

System Automation for OS/390



# Enhancements for Parallel Sysplex Automation

*Version 2 Release 1*



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*Version 2 Release 1*

### **Second Edition (May 2003)**

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# Contents

**Figures . . . . . v**

**Tables . . . . . vii**

**Chapter 1. Enhancements of Parallel Sysplex Operation with SA OS/390 . . . 1**

Functional Prerequisites . . . . . 1  
 Software Prerequisites . . . . . 2  
 Hardware Prerequisites . . . . . 3  
   Required Support Element LIC Levels . . . . . 3  
   Required Hardware Management Console LIC Levels . . . . . 3  
 Enhanced Sysplex Functions . . . . . 3  
 Managing Couple Data Sets . . . . . 3  
   Ensuring Continuous Availability of Alternate Couple Data Sets . . . . . 4  
   Customization . . . . . 4  
   INGPLEX CDS . . . . . 4  
 Managing the System Logger . . . . . 5  
   Terms and Concepts . . . . . 5  
   Resizing the LOGR Couple Data Sets in Case of Directory Shortage . . . . . 5  
   Notifying the Operator of Incorrect Share Options . . . . . 5  
   Customization . . . . . 6  
 Managing Coupling Facilities . . . . . 6  
   INGCF DRAIN . . . . . 7  
   INGCF ENABLE . . . . . 8  
   INGCF PATH . . . . . 9  
   INGCF STRUCTURE . . . . . 9  
   Customization . . . . . 9  
 Recovery Actions . . . . . 9  
   Resolving a System Log Failure . . . . . 9  
   Resolving WTO(R) buffer shortages . . . . . 10  
   Handling Long-Running Enqueues (ENQs) . . . . . 10  
   System removal . . . . . 11  
   Recovering Auxiliary Storage Shortage . . . . . 12  
 The IBM Health Checker for z/OS and Sysplex . . . . . 13  
   General Prerequisites . . . . . 13  
   HealthChecker Best Practice Values . . . . . 13  
   INGPLEX BESTpractices . . . . . 14  
   INGHC . . . . . 14  
   Customization . . . . . 15  
 Hardware validation . . . . . 15  
   Prerequisites . . . . . 17  
 Miscellaneous . . . . . 17  
   Recording IPL Information . . . . . 17  
   System Dump Options . . . . . 17  
   Multisystem Dumps . . . . . 17  
   SLIP Traps . . . . . 17

**Chapter 2. Preparing the Hardware . . . 19**

Understanding the Hardware Interface . . . . . 19  
 Preparing the Master Hardware Management Console . . . . . 19

Preparing the Support Element . . . . . 20  
 Configure SNMP . . . . . 20  
 Enable the API and Set the Community Name . . . . . 20  
 Set the Cross Partition Flags . . . . . 21

**Chapter 3. Customization Dialog Enhancements . . . . . 23**

Specifying Alternate Couple Data Sets with the Customization Dialog . . . . . 23  
 Defining the Policy Item SYSPLEX . . . . . 23  
 Automating System Log Recovery . . . . . 26  
 Automating WTO(R) Buffer Shortage Recovery . . . . . 27  
 Customizing Hardware Automation . . . . . 29  
   Entry PROCESSOR . . . . . 29  
   Entry IMAGECNTL . . . . . 30  
   IMAGE Definitions . . . . . 31  
   Automating System Removal . . . . . 33  
 Automating Long Running Enqueues . . . . . 36  
 Automating Auxiliary Storage Shortage Recovery . . . . . 37  
 Customizing the IBM Health Checker for z/OS and Sysplex . . . . . 38  
 Defining Common Automation Items . . . . . 40

**Chapter 4. Customizing the System to Use the New Functions . . . . . 43**

Additional Automation Operator IDs . . . . . 43  
 Switching Sysplex Functions On and Off . . . . . 43  
 Adding Procedures to PROCLIB . . . . . 44  
 Message Automation . . . . . 44  
 Important Processor Operations Considerations . . . . . 45  
 Allocating VSAM Data Sets . . . . . 45

**Chapter 5. Authorizations. . . . . 47**

Granting NetView and the STC-User Access to Data Sets . . . . . 47  
   Access to XCF Utilities . . . . . 47  
   Access to HOM Interface . . . . . 47  
   Access to IPL Information . . . . . 48  
   Access to Spare Couple Data Sets . . . . . 48  
   Access to User-Defined Couple Data Sets . . . . . 48  
   Access to Spare Local Page Data Sets . . . . . 49  
 Restricting Access to INGPLEX and INGC Functions . . . . . 49  
 Controlling Access to the Processor Hardware Functions . . . . . 50  
   Access to the CPCs . . . . . 50  
   Levels of CPC Access . . . . . 51  
   Defining the CPC Access Lists . . . . . 51

**Chapter 6. Sysplex-Related Commands 53**

Additional Parameters for System Operations Commands . . . . . 53  
 INGCF . . . . . 57  
   DRAIN . . . . . 64

|                             |     |
|-----------------------------|-----|
| ENABLE . . . . .            | 70  |
| PATH . . . . .              | 74  |
| STRUCTURE . . . . .         | 75  |
| INGCFL . . . . .            | 78  |
| Purpose . . . . .           | 78  |
| Syntax . . . . .            | 78  |
| Parameters . . . . .        | 78  |
| INGHC . . . . .             | 79  |
| Purpose . . . . .           | 79  |
| Types of reports . . . . .  | 79  |
| About the reports . . . . . | 79  |
| Types of actions . . . . .  | 80  |
| Recommendation . . . . .    | 80  |
| Syntax . . . . .            | 80  |
| Parameters . . . . .        | 81  |
| Examples . . . . .          | 82  |
| Line mode output . . . . .  | 85  |
| INGPLEX . . . . .           | 86  |
| BESTpractices . . . . .     | 90  |
| CDS . . . . .               | 93  |
| SYStem . . . . .            | 100 |
| CONsole . . . . .           | 102 |
| IPL . . . . .               | 105 |
| SDUMP . . . . .             | 107 |
| SVCdump . . . . .           | 110 |
| SLIP . . . . .              | 113 |

**Chapter 7. Messages . . . . . 115**

**Appendix A. The IBM Health Checker  
for z/OS and Sysplex Checks . . . . . 123**

**Appendix B. Response Messages,  
Error Strings, Condition Codes. . . . . 137**

|   |     |
|---|-----|
| Response Messages (AOFA0000 – AOFA0018) . . . . .                   | 137 |
| Asynchronous Response Messages<br>(AOFA0100-AOFA0900) . . . . .     | 142 |
| Condition Codes . . . . .   | 143 |
| Hardware Communication Task Condition<br>Codes "00B00xxx" . . . . . | 144 |
| SNMP Data Exchange Services "0B100xxx" . . . . .                    | 146 |
| SNMP Command Services "0B200xxx" . . . . .                          | 147 |
| BCP Internal Interface Transport Services<br>"0Bx00xxx" . . . . .   | 148 |

**Appendix C. Sense Codes, Hardware  
Object Status Summary . . . . . 153**

|  |     |
|--|-----|
| Sense Codes . . . . .                    | 153 |
| Hardware Object Status Summary . . . . . | 161 |

## Figures

|   |    |  |     |
|---|----|--|-----|
| 1. Sysplex Policy Definition Panel for Sysplex Groups . . . . .     | 24 | 28. Confirmation Panel for ENABLE . . . . .  | 72  |
| 2. Message Processing Panel. . . . .                                | 26 | 29. ENABLE Command Dialog: Panel After Enabling . . . . .  | 72  |
| 3. CMD Processing Panel. . . . .                                    | 27 | 30. ENABLE Command Dialog Panel: After Populating . . . . .                                      | 73  |
| 4. CMD Processing Panel. . . . .                                    | 27 | 31. PATH Dialog Panel . . . . .  | 74  |
| 5. Message Processing Panel. . . . .                                | 28 | 32. STRUCTURE Dialog Panel . . . . .   | 75  |
| 6. Code Processing Panel . . . . .                                  | 29 | 33. INGHC Panel . . . . .  | 82  |
| 7. Sample for UET Entry PROCESSOR . . . . .                         | 30 | 34. INGHC Check Confirmation Panel. . . . .  | 84  |
| 8. Sample for UET Entry IMAGECNTL . . . . .                         | 31 | 35. INGHC line mode output. . . . .  | 85  |
| 9. Definition of Application Type IMAGE . . . . .                   | 32 | 36. INGPLEX selection panel . . . . .  | 89  |
| 10. Application Automation Definition. . . . .                      | 33 | 37. INGPLEX BESTpractices panel . . . . .  | 90  |
| 11. Sample Panel for Defining IXC102A Automation . . . . .          | 34 | 38. INGPLEX CDS dialog panel . . . . .   | 94  |
| 12. Sample Panel for Command Processing . . . . .                   | 35 | 39. Confirmation panel for switching from the current primary CDS to the alternate CDS . . . . . | 95  |
| 13. Sample Panel for IXC102A and IXC402D Automation . . . . .       | 35 | 40. INGPLEX CDS dialog panel after the switch . . . . .  | 96  |
| 14. UET Keyword-Data Specification Example . . . . .                | 39 | 41. CFRM couple data set information panel before policy switch. . . . .                         | 97  |
| 15. UET Keyword-Data Entry for L69 . . . . .                        | 40 | 42. Confirmation panel for policy switch . . . . .   | 98  |
| 16. Sample Definition of Key-Data Pairs for Entry ENVIRON . . . . . | 41 | 43. Channel path information for CFRM couple data sets . . . . .                                 | 98  |
| 17. Flag Automation Specification Panel . . . . .                   | 44 | 44. INGPLEX SYSTEM dialog panel . . . . .  | 100 |
| 18. Resource Selection Panel 1 – Non-sysplex-wide . . . . .         | 55 | 45. INGPLEX CONS dialog panel . . . . .  | 102 |
| 19. Resource Selection Panel 2 – Sysplex-wide . . . . .             | 56 | 46. INGPLEX IPL main panel . . . . .   | 105 |
| 20. INGCF Selection Panel. . . . .                                  | 63 | 47. INGPLEX dump options panel. . . . .  | 107 |
| 21. DRAIN Command Dialog Panel: Before any Action . . . . .         | 66 | 48. INGPLEX SDUMP panel. . . . .   | 108 |
| 22. DRAIN Command Dialog: Confirmation Panel for REBUILD . . . . .  | 67 | 49. INGPLEX SDUMP modification panel . . . . .   | 109 |
| 23. DRAIN Command Dialog Panel: After Rebuild . . . . .             | 67 | 50. INGPLEX SVCDUMP target system selection panel . . . . .                                      | 110 |
| 24. DRAIN Command Dialog Panel: After Forcing . . . . .             | 68 | 51. INGPLEX SVCDUMP address space selection panel . . . . .                                      | 111 |
| 25. DRAIN Command Dialog Panel: After Draining . . . . .            | 69 | 52. INGPLEX SVCDUMP address space detail panel . . . . .   | 111 |
| 26. DRAIN Command Dialog Panel: After Inactivation . . . . .        | 69 | 53. INGPLEX SVCDUMP dump option panel . . . . .  | 112 |
| 27. ENABLE Command Dialog: Panel Before Any Action . . . . .        | 71 | 54. INGPLEX SLIP main panel . . . . .  | 113 |





