OFF
- ❑ Using these command options - create messages
 - These messages are sent to the SYSLOG and OPERLOG

MONITOR Message Independence



- ❑ JOB NAMES - Message production is enabled for the display of the name of each job when the job starts and terminates, including unit record allocation when the step starts - If a job terminates abnormally, the job name appears in a diagnostic message
- ❑ SESS - Message production is to be enabled for the display of the user identifier for each TSO terminal when the session is initiated and when it is terminated - If the session terminates abnormally, the user identifier appears in the diagnostic message

MONITOR Message Independence



- ❑ STATUS - Message production is to be enabled for the display of data set names and volume serial numbers of data sets with dispositions of KEEP, CATLG, or UNCATLG whenever they are freed
- ❑ T - The T option is for monitor messages that can optionally contain a timestamp, and if so, the timestamp is to be included in the message



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Using New MONITOR Keyword



- ❑ DISPLAY OPDATA command
 - On the DISPLAY OPDATA command, the MONITOR keyword displays overall monitor message production status
 - DISPLAY OPDATA,MONITOR [,FULL]



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Using New MONITOR Keyword



DISPLAY OPDATA,MONITOR

```
CNZ1100I 10.03.57 MONITOR DISPLAY 849
SPACE=OFF DSNAME=OFF  TIMESTAMP=OFF
MSGTYPE  SETCON MN  NUMBER OF RECEIVERS
JOBNAMES  ON,LOG           3 CONSOLES
SESS      ON,NOLOG        5 CONSOLES
STATUS    OFF             3 CONSOLES
```

DISPLAY OPDATA,MONITOR,FULL

```
CNZ1101I 10.06.48 MONITOR DISPLAY 853
SPACE=OFF DSNAME=OFF  TIMESTAMP=OFF
MSGTYPE  SETCON MN  RECEIVING CONSOLE NAMES
JOBNAMES  ON,LOG           MCSY13E0 EMCSY1   EMCSY2
SESS      ON,NOLOG        MCSY13E0 EMCSY4   EMCSY5   EMCSY3
EMCSY6
STATUS    OFF             MCSY13E0 EMCSY7   EMCSY8
```



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Consoles Query Interface



- Internal and external users need a way to obtain “retained messages” data
- Enhancement in z/OS V1R7
 - Provide an IBM-supported interface
- The CNZQUERY interface has the following keywords:
 - WTOR = NO | YES
 - AMRF= NO | YES
 - ANSAREAALET=xansareaalet



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Consoles Query Interface



- ❑ **WTOR=YES** - Return information about WTORs
 - A queue of OREs is returned
- ❑ **AMRF=YES** - Return information about the AMRF
 - Three queues of WQEs are returned
- ❑ **ANSAREAALET** - This is the ALET of the data space which is to contain the output information
 - The data space must be on the dispatchable unit access list or be a common area data space
 - It must include the address range x'1000' through x'7FFFEFFF' (i.e., it is a 2G data space)

1-byte Console ID Elimination - V1R7



- ❑ **Remove externals (macros, commands) that support 1-byte Console IDs and migration IDs**
- ❑ **This is the last release to support 1-byte Console IDs**
- ❑ **A future release**
 - **Complete removal of 1-byte Console ID support**

1-byte Console ID Elimination



- ❑ There is a sysplex limit of 99 MCS, SMCS, and subsystem consoles
 - In the future, raising the limit requires the elimination of 1-byte console IDs
- ❑ Continue the transition to console names (or 4-byte Console ID) by removing all 1-byte Console ID externals, as well as all 1-byte migration ID externals
 - Opens the door for raising the sysplex limit of 99 MCS, SMCS and subsystem consoles to be delivered in a future release

One-byte Console ID Overview



- ❑ Future enhancements to the consoles components will require a redefinition of the console id field
- ❑ In z/OS V1R7 the one-byte console id will no longer be valid
- ❑ To aid in finding and eliminating users of one-byte console ids a service has been created.
 - Tracks 1-byte users on: WTO, MPF, SSI, MGCR/MGCRE, CONVCON, MCSOPER
 - Allows hooks into the same infrastructure for customers/vendors to track users of 1-byte console ids in their code

One-byte Console ID Solution



- ❑ Service is provided to detect and record instances of one-byte id usage
 - Command interface to activate / deactivate the service and to display the list of uses
- ❑ Programmable Interface is provided for customers and vendors to track usages in other interfaces
 - Requires hooks into existing code