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## Tables

|    |  |     |    |   |     |
|----|--|-----|----|---|-----|
| 1. | . . . . .  | 123 | 5. | SNMP Command Services Condition Codes   | 148 |
| 2. | AOFA0000 Response Message Error Strings                  | 137 | 6. | BCP Internal Interface Transport Services<br>Condition Codes . . . . .        | 149 |
| 3. | Hardware Communication Task Condition<br>Codes . . . . . | 144 | 7. | Status values for CPC and image objects<br>provided by the z900 API . . . . . | 161 |
| 4. | SNMP Data Exchange Services Condition<br>Codes . . . . . | 146 |    |   |     |



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## Chapter 1. Enhancements of Parallel Sysplex Operation with SA OS/390

This document describes the functional enhancements that are shipped with APARs OW50146 and OW56107. Installing these grant greater system reliability and availability in the sysplex. Sysplex management with SA OS/390 is enhanced as follows:

- A number of recovery actions can now be automated, for example:
  - Creating or recreating missing alternate couple data sets (CDSs)
  - Expanding the system logger CDSs in case of a directory shortage
  - Resolving of WTO(R) buffer shortages
  - Resolving pending I/Os for systems being removed from the sysplex
  - Recovering auxiliary storage
  - Recovery of long-running ENQs

Each automatic recovery action can be enabled or disabled separately. To do this, additional minor resources are introduced for the MVS Component policy object (MVC entry type). A number of these actions can be customized. For further information refer to Chapter 3, “Customization Dialog Enhancements”, on page 23 and “Automating WTO(R) Buffer Shortage Recovery” on page 27.

- The previously available sysplex-related commands have now been merged into two powerful commands, INGPLEX and INGCF. Furthermore, the following functions were introduced:
  - Making an alternate CDS the primary one
  - Defining a new alternate CDS
  - Switching the active policy
  - Integrating a coupling facility into the sysplex
  - Recording IPL information
  - Allowing for specifying dump options
  - Allowing for multisystem SVC dumps
  - Viewing, enabling disabling, and deleting SLIP traps defined in the sysplex.

This new edition incorporates the APAR that introduces the following changes and improvements:

- The IBM Health Checker for z/OS and Sysplex and its related command INGHC; for more information see “INGHC” on page 79
- Avoiding sysplex outages through better handling of hung commands
- Improved resolution of pending I/Os for systems being removed from the sysplex
- Hardware validation

---

### Functional Prerequisites

The following lists the functional hardware and software prerequisites that are required for using the enhanced Parallel Sysplex automation functionality shipped with APARs OW50146 and OW56107.

## Functional Prerequisites

To obtain current service recommendations and to identify current product service requirements, contact the IBM Customer Support Center or use S/390 SoftwareXcel to obtain the current "PSP Bucket".

## Software Prerequisites

The following APARs need to be installed:

| APAR    | PTF     | FMID    | Area | Function  |
|---------|---------|---------|------|---|
| 0W51923 | UW84343 | HBB7703 | SPI  | BCP (Basic Control Program) Internal Interface used by system |
|         | UW84344 | HBB7705 |      | recovery and coupling facility                                |
|         | UW84345 | HBB7706 |      | functions   |

This APAR allows multiple applications (especially HCD and SA OS/390) to use the BCP Internal Interface simultaneously. SA OS/390 uses this interface to activate, inactivate, and query coupling facilities as well as to send hardware commands to the LPAR of the system which is being partitioned out of the sysplex.

| APAR    | PTF     | FMID    | Area | Function                    |
|---------|---------|---------|------|-----------------------------|
| 0W52369 | UW86446 | HBB7703 | XCF  | Coupling facility functions |
|         | UW86444 | HBB7705 |      |                             |
|         | UW86445 | HBB7706 |      |                             |

With z/OS 1.2, XCF introduced a different behavior from previous functionality of how users are informed when a rebuild duplex process has completed. Only users starting the duplex process are informed when this process has been stopped. Therefore, all automation functions doing rebuilds will time-out for structures whose duplex process has been started by MVS or by another operator. This APAR resolves the situation by informing the user who started the duplex process as well as the user who stops it.

| APAR    | PTF     | FMID    | Area | Function                         |
|---------|---------|---------|------|----------------------------------|
| 0W56587 | UW94992 | HBB7703 | GRS  | Elimination of long running ENQs |
|         | UW94993 | HBB7705 |      |                                  |
|         | UW94994 | HBB7706 |      |                                  |
|         | UW94995 | HBB7707 |      |                                  |

The automation of eliminating long-running ENQs is only available when this APAR is installed. After installing the APAR you can activate this automation by issuing the ACF COLD command from the NCCF screen of the NVSS where you want to run this sysplex-wide automation. This command will schedule the automation function on the appropriate autotask when the APAR has been applied. Recycling the NVSS address space has the same result.

| APAR    | PTF | FMID    | Area | Function                   |
|---------|-----|---------|------|----------------------------|
| 0W53637 |     | HBB7703 | XCF  | Structure rebuild function |
|         |     | HBB7705 |      |                            |
|         |     | HBB7706 |      |                            |

With z/OS 1.2, XCF introduced a different behavior from previous functionality of how users are informed when a rebuild duplex process has completed. This also affects messages issued on behalf of the SETXCF ALTER command. When the automation rebuilds a structure, it also checks its initial and actual size. In case the initial size is less than the actual size the automation tries to change the initial size to the actual size. Because the expected message is no longer issued as a command

response the automation times out when waiting for it and issues an appropriate message. Even if automation continues the message could be misleading. This APAR resolves the problem.

## Hardware Prerequisites

**Note:** A number of hardware commands are not supported when running on a z/OS image which runs under z/VM. Refer to “Enhanced Sysplex Functions” for information about which particular functions are affected.

### Required Support Element LIC Levels

For current information about the required LIC levels for the following servers, refer to the PSP bucket.

- zSeries
- CMOS-S/390 G5, G6
- CMOS-S/390 G3, G4

### Required Hardware Management Console LIC Levels

For zSeries processors, the following LIC levels are required:

- Driver 3g, J11213.107
- Driver 3c, J10638.116

For CMOS-S/390 G5 and G6 processors the following LIC level is required:

- Driver 26.F99918.140

These MCL levels are required for all HMCs that serve as Master HMCs and have the LIC change console service enabled. Note that at least one HMC in your processor LAN configuration must have this service enabled in order to provide cross-CPC communication over the BCP Internal Interface.

---

## Enhanced Sysplex Functions

This section gives an overview of the SA OS/390 sysplex functions that can now be automated and the new command-driven actions.

### Managing Couple Data Sets

*Couple data sets* (CDSs) contain control information about the sysplex and its resources, and are of crucial importance for the functioning of a Parallel Sysplex. Particularly important are the SYSPLEX couple data set, which contains information about the systems and the communication structure (XCF groups) of the sysplex, and the CFRM couple data set, which specifies its coupling facilities (CFs) and structures (see “Managing Coupling Facilities” on page 6). Every MVS system in a Parallel Sysplex must have access to these CDSs, and to those of all other implemented sysplex functions, such as SFM and Application Response Measurement (ARM).

If a member system cannot access a CDS, the corresponding sysplex function is impacted, and in some cases the sysplex will go down. It is therefore recommended that you define two CDSs to XCF for every CDS type required for the implementation of the sysplex. One of these, the *primary* CDS, is the one that is actually used. The other, which is called the *alternate* CDS, serves as a backup copy. The two CDSs contain the same data. Whenever the primary CDS changes, XCF updates the alternate CDS accordingly. If an alternate CDS is available for a certain type, XCF automatically switches to this alternate CDS whenever a member can no longer access the primary CDS.

## Managing Couple Data Sets

All CDSs except the sysplex couple data set contain one or more user-defined configurations, called *policies*. For each CDS type, only one policy can be active. However, it is possible to switch the active policy at run time. Refer to “INGPLEX CDS” for further information.

SA OS/390 offers two functions for easier CDS management:

- Automated creation and recovery of alternate couple data sets for continuous availability
- INGPlex CDS, which simplifies management of couple data sets

The following describes the enhancements of SA OS/390 for managing couple data sets.

### Ensuring Continuous Availability of Alternate Couple Data Sets

When an alternate CDS exists for a given CDS type and the current primary CDS fails, XCF makes this alternate the primary CDS. After this switch, however, an alternate CDS no longer exists, and if the current primary CDS also fails, the problems that were to be avoided by the creation of an alternate occur again. To avoid this single-point-of-failure situation, SA OS/390 provides a recovery mechanism that tries to ensure that an alternate CDS is always available for every CDS type used.

SA OS/390 creates a new alternate CDS in the following two situations:

- During initialization, SA OS/390 checks that an alternate CDS is specified for every primary CDS. If there is a primary CDS for which no alternate CDS exists, SA OS/390 automatically creates it.
- At run time, SA OS/390 ensures that a new alternate is created whenever the current alternate has been removed or switched to the primary one.

### Customization

Recovery of alternate CDSs is initiated either by the CDS function of INGPlex or in the background (for example, at initialization time). Background recovery can be switched on and off by using the SA OS/390 customization dialogs. Automatic re-creation with INGPlex CDS is always enabled.

You must specify the spare volumes that SA OS/390 may use for creating missing alternate CDSs (using the policy item SYSPLEX from the *Policy Selection* panel for sysplex groups). This is also required for automatic creation with INGPlex CDS. Every CDS type has its own pool of spare volumes. Note that if you do not define spare volumes for a CDS type, no recovery will be performed for this type. For details on the use of the customization dialogs, see “Specifying Alternate Couple Data Sets with the Customization Dialog” on page 23.

You can control access to those functions of INGPlex CDS that modify the sysplex configuration. Refer to “Restricting Access to INGPlex and INGCF Functions” on page 49 for details.

### INGPLEX CDS

INGPLEX CDS displays information about all couple data sets, including details of the respective policies, and allows you to perform the following actions for every CDS type that is required for the implementation:

- Switch from the primary to the alternate CDS
- Define a new alternate CDS
- Change the active policy (if applicable)
- Automatically rebuild a structure after the activation of the CFRM policy

For the first two actions, INGPLEX CDS offers automatic creation of a new alternate CDS. You can also specify your own alternate CDS. For more information on INGPLEX CDS, see “CDS” on page 93.

## Managing the System Logger

### Terms and Concepts

The *system logger* provides a sysplex-wide logging facility. Applications that use the system logger write their log data into *log streams*. Within a Parallel Sysplex, these log streams are usually associated with a coupling facility structure. For further information about coupling facility structures, refer to “Managing Coupling Facilities” on page 6. By using a coupling facility log stream, members of a multisystem application can merge their logs even when residing on different systems.

When an application writes data to a log stream this data is stored at first temporarily in the associated structure (coupling facility log stream) or a local buffer (DASD-only log stream). From there, it is offloaded into a log stream data set which is automatically allocated by the system logger. When this log stream data set is full, the system logger allocates a second one, and so on.

The control information for the system logger, which includes a directory for the log stream data sets of every log stream, is contained in the LOGR couple data set. The total number of log stream data sets that can be allocated by the system logger is determined when the LOGR couple data set is formatted.

Two problems that can arise in connection with the log stream data sets are a shortage of directory space in the LOGR CDS and incorrect share options for the log stream data sets. SA OS/390 provides the following recovery actions for these problems:

- The primary and alternate LOGR CDSs are automatically resized if there is a directory shortage
- The operator is notified if the share options for log stream data sets are not defined correctly

### Resizing the LOGR Couple Data Sets in Case of Directory Shortage

The LOGR CDS contains information about the log stream data sets used by the system logger. This information is stored in *directory extents*. Every directory extent record can hold information about up to 168 log stream data sets. The number of directory extents available in a LOGR CDS is specified when the CDS is formatted (DSEXTENT parameter). When all available directory extents are used up the system logger can no longer allocate new log stream data sets. This can cause considerable problems for applications that use the system logger.

With SA OS/390, you can avoid this situation. If you switch on logger recovery, SA OS/390 automatically reformats your primary and alternate LOGR CDS with an increased DSEXTENT parameter whenever the system reports a directory shortage.

### Notifying the Operator of Incorrect Share Options

**Note:** This section applies to z/OS 1.2 and below.

If you wish to use the system logger, you must define share options for the log stream data sets. Merging data from several systems into one coupling facility log

## Managing the System Logger

stream requires you to specify VSAM SHAREOPTIONS(3,3) for the log stream data sets. With other share options, especially (1,3), such a merge will fail. If you manage your DASD data sets with SMS (Storage Management Subsystem), a possible cause for incorrect share options is that the data class you use for the log stream data sets is also used for other purposes that require different share options.

SA OS/390 provides a control mechanism for VSAM share options. The share options are checked on a daily basis. If incorrect share options are detected, SA OS/390 notifies the operator.

### Customization

Automation of system logger recovery is enabled through the SA OS/390 customization dialogs. For more details, see “Automating System Log Recovery” on page 26.

## Managing Coupling Facilities

A *coupling facility* (CF) is a logical partition that provides storage for data exchange between components of an application that is distributed across different systems in a Parallel Sysplex. A Parallel Sysplex can contain more than one CF. The storage of a coupling facility is divided into areas that are called *structures*. You can imagine a structure as a special kind of data set. It is these structures, which are identified by their name, that are accessed for reading and writing by the application components.

The association between CFs and structures is dynamic. A structure that is used by an application need not be allocated at all (for example, when the application is not running), and can be allocated on different CFs at different points in time. For every structure, there exists a *preference list* that defines the CFs on which it may be allocated. The order of the CFs in that list determines which CF is selected when more than one member of the list satisfies all allocation requirements (for example, provides enough space).

The preference list, the space requirements, and other properties of the structures are defined in the active CFRM policy. This policy is contained in the CFRM couple data set. Refer to “Managing Couple Data Sets” on page 3 for further information.

XES allocates a structure that does not yet reside on any CF when an application component needs to be connected to it. Note that the application component only specifies the name of the structure that it wants to access. It is XES that decides on which CF the structure is allocated. This decision is influenced by the structure definition in the active CFRM policy. After the structure has been allocated, the requesting application component can access it, and further components of this application can require to connect to it. An application component that has access to an allocated structure is referred to as an *active connector* to this structure.

In the simplest case, XES deallocates a structure when all connected application components have disconnected from the structure. However, an application component can require that the structure or its own connection to the structure be *persistent*. When the *structure* is persistent it remains allocated even when the application component is no longer connected to it. When a *connection* is persistent the structure remains allocated after a failure of that connection. The application component in question remains a connector to the structure, although not an active one. It is now a *failed persistent* connector. In both cases, you can force the deallocation of the structure as soon as it no longer has active connectors.



## Managing Coupling Facilities

Allocated structures can be *rebuilt*. Rebuilding is the process of reconstructing a structure on the same or another CF. A rebuild consists of three main steps. First, XES allocates the new structure instance. Then, the data of the old structure is reconstructed in the new structure. Finally, XES deallocates the old structure instance. Note that you cannot specify the target CF in your rebuild request. As with structure allocation, XES selects it from the preference list.

There are two methods for rebuild: user-managed and (from OS/390 2.8 onward) system-managed. With user-managed rebuild, the active connectors are responsible for reconstructing the data. With system-managed rebuild, XES transfers the data to the new structure instance. System-managed rebuild is thus also available for structures without active connectors. These structures can either themselves be persistent or have failed persistent connections.

When an application component connects to a structure, it specifies whether it allows the structure to be rebuilt through user-managed or system-managed rebuild. For structures with active connectors, both rebuild methods require that all active connectors allow the respective rebuild method.

You can also *duplex* structures. Duplexing means maintaining two instances of the same structure on different CFs at the same time. Duplexing serves to increase availability and usability of a structure.

Typical management tasks for CFs are removing a CF from the sysplex and reintegrating it again. These tasks have several steps that must be performed in a certain order and can be quite complex. To simplify these operations, SA OS/390 offers the INGCF command. INGCF has several functions, which serve to manipulate structures and the CFs themselves. These functions are briefly described in the following. For more information, see “INGCF” on page 57.

Some functions deal with the sender paths of a coupling facility. They have the following limitations. First, at least one system in the sysplex that is running the automation must know the control unit id (CUID) of the coupling facility. If this is not the case, no missing sender paths can be resolved.

A missing sender path occurs when a coupling facility is deactivated prior to a system IPL (or reIPL) and then activated afterwards. The system that has been IPLed (or reIPLed) does not recognize the coupling facility. To determine the missing sender paths, the automation calls the HOM interface of HCD. Resolving the missing path information is only possible when either the complete network address is defined in HCD along with the processor id, or you provide the CPC synonym used by the automation as the processor id. However, it is recommended that you define both. If neither is defined, the system that misses the sender paths must run the automation.

### INGCF DRAIN

INGCF DRAIN displays information about the allocated structures of a coupling facility and supports removal of this coupling facility from the sysplex. Usually, draining a coupling facility requires that at least one alternate coupling facility is enabled for the sysplex.

With INGCF DRAIN, you can perform the following sequence of tasks:

1. Rebuild all structures that can be rebuilt with user-managed or system-managed rebuild on an alternative coupling facility, and deallocate structure instances on the target CF that are being duplexed on another CF. For duplex structures, the duplexing process is stopped.

## Managing Coupling Facilities

The scope of the rebuild action depends partly on the release level of the systems from which the structures were allocated:

- Structures that were allocated from a system with OS/390 2.7 or below can only be rebuilt if they have at least one active connector and all its active connectors support user-managed rebuild.
- Structures that were allocated from a system with OS/390 2.8 or above can be rebuilt if they have an active connector and support either user-managed or system-managed rebuild, or if they have no active connector.

**Note:** INGCF DRAIN rebuilds structures one at a time (SETXCF START,REBUILD,STRNAME=), not globally (SETXCF START,REBUILD,CFNAME=), and always on a CF that is different from the target CF (LOCATION=OTHER).

2. Force the deallocation of structures that have no active connectors and could not be rebuilt.
3. Disconnect the coupling facility from the systems to which it is connected.
4. Deactivate the coupling facility.

**Note:** This task is unavailable when running on a z/OS image which runs under z/VM.

INGCF DRAIN ensures that the supported actions are carried out in the right order. Thus, for example, INGCF DRAIN lets you disconnect the coupling facility from the systems only after all structures of the coupling facility have been moved to another CF or have been deallocated. After each step, INGCF DRAIN presents the results of that step. You can then choose whether you want to initiate the next step.

For further information about the INGCF DRAIN command refer to “INGCF” on page 57.

### INGCF ENABLE

INGCF ENABLE is the counterpart of INGCF DRAIN. It supports integration of a new CF into a sysplex and reintegration of an existing CF into the sysplex, for example, after maintenance of the CF.

**Note:** INGCF ENABLE assumes that the receiver paths from the CF to the systems in the sysplex have been defined and activated. This requires a POR of the CPC on which the CF resides.

With INGCF ENABLE, you can perform the following sequence of tasks:

1. Activate the coupling facility.

**Note:** This task is unavailable when running on a z/OS image which runs under z/VM.

2. Connect the systems of the sysplex with the coupling facility (sender paths).
3. Switch to another CFRM policy if
  - the target CF is not defined in the active policy, and
  - a policy is available that contains the target CF and definitions for all active CFs and all allocated structures.
4. Populate the target CF, that is, rebuild all those structures on the target CF, if this CF is the first usable one in the preference list, provided that this is not excluded by other requirements.

When the structures have been allocated on the target CF, INGCF ENABLE displays the result.

As with INGCF DRAIN, INGCF ENABLE ensures that the supported actions are carried out in the right order. Thus, you can only start populating the target CF after it has been connected to the systems in the sysplex.

For further information about the INGCF ENABLE command refer to “INGCF” on page 57.

### INGCF PATH

INGCF PATH lets you set the sender paths ONLINE or OFFLINE. The last sender path can only be set offline when no more structures are allocated. For further information about the INGCF PATH command refer to “INGCF” on page 57.

### INGCF STRUCTURE

INGCF STRUCTURE displays all the allocated structures of a coupling facility and information about their actual conditions. For a selected structure, you can:

- Display detail information
- Initiate a rebuild on another CF, depending on the rebuild pending status (PENDING calls LOCATION=NORMAL, otherwise LOCATION=OTHER)
- Force the deletion of the structure
- Start and stop duplexing

Rebuild and deletion can only be performed for structures with certain conditions.

For further information about the INGCF STRUCTURE command refer to “INGCF” on page 57.

### Customization

None. For information on how to control access to INGCF, refer to “Restricting Access to INGPlex and INGCF Functions” on page 49.