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Utilizing One-byte ID Tracker



- ❑ To track usages on the console component interfaces
 - Operator command to control the activation of the service SETCON
TRACKING=ON/ONWITHABEND/OFF
 - Display 'violators' via the following command
 - **DISPLAY OPDATA,TRACKING**
 - Known instances can be ignored through the specification of CNIDTRxx member in SYS1.PARMLIB.
- ❑ To track other instances of 1-byte console ids
 - Initialize the CNZTRPL parameter list
 - Includes data that describes what is being tracked
 - Includes the 'bad' console id being used
 - Invoke the CNZTRKR service, passing the CNZTRPL parameter list



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D OPDATA,TRACKING command



```

CNZ1001I 10.53.40 TRACKING DISPLAY
STATUS=ON,ABEND NUM=08    MAX=1000 MEM=n/a EXCL=0    REJECT=0
----TRACKING INFORMATION---- -VALUE-- JOBNAME  PROGRAM+OFF-- ASID NUM
Parmlib Reader: ADYSET00          00 *MASTER* ADYSETP  1BD8  01  1
Parmlib Reader: COFVLF04          00 VLF        COFMINIT  2EFE  18  1
Parmlib Reader: IEFSSN00          00 *MASTER* IEEMB860  9E2A  01  1
Parmlib Reader: SMFPRM00          00 SMF        IFASMF    ECBE  19  1
WTO: CNZ1234I                     00 CNZJ      MOD1      1B0AC  14  2
WTO: CNZ1234I SYSTEM ZZ13 IS      A3 CNZJ      MOD2         9A  09  2
WTO: CNZ1234I SYSTEM ZZ13 IS      B0 CNZJ      MOD2         9A  09  5
WTO: CNZ5888E UH OH                00 CNZEND    MOD3      1288  18  1
    
```



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Example CNIDTRxx Parmlib Member



```

*                               Jobname  Pgmname                               *
* Tracking Information Mask      Mask      Mask      Comments (ignored)                    *
*-----+-----+-----+-----+-----+-----+-----+-----+-----+
CONVCON                          |*       |AJOB     | AJOB ISSUES CONVCON |
MCSOPER: *                       |MAINAS  |EMCSCON  | EMCSCON GETS MIGID  |
MGCR: *                          |SS2     |THESS20  |                      |
MGCR: *                          |*       |MYASIS   |                      |
PARMLIB READER: IEFSSN??         |*MASTER*|IEEMB860 |                      |
WTO: IEF452I *                   |*       |IEFNB903 |                      |
WTO: IEF677I WARNING MESSAGE|*       |IEFNB903 |                      |
***** Bottom of Data *****
    
```



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Migration/Coexistence Considerations



❑ Command externals

- All commands supporting L=cc and L=name now only support L=name
- The following commands used to support Console ID or name – they now only support console names

Command	Response if Console ID specified
D C,CN=nn	IEE274I DISPLAY CONSOLE nn NOT VALID
D PFK,CN=nn	IEE274I DISPLAY CONSOLE nn NOT VALID
D R,CN=nn	IEE274I DISPLAY CONSOLE nn NOT VALID
RESET CN(nn)	IEE274I RESET CONSOLE nn NOT VALID
SWITCH CN=nn	IEE274I SWITCH CONSOLE nn NOT VALID
VARY CN(nn)	IEE274I VARY CN CONSOLE nn NOT VALID



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Migration/Coexistence Considerations



❑ TRACK Command Elimination

- CONSOLxx PARMLIB Externals
 - UTME(nnn) keyword is no longer supported

IEA196I CONSOLJG 03E0: UNRECOGNIZED KEYWORD UTME(30) IGNORED.

- The following commands are no longer supported

Command	Response if command issued
TRACK	IEE305I TRACK COMMAND INVALID
STOPTR	IEE305I STOPTR COMMAND INVALID
CONTROL T	IEE156I CONTROL INVALID OPERAND -T
CONTROL D,H	IEE156I CONTROL INVALID OPERAND -D
CONTROL D,U	IEE156I CONTROL INVALID OPERAND -D
MSGRT TR=A	IEE156I MSGRT INVALID OPERAND -TR=A



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TRACK Command Elimination



- ❑ The TRACK command is incompatible with the new Console Restructure infrastructure (to be delivered in a future release)
- ❑ In z/OS V1R7 the TRACK and STOPTR commands are disabled since there are no known exploiters of this command
- ❑ Alternative:
 - \$TA and \$VS commands