Note that the ENABLE function requires that the active IODF is catalogued. otherwise, sender path information cannot be retrieved in certain situations.

## Recovery Actions

### Resolving a System Log Failure

SYSLOG message automation has been enhanced with a recovery function. Both functions (recovery and automation of message IEE043I) exist in parallel. Recovery takes place if the system log becomes inactive. It responds to message IEE037D following one of the messages IEE043I, IEE533E, or IEE769E, and it responds to message IEE041I. For details refer to “Automating System Log Recovery” on page 26. Except for the decision message, you can define individual action commands in the customization dialogs for the above messages.

Because the recovery and the former automation of message IEE043I affect the same resource SYSLOG, only one threshold can be defined in the policy SYSLOG THRESHOLDS. To allow the separate control of SYSLOG recovery from the former SYSLOG message automation, the new minor resource flag LOG has been introduced. For the run time environment, two thresholds are generated from the single threshold definition. The names of these thresholds correspond to the names of the minor resource flags.

## Recovery Actions

**Note:** Action commands that are executed for the old SYSLOG message automation are defined in the customization dialog using the entry SYSLOG in the messages policy for the entry type MVS Components. Action commands that are executed for the new SYSLOG recovery of message IEE043I are defined in the customization dialog in entry IEE043I in the same policy. If SYSLOG message and recovery commands are defined, both action commands will be issued, if message IEE043I followed by message IEE037D is trapped.

**Customization:** Automation of system log recovery is enabled through the SA OS/390 customization dialogs. For more details, see “Automating System Log Recovery” on page 26.

### Resolving WTO(R) buffer shortages

When all WTO(R) buffers are in use, it is possible that commands can no longer be processed. To resolve this, there are several options: you can extend the buffer, change the properties of the affected consoles, or cancel jobs that issue WTO(R)s.

SA OS/390 provides recovery of buffer shortage in two stages. It first tries to extend the buffer and modify the console characteristics, if applicable. If this does not help, it then cancels jobs that issue WTO(R)s. You must specify which jobs can be canceled by SA OS/390 if there is a buffer shortage.

**Customization:** Automation of buffer shortage recovery is enabled using the SA OS/390 customization dialogs. For more information, see “Automating WTO(R) Buffer Shortage Recovery” on page 27.

### Handling Long-Running Enqueues (ENQs)

This recovery function lets you:

- Check which resources are blocked
- Customize automation to cancel or keep the jobs that block the resource
- Customize automation to dump the jobs before they are canceled

You can determine which resources you want to monitor. You can define a value for the maximum time a job can lock a resource while other jobs are waiting for it. If this amount of time is exceeded, recovery takes place. Identification of and elimination of these potential bottlenecks helps to reduce the risk of a Parallel Sysplex outage.

While the time definition describes an inclusion list, you also have the possibility to define an *exclusion list* of resources that are not monitored at all.

For more information about enabling the ENQ function, see “Automating Long Running Enqueues” on page 36.

This function has now been extended to include automatic recovery of the SYSIEFSD family of resources.

**SYSIEFSD resource recovery:** The purpose of this function is to detect critical ENQ resources that, if held for extended periods of time, can cause commands to hang. Hung commands often result in multisystem outages. The focus of this function is on the SYSIEFSD family of resources that are involved in 98% of hung command outages:

- SYSIEFSD Q10 – this resource is required for every command. It is used to serialize changes to the CSCB chain. If any task gets this resource and then hangs, *all commands* will be locked out of the system. This also means that *all*

*consoles* will be locked out of the system. This is because, as soon as a console issues a command after Q10 has hung, it will be waiting behind Q10, and that locks out the task that handles all MCS consoles. EMCS consoles will then also get locked out one by one as they issue a command and also get hung behind Q10. Actions taken to free up this hang cannot include issuing a command (for example, D GRS)—the task has to be terminated via CALLRTM.

- SYSIEFSD Q4 – this resource is used to serialize changes to the UCB by allocation and VARY command processing. Allocation obtains the resource as SHARED, while the VARY command obtains it exclusively. If a VARY command hangs while holding this resource, all allocations will also hang. The VARY command that is hung can be displayed and abended with the CMDS command.
- SYSIEFSD VARYDEV – this resource is used in the processing of VARY commands. If the resource is hung, then all VARY commands will hang behind it. The VARY command that is hung can be displayed and abended with the CMDS command.
- SYSIEFSD CHNGDEVS – this resource is used in the processing of UNLOAD commands. If this resource is hung, then other UNLOAD commands will be hung behind it, and allocations may also hang. The UNLOAD command that is hung can be displayed and abended with the CMDS command.

If any of these resources do not execute within 10 seconds, they are considered to have hung.

**Hung command recovery:** The purpose of this function is to detect hung commands that often result in multisystem outages. Any commands shown by the MVS command CMDS SHOW that do not execute within 30 seconds are considered to have hung. Exceptions to this are the following commands:

- TRACE and DUMP are given a time limit of 5 minutes because they are interactive commands
- SET SLIP and SET MPF are excluded from hung command recovery
- A dump is made for all other commands that are abended because the reason for abending them is not known.

**Customization:** Automation of handling long-running enqueues is enabled through the SA OS/390 customization dialogs. For more details, see “Automating Long Running Enqueues” on page 36.

Neither SYSIEFSD resource recovery nor hung command recovery need further customization.

### System removal

The purpose of this function is to isolate failed systems from a Parallel Sysplex by removing them as quickly as possible. It also ensures fast mean time to recovery (MTTR) for those system images that you wish to restart immediately if an unavoidable outage occurs.

**Note:** This function is unavailable when running on a z/OS image which runs under z/VM, even if the function is enabled.

In particular, the function automates the messages IXC102A and IXC402D.

The automation of the first message completes the Sysplex Failure Management (SFM). Under certain circumstances SFM cannot complete the isolation of a failed system. This is because SFM’s HW isolation, resetting the channel subsystem (CSS) of the failed system, is driven through the CF. When connectivity between the

## Recovery Actions

system image and the coupling facility is lost, SFM cannot perform the hardware isolation (ISOLATE command) and defers resetting the system image until manual operator intervention occurs. Message IXC102A tells the operator to manually reset the HW and then reply "DOWN" to the message, after which SFM safely partitions the system image out of the sysplex. The longer the delay lasts, the more the components and applications that rely on XCF messaging are impacted. The delay can eventually lead to a sysplex outage when the failed system has I/O operations pending. Automation of this message minimizes the delay.

The second message has the same impact as the first one. However, this message indicates a possible temporary inoperative status of the system due to a missing status update. For this reason the automation gives the system the chance to recover before the removal takes place by replying "INTERVAL=sss" to the first occurrence of message IXC402D. The interval time is calculated as twice the SPINTIME value (defined in parmlib member EXSPATxx) plus 5 seconds.

The automation does the removal of a system in two stages. The first stage clears any pending I/O operations by sending a hardware command to the Support Element. This requires information about the software running on the hardware. Because the system issuing message IXC102A or IXC402D does not necessarily have access to the hardware of the failed system, the automation needs predefined mapping between software and hardware. Depending on this mapping, it then routes the hardware command to the system that has access to the hardware of the failed system. For information about how to do the mapping refer to "Customizing Hardware Automation" on page 29. For further information about the hardware requirements refer to Chapter 2, "Preparing the Hardware", on page 19.

The second stage replies to the outstanding WTOR with "DOWN" triggering the removal of the system from the sysplex.

**Customization:** Automation of message IXC102A is enabled through the SA OS/390 customization dialogs. For more details, see "Automating System Removal" on page 33.

### Recovering Auxiliary Storage Shortage

With the automation of local page data sets, SA OS/390 prevents auxiliary storage shortage outages by dynamically allocating spare local page data sets when needed. The function checks which jobs cause the shortage condition and whether additional page data sets can be added. If this is not possible, the job that is causing the shortage will be canceled if this has been defined.

To enable local page data set automation customize the PAGTOTL parameter (defined in one of the IEASYSxx PARMLIB members used during IPL). Make sure to set the PAGTOTL parameter to a value greater than the number of local page data sets currently used.

Local page data sets must be defined in the master catalog and should not be SMS-managed. It is recommended to use preallocated local data sets instead of dynamically allocated ones. This makes the process faster because formatting newly allocated page data sets is timeconsuming (10sec./35MB). Each predefined local page data set should be allocated with 10% space of local page space currently used by the system. If predefined page data sets can no longer be allocated, new local page data sets will be created dynamically.

**Customization:** Automation of the recovery of auxiliary storage shortage is enabled through the SA OS/390 customization dialogs. For more details, see “Customizing Hardware Automation” on page 29.

### The IBM Health Checker for z/OS and Sysplex

The IBM Health Checker for z/OS and Sysplex is a tool that checks the current, active operating system (z/OS or OS/390) and sysplex settings and definitions for an image, and compares their values to those either suggested by IBM or defined by you, as your criteria. The objective of the HealthChecker is to identify potential problems before they impact your availability, or in worst cases, cause outages. The function produces reports (snapshots of your system) to help you analyze the values defined for this system. SA OS/390 can automate the running of the checks **sysplex-wide** and provides an easy-to-use interface for viewing the report data.

#### General Prerequisites

The following operating systems are supported by the HealthChecker:

- OS/390 R10 or later
- all z/OS releases

The following system configurations are supported:

- XCFLOCAL is NOT supported
- MONOPLEX
- MULTISYSTEM

#### HealthChecker Best Practice Values

The values used by the HealthChecker are also referred to as best practices and originate from a variety of sources, including books and Web sites. However, the fact that the information comes from various sources can make it more difficult for you to ensure that your configurations reflect all of the suggestions. Using the HealthChecker means that this work is done for you. Another problem is keeping up with the changes that may have been made on your systems and ensuring that they still reflect either IBM’s suggestions or your own criteria. To address this, you can ensure that the HealthChecker be run on demand or automatically, and hence easily determine if new values have introduced potential exceptions. We also realize that there are customer-unique and system-unique cases where the IBM suggestions are not appropriate. Therefore, you can either specify overrides to IBM values or suppress the running of a check. See Chapter 3, “Customization Dialog Enhancements”, on page 23 for details.

The HealthChecker checks the current values that are being used by your system; it does not check PARMLIB values. The scope of the checks are the local system where the function is run. It does not check values on other systems within the sysplex, although some values checked are sysplex-wide in scope. We recommend that you run the HealthChecker on all systems in your sysplex. In this case, all the systems in your sysplex will run the LOCAL checks (system-wide scope) but only one system in your sysplex will run the GLOBAL checks (sysplex-wide scope) in addition to the LOCAL checks. The way this latter system is determined is such that the HealthChecker function does an exclusive ENQ on a global GRS resource. The system that gets that LOCK will also do the Global checks.

When the HealthChecker function is enabled, it performs regular checks at predefined time intervals. The time intervals are defined individually for each check as part of IBM’s best practices, although you can also override them. The checks are done based on IBM’s best practices or your overrides. The HealthChecker implements the best practices in these ways:

## The IBM Health Checker for z/OS and Sysplex

1. Consolidates best practice values from multiple IBM sources
2. Reports on your configuration's active settings compared to IBM's suggestions, simplifying administration and operations
3. Reports on your configuration's active settings specific to any customer-specified preferences that can be used to override IBM values
4. Provides a mechanism for IBM to distribute updates to best practice values or to provide additional checks in a manner that is easily integrated into your environment

The basis for the values used by the IBM Health Checker for z/OS and Sysplex include:

- Parallel Sysplex and z/OS publications:
  - *z/OS MVS Setting Up a Sysplex*
  - *z/OS MVS Planning: Operations, SA22-7601*
  - *z/OS MVS Initialization and Tuning Reference, SA22-7592*
- Parallel Sysplex Availability Checklist  
The Parallel Sysplex Availability Checklist can be found at:  
<http://www.ibm.com/servers/eserver/zseries/ps/>
- ITSO Redbooks
  - *OS/390 Parallel Sysplex Configuration, Volume 1: Overview, SG24-5637*
  - *OS/390 Parallel Sysplex Configuration, Volume 2: Cookbook, SG24-5638*
  - *OS/390 Parallel Sysplex Configuration, Volume 3: Connectivity, SG24-5639*

The Redbooks can be found at:

<http://www.redbooks.ibm.com/>

- *z/OS Parallel Sysplex Test Report, SA22-7663*  
The Parallel Sysplex Test Report can be found at:  
<http://www.ibm.com/servers/eserver/zseries/zos/integtst/>
- Washington System Center Flashes  
Washington System Center Flashes can be found at:  
<http://www.ibm.com/support/techdocs/>

Of particular interest for migration to a 64-bit environment is whitepaper WP100269, *z/OS Performance: Managing Processor Storage in a 64-bit environment*, and Washington System Center Flash 10086, *Software Capacity Planning: Migration to 64 bit Mode*.

### INGPLEX BESTpractices

This command allows you to view the currently active best practices (for a description of the command, see "INGPLEX" on page 86).

### INGHC

This command has two purposes:

1. Display the results of the checks
2. Trigger actions in the HealthChecker

**Types of Reports:** The HealthChecker reports reflect values at a point in time (snapshot). The report is comprised of a series of records in the System Logger. These records are comprised of the following components:

- Message text and explanation
- Actions that can be taken in case of an exception to address the exception



- IBM suggestions
- Reasons for IBM's suggestions

**Types of Actions:** The following type of action are available:

- You can request selected or all checks to be done immediately instead of waiting for the time interval of the respective checks to elapse. This is useful if you have made some change to your system and you want to immediately have these changes checked against the best practices. You can select individual systems in your sysplex or all at once.

### Customization

Automation of the HealthChecker is enabled using the SA OS/390 customization dialogs. For more details, see "Customizing the IBM Health Checker for z/OS and Sysplex" on page 38.

You can override IBM's suggestions in order to:

- Specify your own values for a check
- Disable the running of a check

In order to activate these changes, use the INGAMS REFRESH command.

## Hardware validation

This function performs cross-validation of the hardware configuration mapped out in the customization dialogs against the actual hardware configuration that is running. This information is critical to accurately control logical partitions (LPARs) on any supported CPC within the HMC/SE LAN over the BCP Internal Interface.

Hardware validation uses the CPC name, Partition name and Partition number to ensure that the LPARs defined in the customization dialogs are on the correct CPC and located on the correct partition number. However, this helps only for coupling facilities because their partition identifiers must be defined in the active CFRM policy.

For MVS images, information from the HMC/SE (such as system name and sysplex name that are stored during initialization) is used to verify the corresponding customization dialog definitions. During initialization of the automation's Hardware Command Interface and just before a disruptive request is sent to a partition, new checks are made to ensure that everything matches correctly.

**Note:** Only active images can be verified. For inactive images we must still rely on definitions made in the customization dialogs.

An active system in this context is a system belonging to the same sysplex as the system that runs the hardware validation, that is SA OS/390 checks only systems and coupling facilities within its own sysplex.

Hardware validation runs on an SA OS/390 system primarily during startup, and subsequently when changes to the definition in the customization dialogs are applied through the ACF command (ACF COLD, and ACF REFRESH when any CPC or image data has changed). The validation checks the definitions of all registered systems, that is whenever an SA OS/390 system performs the hardware validation, it validates all systems and coupling facilities that are active in the sysplex at this point in time. Registered systems are systems running msys for Operations or SA OS/390 that have joined the same XCF group.

## Hardware validation

The validation of active systems and coupling facilities requires that the CPCs that host the active systems must all be defined in the customization dialogs.

The data for inactive systems cannot be verified. However, these definitions are checked for consistency across all registered systems. As soon as one of these inactive systems or coupling facilities joins the sysplex or is made available for use, the validation is run for the particular image only.

Retrieving actual hardware information can take up to 5 minutes per CPC depending on the model and its LPARs. During the time that the hardware validation takes place all other hardware-related automation is either delayed or cannot be performed, depending on the type of recovery. For this reason the validation carries out "delta" processing. That is validating only the data that has changed. This also includes the absence of data resulting in terminating CPC connections when CPC definitions are missing that have been applied by a prior validation. The actions resulting from the validation are performed on ALL registered systems. This has two advantages:

- you don't need to recycle NetView for changes in hardware definitions.
- you only need to make the changes available to one system.

The first part of the hardware validation triggered by the ACF command or the automation startup determines what CPC connections must be terminated and initiated, namely in this sequence. The resulting actions are performed on all registered systems. When this step has been completed successfully the image validation is performed.

The image validation collects actual hardware information, and verifies the current hardware definitions against the actual data and the definitions found on all other registered systems. It informs you if:

- a real system or coupling facility could not be validated because either actual hardware information or user definitions are not available
- the image definitions could not be evaluated because the actual hardware information is not available
- the real system or coupling facility is not active and the image definitions of some of the registered systems are different
- any definition value has been corrected that was improperly defined or not defined at all

Changes in hardware definitions can be made available to all registered systems by simply invoking the command ACF COLD|REFRESH at only one of the these systems. There is one exception: the change of the authorization token value used for the communication with a particular CPC. A change of this value requires 3 steps:

1. In the first step you must remove the particular CPC definition and then invoke the ACF command as above.
2. When the command completes successfully the next step is to change the authorization token value of the CPC at the Support Element.
3. The final step is to define the CPC again with the new token value and invoke the ACF command again.

**Note:** This behavior of the ACF command applies to the hardware definitions ONLY.

The second part of the validation is triggered by either the message IXC517I that is issued when a coupling facility is made available for use, or by the automation itself when notified that a system joined the sysplex. Both trigger the automation to perform only the validation of the new system or coupling facility. Multiple occurrences of messages for the same system or coupling facility are ignored while this system or coupling facility is validated. In case of a new system, the advantage here is that the real hardware is validated before the system starts NetView and the automation. If this automation then detects no difference between its current definitions and the definitions of the other registered systems—which is the normal case—only a consistency check takes place. This check does not require any real hardware information.

### Prerequisites

Hardware validation has the following prerequisites:

- SA OS/390 must have been initialized. For this reason the validation is delayed until the initialization has completed.
- All coupling facilities that are used in the sysplex must reside on a CMOS-S/390 G5 processor or higher. Only these processors return the partition identifier that is required for validating coupling facilities.
- The BCP Internal Interface must have been initialized to accept requests. Or, when unavailable, at least one other registered system must have access to the hardware. Registered systems are systems running msys for Operations or SA OS/390 that have joined the same XCF group.

**Note:** Hardware validation is not supported on MVS systems running under z/VM.

## Miscellaneous

### Recording IPL Information

With the INGPLEX IPL command you can record, view and compare the IPL information of the operating system. If a system does not behave after the IPL as expected, the IPL recording function enables you to identify parameters that were changed, for example, since the last IPL. The recording function enables you to compare different IPL scenarios. INGPLEX IPL is a tool that helps to identify the cause of problems. For further information about the INGPLEX IPL command refer to “INGPLEX” on page 86.

### System Dump Options

The enhanced INGPLEX functions allow you to control dump options sysplex-wide, for *registered* systems, that is, those on which the automation runs. For further information refer to “INGPLEX” on page 86.

### Multisystem Dumps

One of the enhanced INGPLEX functions provides an easy-to-use interface for multisystem dumps. For further information refer to “INGPLEX” on page 86.

### SLIP Traps

The enhanced INGPLEX functions also let you view, enable, disable, and delete SLIP traps defined in the sysplex. For further information refer to “INGPLEX” on page 86.

## Miscellaneous

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## Chapter 2. Preparing the Hardware

This section describes the steps necessary to prepare your processor hardware in the sysplex to use the Parallel Sysplex enhancements.

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### Understanding the Hardware Interface

In order to allow the sysplex wide activation or deactivation of the coupling facilities and to control sysplex members leaving the sysplex, SA OS/390 uses the BCP (Basic Control Program) Internal Interface. The BCP Internal Interface of the following processor hardware families is supported:

- zSeries
- CMOS-S/390 G6
- CMOS-S/390 G5

Using the BCP Internal Interface from MVS allows to send hardware operations commands such as SYSTEM RESET or ACTIVATE to the Support Element attached to the own processor hardware (CPC). If the CPC is configured in LPAR mode, the operations command can be sent to all logical partitions defined on the CPC.

Furthermore, with the enhanced sysplex functions of SA OS/390, sysplex members running on other CPCs than the own image can be controlled through the BCP Internal Interface. This is possible by defining all CPCs of your sysplex to the master HMC of your processor hardware LAN.

The following processor hardware can be controlled as a target with the BCP Internal Interface of the above listed processors, but cannot use the SA OS/390 BCP Internal Interface to control itself or other processors:

- CMOS-S/390 G4
- CMOS-S/390 G3

Note that the MVS/HCD function uses the BCP Internal Interface to update IOCDS and IPL information in the Support Elements of addressed CPCs. You cannot use SA OS/390 to perform these tasks, nor can HCD be used to perform the hardware operations functions of SA OS/390.

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### Preparing the Master Hardware Management Console

To prepare the master HMC, log on to the HMC in your LAN that is to be used for change management operations with a user ID having SYSPROG authority. The HMC must have the CPC objects of your sysplex in the defined CPCs group.

Select **Console Actions** and click on the *Enable Hardware Management Console Services* icon. Set the LIC change Enabled radio button. Press the OK button to save the change or press cancel if LIC change was already set to Enabled.

Usually, there is one HMC in a CPC LAN environment, that has LIC change permanently enabled. It will automatically be used by the BCP Internal Interface. Make sure this HMC has all CPC objects of your sysplex in the Defined CPCs group.

### Preparing the Support Element

Before the BCP Internal Interface can be used, you need to verify for the CPC Support Elements in your sysplex that the required prerequisite MCL levels are active, and that any essential services have been enabled with the necessary settings. This requires the following:

- Configure SNMP
- Enable API and set the community name
- Set the cross partition flag (LPAR mode)

For additional SNMP and API configuration information please refer to *zSeries 900 Application Programming Interfaces*, Chapter 6, "Configuring for the Data Exchange APIs".

### Configure SNMP

You have to specify two community names to use the the BCP Internal Interface. For this task, you need to be logged on in *Access Administrator* mode on your CPC's Support Element. To complete this task:

1. Start the SNMP Configuration task by double clicking the **Console Actions** icon in the *Views* area of the Console.
2. Select the **Communities** tab of the SNMP Configuration notebook window.
3. For the **API** community name, enter the following information and select the **Add** push buton to add the new community name:

|                     |  |
|---------------------|--|
| <b>Protocol</b>     | Select UDP from the drop-down list.  |
| <b>Name</b>         | The API Community name you have chosen.  |
| <b>Address</b>      | The TCP/IP address of the Support Element which you previously made a note of. |
| <b>Network Mask</b> | 255.255.255.255  |
| <b>Access Type</b>  | Select the <b>Read only</b> radio button.                                      |

4. For the **BCP Internal Interface** community name, enter the following information and select the **Add** push buton to add the new community name:

|                     |   |
|---------------------|---|
| <b>Protocol</b>     | Select UDP from the drop-down list.   |
| <b>Name</b>         | SAFOS (Use the CPC authtkn name that you defined for the CPC using the customization dialogs) |
| <b>Address</b>      | 127.0.0.1   |
| <b>Network Mask</b> | 255.255.255.255   |
| <b>Access Type</b>  | Select the <b>Read/write</b> radio button.  |

5. Select the **OK** push button to save the changed settings and close the SNMP notebook window.
6. If any of the above data was added or changed, you need to shutdown and restart the Console before the changes will be put into effect. However, before doing so, continue with the configuration steps for Console below.

### Enable the API and Set the Community Name

In order to use the BCP Internal Interface, the Support Element API function needs to be enabled. To complete this task:

## Preparing the Support Element

1. Start the Support Element Settings task by double clicking the **Console Actions** icon in the *Views* area of the Console.
2. Select the **API** tab of the Support Element Settings notebook window. If not already active, enable the API by checking the **Enable the Support Element Console Application Program Interface** checkbox.
3. In the **Community name** field, enter the community name you chose when you configured for SNMP.
4. Select the **Apply** push button to save the changes.
5. Finally, for the changes you have made to the Support Element to become active, you must reboot the Support Element.

## Set the Cross Partition Flags

For this task, you need to be logged on in *System Programmer mode* on your CPC's Support Element. To complete this task:

1. Click on the CPC Group and highlight the CPC icon.
2. Select the **CPC Operation Customization** task.
3. Click on the **Change LPAR Security** icon. The window displayed shows the security settings from the active IOCDS for the logical partitions defined on this CPC.
4. For each logical partition that should use the BCP Internal Interface to control another partition on this CPC, check the **Cross Partition Authority** checkbox.

## Preparing the Support Element



---

## Chapter 3. Customization Dialog Enhancements

This section describes how the SA OS/390 customization dialogs support the enhancements introduced with APARs OW50146 and OW56107.

**Note:** If you use a host code page other than 037, the hexadecimal representation of the at sign (@) can be different. Use the letter represented by the hex code X'7C' for the at sign.

All definitions that are described in the following must be linked by all systems in the sysplex.

---

### Specifying Alternate Couple Data Sets with the Customization Dialog

Couple data sets (CDS) contain important information on how to manage certain aspects of your sysplex. For example, the SFM CDS (sysplex failure management couple data set) defines how the system manages system and signalling connectivity failures and PR/SM (processor resource/system manager) reconfiguration actions.

The following couple data sets are particularly important for the functioning of your Parallel Sysplex:

- The SYSPLEX couple data set, which defines the systems and the XCF groups of the sysplex
- The CFRM couple data set, which defines the coupling facilities and structures of the sysplex

It is recommended that you define alternate couple data sets for all couple data sets in your sysplex. These alternate couple data sets serve as backups when the primary CDS fails.

With the customization dialog you can specify a series of spare volumes for every CDS type, for example, SYSPLEX, ARM, CFRM. The first volume in the series is used to create an alternate CDS if one of the active (primary or alternate) CDSs fails.

In the customization dialog you define the potential alternate couple data sets using the *Group* entry type. Select a sysplex group, then select its policy item SYSPLEX (define sysplex policy) from the panel *Policy Selection*.

---

### Defining the Policy Item SYSPLEX

A panel as shown in Figure 1 on page 24 is displayed if you select policy item SYSPLEX from the *Policy Selection* panel for sysplex groups.

## Defining the Policy Item SYSPLEX

```

COMMANDS  HELP
-----
                          Sysplex Policy Definition
Command ==> _____

Entry Type : Group          PolicyDB Name : DATABASE_NAME
Entry Name  : SYSPLEX_GROUP_01      Enterprise Name : YOUR_ENTERPRISE
                                           More:      +

Sysplex Name. . . . . _____
Sysplex Timer Monitoring. . . . . YES      YES NO
Number Monitored Sysplex Timers . . . . . 2      1 2
Temporary Data Set HLQ. . . . . _____
                                           Data set HLQ (max. 17 chars)

Started Task Job Name . . . . . _____
Couple Data Set HLQ . . . . . _____

CDS type   Alternate volumes          Desired monitoring
Sysplex    _____                (PRIMARY ALTERNATE NONE)
ARM        _____                PRIMARY

F1=HELP    F2=SPLIT   F3=END     F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP      F8=DOWN    F9=SWAP   F10=LEFT   F11=RIGHT  F12=RETRIEVE

```

Figure 1. Sysplex Policy Definition Panel for Sysplex Groups

The input fields on the *Sysplex Policy Definition* panel are as follows:

### Sysplex Timer Monitoring

If you have one or more sysplex timers in your sysplex and you want them monitored by the NMC workstation, enter YES and specify the number of monitored sysplex timers in the next field. Enter NO, if you do not want monitoring. This is the default.

### Number Monitored Sysplex Timers

Enter '2' if you are using the sysplex timer with the Expanded Availability Option and you want to have two sysplex timers monitored by the NMC workstation. Enter '1', if you only want one sysplex timer monitored.

### CDS High Level Qualifier

Specify the high level qualifier to be used for the allocation of alternate couple data sets (CDS). The qualifier may consist of up to three parts according to the OS/390 data set naming rules. When allocating an alternate CDS, this qualifier is appended with the type (for example, SYSPLEX) and CDS0n, where 'n' is a sequence number.

### CDS type - Alternate volumes - Desired monitoring

Specify the types of couple data sets to be used, and the monitoring to be done.

The types of supported couple data sets are:

#### Sysplex

This contains the policy and status for basic sysplex functions and points to the other couple data sets

**ARM** This contains the policy for automatic restart management

#### BPXMCDS

This contains the policy for z/OS UNIX System Services

**CFRM** This contains the policy for coupling facility resource management

**LOGR** This contains an inventory for the sysplex logger function

**SFM** This contains the policy for sysplex failure management

## Defining the Policy Item SYSPLEX

**WLM** This contains the policy for the workload manager

In the column *Alternate volumes* you can enter up to 8 volume names for allocating alternate couple data sets for types Sysplex, ARM, CFRM, LOGR and SFM. For BPXMCDS and WLM, no alternate volumes can be specified. The names must be in accordance with OS/390 volume naming rules. In case of allocating alternate couple data sets, the allocation starts on the first specified volume and continues in the specified order.

The information that you enter in the column *Desired monitoring* determines when the NMC workstation of SA OS/390 displays the associated icon for a couple data set as satisfactory or unsatisfactory. For example, if you have a couple data set QUAL1.ARM.CDS0, which you want to be monitored as PRIMARY, but currently this data set is not available because the operator had to switch to an alternate ARM CDS, then the icon for QUAL1.ARM.CDS0 is marked as being unsatisfactory (colored red).

You specify the monitoring that is to be done for each type of couple data set as follows:

### ALTERNATE

Indicates that you want to monitor both the primary and the alternate data set. In this case, when either the primary or the alternate will fail, the related icon will turn red.

### PRIMARY

Indicates that you want to monitor only the primary couple data set. In this case, there is only one icon (for the primary CDS) on the NMC workstation and the operator will only see when the primary itself is unavailable, no matter whether an alternate CDS is available to take over.

### NONE

Indicates that none of the couple data sets are monitored. This is the default for all types of CDSs, except for the sysplex CDS. The default for the sysplex CDS is PRIMARY.

## Logical Sysplex Group ID

**Note:** The logical SYSPLEX Group ID is for SA OS/390 1.3 only.

A logical sysplex group ID may be specified to indicate that a subset of the members of an actual OS/390 sysplex is defined in this sysplex group. If specified, the ID may contain 1 or 2 characters. Valid characters are A-Z, 0-9, and the national characters (\$, # and @).

If a logical sysplex group ID is specified, it will be prefixed with the string INGXS to construct the XCF group name used for cross system synchronization, for example, INGXSxy.

If no logical sysplex group ID is specified, the default group name INGXS will be used.

This group needs to be associated to an appropriate XCF transport class by the person responsible for the sysplex setup (refer to the manual *z/OS MVS Setting Up a Sysplex*).

## Automating System Log Recovery

The SA OS/390 customization dialog supports the automation of the system log recovery by defining commands for the following messages:

- IEE041I
- IEE043I
- IEE533E
- IEE769E

Use the *MVS Component* entry type to specify the commands that will be issued in case of a SYSLOG problem. Select the MESSAGES/USER DATA policy item of a selected *MVS Component* policy object to display the *Message Processing* panel. Enter CMD in the *Action* column and the message ID in the *Message ID* column, as shown in Figure 2.

```

COMMANDS  ACTIONS  HELP
-----
Message Processing
Command ==> _____ SCROLL==> PAGE

Entry Type : MVS Component      PolicyDB Name : DATABASE_NAME
Entry Name  : MVS_COMPONENT     Enterprise Name : YOUR_ENTERPRISE

Subsystem   : MVSESA

Enter messages issued by this resource that will result in automated actions.
Actions: CMD = Command  REP = Reply  CODE = CODE  USER = User defined values

Action  Message ID      Description      Cmd  Rep  Code  User
-----  -
CMD   IEE041I
_____
_____
_____
_____

F1=HELP  F2=SPLIT  F3=END  F4=RETURN  F5=RFIND  F6=RCHANGE
F7=UP    F8=DOWN   F9=SWAP F10=LEFT   F11=RIGHT F12=RETRIEVE
    
```

Figure 2. Message Processing Panel

Press Enter to display the *CMD Processing* panel, as shown in Figure 3 on page 27. On this panel you specify the MVS command that will be executed when the resource issues message IEE041I. For example, enter MVS VARY SYSLOG,HARDCPY to have the SYSLOG receive the hardcopy log. (This action is recommended by IBM.)

```

COMMANDS  HELP
-----
Command ==> _____          CMD Processing          Row 1 to 2 of 20
                                   SCROLL==> PAGE

Entry Type : MVS Component          PolicyDB Name : DATABASE_NAME
Entry Name : MVS_COMPONENT          Enterprise Name : YOUR_ENTERPRISE

Subsystem : MVSESA
Message ID : IEE041I

Enter commands to be executed when resource issues the selected message.

Pass/Selection Automated Function/'*'
Command Text

MVS VARY SYSLOG,HARDCPY
-----
-----
-----
F1=HELP   F2=SPLIT   F3=END    F4=RETURN  F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP   F10=LEFT   F11=RIGHT  F12=RETRIEVE
    
```

Figure 3. CMD Processing Panel

In the case of message IEE043I, the IBM recommended action is to enter the MVS command MVS WRITELOG START to restart the system log.

```

COMMANDS  HELP
-----
Command ==> _____          CMD Processing          Row 1 to 2 of 20
                                   SCROLL==> PAGE

Entry Type : MVS Component          PolicyDB Name : DATABASE_NAME
Entry Name : MVS_COMPONENT          Enterprise Name : YOUR_ENTERPRISE

Subsystem : MVSESA
Message ID : IEE043I

Enter commands to be executed when resource issues the selected message.

Pass/Selection Automated Function/'*'
Command Text

MVS WRITELOG START
-----
-----
-----
F1=HELP   F2=SPLIT   F3=END    F4=RETURN  F5=RFIND   F6=RCHANGE
F7=UP     F8=DOWN    F9=SWAP   F10=LEFT   F11=RIGHT  F12=RETRIEVE
    
```

Figure 4. CMD Processing Panel

For the remaining messages repeat the steps as shown in the preceding panels.

You can use the customization dialog *Minor Resource Selection* to disable the system log recovery. To do this, set the automation flag of the minor resource LOG to NO. For details refer to “Switching Sysplex Functions On and Off” on page 43.

---

## Automating WTO(R) Buffer Shortage Recovery

The SA OS/390 customization dialog supports the automation of WTO(R) buffer shortage recovery.

## Automating WTO(R) Buffer Shortage Recovery

**Note:**

SA OS/390 2.1 provides automation for WTO buffer recovery in policy item WTOBUF RECOVERY of the *MVS Component* entry type. However, use this policy only to define the WTO buffer shortage recovery process for SA OS/390 2.1 without APAR OW49690. With APAR OW49690 installed, use policy item MESSAGES/USER DATA to obtain the SA OS/390 facility to cancel jobs.

When using the *MVS Component* entry type (MVC), you can specify jobs that will be canceled or kept in case a WTO(R) buffer shortage is threatening. The jobs that you select for cancellation, will then no longer issue WTO(R)s.

Select the MESSAGES/USER DATA policy item of a selected *MVS Component* policy object to display the *Message Processing* panel.

Enter CODE in the *Action* column and WTOBUF in the *Message ID* column as shown in Figure 5.

```

COMMANDS  ACTIONS  HELP
-----
Message Processing
Command ==> _____ SCROLL==> PAGE
Entry Type : MVS Component      PolicyDB Name : DATABASE_NAME
Entry Name  : MVS_COMPONENT      Enterprise Name : YOUR_ENTERPRISE
Subsystem   : MVSESA

Enter messages issued by this resource that will result in automated actions.
Actions:  CMD = Command  REP = Reply  CODE = CODE  USER = User defined values

Action  Message ID          Cmd  Rep  Code  User
        Description
CODE  WTOBUF
        _____
        _____
        _____
        _____

F1=HELP  F2=SPLIT  F3=END  F4=RETURN  F5=RFIND  F6=RCHANGE
F7=UP    F8=DOWN   F9=SWAP F10=LEFT  F11=RIGHT F12=RETRIEVE
    
```

Figure 5. Message Processing Panel

After pressing Enter, the *Code Processing* panel is displayed, as shown in Figure 6 on page 29.

## Automating WTO(R) Buffer Shortage Recovery

```
COMMANDS  HELP
-----
Code Processing                               Row 1 to 6 of 20
Command ==> _____ SCROLL==> PAGE

Entry Type : MVS Component      PolicyDB Name : DATABASE_NAME
Entry Name  : MVS_COMPONENT     Enterprise Name : YOUR_ENTERPRISE

Subsystem  : MVSESA
Message ID : WTOBUF

Enter the value to be passed to the calling CLIST when this resource
issues the selected message and the following codes are contained in
the message.

Code 1      Code 2      Code 3      Value Returned
CIC*        *          _____ KEEP
IMS*        *          _____ KEEP
*           *          _____ CANCEL
_____
_____

F1=HELP    F2=SPLIT    F3=END     F4=RETURN   F5=RFIND   F6=RCHANGE
F7=UP      F8=DOWN     F9=SWAP    F10=LEFT    F11=RIGHT  F12=RETRIEVE
```

Figure 6. Code Processing Panel

Enter the following information:

### Code 1

Specifies the job name that you want to be kept or canceled in case of WTO buffer shortage. The example in Figure 6 shows that all jobs beginning with CIC and IMS should be kept, and that all other jobs are canceled.

### Code 2

Enter one of: WTO|WTOR|\*

Your selection specifies when you want the job to be canceled or kept: either if it issued a WTO or a WTOR, or in both cases (\*).

### Code 3

This will always be forced to blank.

### Value Returned

Enter CANCEL or KEEP, depending on how you want to handle the job in the case of WTO buffer shortage.

---

## Customizing Hardware Automation

The SA OS/390 Parallel Sysplex enhancements help you to resolve pending I/Os for systems being removed from the sysplex. See “System removal” on page 11 for further details.

Because the automation must know where the system is located to send the command to the appropriate Support Element, you must define its hardware configuration by using the customization dialog, policy item *E-T DATA* of entry type *User E-T Pairs*.

## Entry PROCESSOR

Define a new entry with name PROCESSOR and type *'processorname'*.

## Customizing Hardware Automation

*processorname* is the name used as UET type designator for a processor. This name must be unique. It can be up to 8 characters long and must start with an alphabetic character. The following characters are allowed: alphanumeric, and the national characters @, #, and \$.

*processorname* represents a logical name for the processor that is used by the BCP Internal Interface. Note that this name has to be used when defining the CPC name for an image control entry.

**Note:** It is strongly recommended that you use the processor id you defined in HCD as *processorname*.

For each CPC you must also define an auto operator `HWOPER $nn$`  (02–33). For details about defining these operators, see “Additional Automation Operator IDs” on page 43.

To specify the network address, CPC name, and the authorization information for communicating with the Support Element, define the following key-data pairs:

```
ADDRESS=netid.nau
AUTHTKN=token
LPAR=(lparname1, ...lparname15)
```

where

**netid.nau** is the network addressable unit of the Support Element

**token** is the authentication name used for communication with the Support Element. Note that this name must match the value specified in the Support Element as SNMP community name. SNMP handles uppercase and lowercase characters in a different way. Only uppercase is supported by System Automation.

**lparname** is the name of a Logical Partition

**Note:** When defining a CPC running in basic mode, the LPAR name must be identical to the CPC name.

```
Entry Type : User E-T Pairs      PolicyDB Name : DATABASE_NAME
Entry Name : SYSPLEX_ENHANCEMENT Enterprise Name : YOUR_ENTERPRISE
UET Entry  : PROCESSOR          UET Type      : FREEWAY

Action Keyword/Data(partial)
AUTHTKN
PUBLIC
ADDRESS
DEIBMD1.X7F1E30A
LPAR
(CF1,CFF,CFD,CFX,CIM7,CIM8,KEY3,KEY4,SYS1,SYS2,SYS3,SYS4)
```

Figure 7. Sample for UET Entry PROCESSOR

## Entry IMAGECNTL

Define a new entry with name IMAGECNTL and type '*subsysname*'. Define the following keyword-value pairs:

```
LOCATION=cpcname.lparname
SYSPLEX=sysplexname
SUBTYPE=subtype
```

where



## Customizing Hardware Automation

**cpcname** is the name of the Central Processor Complex the system is running on and must match a processor name previously defined with a processor entry

**lparname** is the name of a Logical Partition the system is running on

**sysplexname** is the name of the sysplex the system belongs to

**subtype** specify MVS, CF or OTHER

```
Entry Type : User E-T Pairs      PolicyDB Name : DATABASE_NAME
Entry Name : SYSPLEX_ENHANCEMENT Enterprise Name : YOUR_ENTERPRISE
UET Entry  : IMAGECNTL         UET Type      : KEY3

Action  Keyword/Data(partial)
        SUBTYPE
        MVS
        LOCATION
        FREEWAY.KEY3
        SYSPLEX
        KEY1PLEX
```

Figure 8. Sample for UET Entry IMAGECNTL

## IMAGE Definitions

Use entry type APL and select policy item APPLICATION INFO. On the panel *Application Information*, as shown in Figure 9 on page 32, you can define a new application type IMAGE. For this type you can specify one of the following subtypes:

MVS | CF | OTHER

## Customizing Hardware Automation

```
COMMANDS  HELP
-----
                                Application Information
Command ==>

Entry Type : Application          PolicyDB Name : DATABASE_NAME
Entry Name : KEY3IMAGE           Enterprise Name : YOUR_ENTERPRISE
-----

The following fields were specified when the Application was defined
and cannot be modified:
  Subsystem Name. . . . . KEY3
  Object Type . . . . . INSTANCE

The following field can only be changed if value is STANDARD:
  Application Type . . . IMAGE      STANDARD IMAGE JES2 JES3
                                       CICS IMS DB2 OPC USS

Enter or update the following fields:
  Subtype . . . . . MVS              (Only for CICS, IMS, OPC, DB2 or IMAGE)
  Clone Job Name. . . . . NO         YES      NO
  Job Name. . . . . KEY3
  Scheduling Subsystem. .          MSTR, JES Subsystem or blank
  JCL Procedure Name. . .
  MVS Automatic Restart
  Management Element
  Name. . . . .
                                       (Only if the application uses )
                                       (MVS Automatic Restart Management)

WLM Resource Name . . .
```

Figure 9. Definition of Application Type IMAGE

Because IMAGE is defined as an application, you must also specify the external startup and shutdown options, to enable the automation to IPL the system. Use policy item AUTOMATION INFO, and on panel *Application Automation Definition*, as shown in Figure 10 on page 33, enter the following:

- NONMVS in the **Job Type** field
- ALWAYS in the **External Startup** and **External Shutdown**

The **Monitor Routine** field is automatically set to INGMTSYS if nothing is specified.

```

COMMANDS  HELP
-----
A0FP1SS1          Application Automation Definition
Command ==>

Entry Type : Application          PolicyDB Name  : DATABASE_NAME
Entry Name  : KEY3IMAGE          Enterprise Name: YOUR_ENTERPRISE

Subsystem   : KEY3
Description:
Job Name    : KEY3

Job Type . . . . . Job properties (MVS NONMVS TRANSIENT)
Transient Rerun . . . . . Transient Jobtype can be rerun (YES NO)
Command Prefix . . . . . Enter console command prefix (above)

Message Prefix . . . . . Enter one or more prefixes (above)
Sysname . . . . . System name used by the application

Start on IPL . . . . . Start with Netview init (YES NO NONE blank)
Start on Recycle . . . . . Start with Sys-Ops recycle (YES NO NONE blank)
Start Timeout . . . . . Time allowed to reach "UP" status (hh:mm:ss)

Monitor Routine. . . . . Routine used for monitoring (name NONE)
Periodic Interval. . . . . Periodic monitoring interval (hh:mm NONE)

Restart Option . . . . . Restart Circumstances (ALWAYS ABENDONLY NEVER)
External Startup . ALWAYS External Startup (INITIAL ALWAYS NEVER blank)
External Shutdown. ALWAYS External Shutdown (FINAL ALWAYS NEVER blank)

Shut Delay . . . . . Time between attempts to shutdown (hh:mm:ss)
Term Delay . . . . . Time for termination cleanup (hh:mm:ss)

F1=Help    F2=RFind    F3=RChange  F4=Cursor   F5=Left    F6=Right
F7=Backward F8=Forward   F9=Swap     F10=Retrieve F11=Split  F12=End

```

Figure 10. Application Automation Definition

## Automating System Removal

As described in “System removal” on page 11, you can automate messages IXC102A and IXC402D to avoid sysplex outages.

**Note:** The following figures show examples for defining commands and codes for message IXC102A.

You can specify one of the following four processor operations commands for each system in the sysplex that is automated.

- SYSRESET [CLEAR]
- DEACTIVATE
- ACTIVATE [P(image\_profile\_name)]
- LOAD [P(load\_profile\_name)] [CLEAR]

where

CLEAR indicates that the storage will be cleared

## Customizing Hardware Automation

P specifies the profile to be used. The name can consist of up to 16 alphanumeric characters. If the parameter is omitted, the last profile is used.

**Note:**

The following restriction applies to the processor operations commands **ACTIVATE** and **LOAD**:

Both commands invoke processor functions, which can cause asynchronous events such as operator messages at BCP (Basic Control Program) Internal Interface initialization time or processor hardware wait states. Currently, the BCP Internal Interface does not allow to monitor and control these events

Use policy item **MESSAGES/USERDATA** of the SA OS/390 customization dialog to define commands and codes for message **IXC102A** and **IXC402D**. Enter **CMD** in the **Action** column and **IXC102A** in the **Message ID Description** column, as shown in Figure 11. The definitions here also apply to message **IXC402D**.

```

COMMANDS  ACTIONS  HELP
-----
Message Processing                               Row 1 to 4 of 21
Command ==> _____ SCROLL==> PAGE

Entry Type : Application          PolicyDB Name : DATABASE_NAME
Entry Name  : KEY3IMAGE           Enterprise Name : YOUR_ENTERPRISE

Subsystem   : KEY3IMAGE

Enter messages issued by this resource that will result in automated actions.
Actions: CMD = Command  REP = Reply  CODE = CODE  USER = User defined values

Action  Message ID          Cmd  Rep  Code  User
-----  -----
CMD   IXC102A
_____
_____
_____

F1=HELP  F2=SPLIT  F3=END  F4=RETURN  F5=RFIND  F6=RCHANGE
F7=UP    F8=DOWN   F9=SWAP F10=LEFT  F11=RIGHT F12=RETRIEVE
  
```

Figure 11. Sample Panel for Defining IXC102A Automation

Pressing Enter will bring up the **CMD Processing** panel, as shown in Figure 12 on page 35. Use this panel to specify a valid command for the image and an action code that must match the "Value Returned" definition specified on the *Code Processing* panel.

```

COMMANDS  HELP
-----
Command ==> _____ CMD Processing Row 1 to 2 of 20
                                SCROLL==> PAGE

Entry Type : Application      PolicyDB Name : DATABASE_NAME
Entry Name  : KEY3IMAGE       Enterprise Name : YOUR_ENTERPRISE

Subsystem   : KEY3IMAGE
Message ID  : IXC102A

Enter commands to be executed when resource issues the selected message.

Pass/Selection Automated Function/'*'
Command Text
ACTCODE
LOAD P(LOADPROF) CLEAR
-----
-----
-----
F1=HELP    F2=SPLIT   F3=END     F4=RETURN  F5=RFIND   F6=RCHANGE
F7=UP      F8=DOWN    F9=SWAP    F10=LEFT   F11=RIGHT  F12=RETRIEVE
    
```

Figure 12. Sample Panel for Command Processing

On the Code Processing panel, as shown in Figure 13, specify the following:

```

COMMANDS  HELP
-----
Command ==> _____ Code Processing Row 1 to 6 of 20
                                SCROLL==> PAGE

Entry Type : Application      PolicyDB Name : DATABASE_NAME
Entry Name  : KEY3IMAGE       Enterprise Name : YOUR_ENTERPRISE

Subsystem   : KEY3IMAGE
Message ID  : IXC102A

Enter the value to be passed to the calling CLIST when this resource
issues the selected message and the following codes are contained in
the message.

Code 1      Code 2      Code 3      Value Returned
IXC102A    BCPII             ACTCODE
-----
-----
-----
-----
-----
F1=HELP    F2=SPLIT   F3=END     F4=RETURN  F5=RFIND   F6=RCHANGE
F7=UP      F8=DOWN    F9=SWAP    F10=LEFT   F11=RIGHT  F12=RETRIEVE
    
```

Figure 13. Sample Panel for IXC102A and IXC402D Automation

If you want to automate messages IXC102A and IXC402D using the Parallel Sysplex enhancements, you must enter IXC102A for Code 1 and BCPII for Code 2. Refer to “Important Processor Operations Considerations” on page 45 for more information.

### Automating Long Running Enqueues

If you automate long running ENQs, you must define the following:

- The resource(s) being checked
- The time frame when a long ENQ is detected

In addition, the following definitions can be made:

- The names of jobs that should be cancelled or kept when detecting a long ENQ
- The title of the dump taken before the job is cancelled
- The default storage areas to be dumped
- Symbol definitions to be used when the dump specifications are provided by a PARMLIB member

Enter these definitions by using the customization dialog, policy item *E-T DATA* of entry type *User E-T Pairs*.

Specify a new entry on the panel *UET entry type selection* with name ENVIRON and type TEMP@SYSPLEX. Define the following key-data pairs (See Figure 16 on page 41 for an example):

```
ENQRES=(major_resource_name,minor_resource_name,waittime|EXCL)
ENQJOB=(jobname|address_space_ID,dumpID_list|KEEP|DUMP|NODUMP)
ENQTITLE=(string)
ENQSDATA=(dumpoption1,dumpoption2,...)
ENQSYM=(jobname|address_space_ID,&symbol.=value)
```

where

**major\_resource\_name**

is the major resource name to be checked. The name can be 1 to 8 characters long. You can use wildcard characters when specifying the major resource name.

**minor\_resource\_name**

is the minor resource name to be checked. The name can be 1 to 255 characters long. You can use wildcard characters when specifying the minor resource name.

**waittime**

is the time in seconds (30 – 999) the automation waits before it treats an ENQ as a long blocking ENQ.

**EXCL**

defines that the resource is excluded from monitoring.

**jobname**

is the name of a job or a name pattern. You can use wildcard characters when specifying the job name.

**address\_space\_ID**

is the 4 character address space ID, for example, 000A

**dumpID\_list**

is the suffix of an IEADMCxx PARMLIB member describing the dump specifications.

Note: The syntax rules for the PARMLIB suffix(es) and the symbol definitions follow the rules of the MVS DUMP command. See *OS/390: MVS System Commands* for details.

**KEEP|DUMP|NODUMP**

If you specify KEEP, the job must not be cancelled. DUMP dumps

## Automating Long Running Enqueues

the job after the wait time has expired, but before the automation cancels the job. NODUMP suppresses the dump before the job is cancelled.

|                   |  |
|-------------------|--|
| <b>string</b>     | is the title of the dump. It can consist of up to 100 characters.  |
| <b>dumpoption</b> | specifies the storage areas to be dumped when the keyword DUMP is used instead of a PARMLIB member. If omitted the automation assumes the following areas:<br><br><b>CSA</b> Common Service Area<br><b>GRSQ</b> Global resource serialization (ENQ/DEQ/RESERVE) queues<br><b>RGN</b> Private area of address space being dumped, including LSQA (Local System Queue Area) and SWA (Scheduler Work Area)<br><b>SQA</b> System queue area<br><b>NOSUM</b><br>No summary dump<br><b>TRT</b> GTF, system trace, master trace, and NIP hardcopy buffer data<br><br>For further details, refer to the command description of MVS DUMP. |
| <b>symbol</b>     | is the name of a symbol to be substituted.   |
| <b>value</b>      | is the substitution value.   |

---

## Automating Auxiliary Storage Shortage Recovery

To prevent auxiliary storage shortage outages you can predefine local page data sets, using the SA OS/390 customization dialog.

Specify a new entry on the panel *UET entry type selection* with name ENVIRON and type TEMP@SYSPLEX. Define the following key-data pairs:

```
LCLPGDSN=data_set_name  
LCLPGJOB=(jobname|*,KEEP|CANCEL)  
LCLPGVOL=(valid1,valid2,...)  
LCLPGHLQ=h1q  
LCLPGSPC=nnn
```

where

**data\_set\_name**

is the name of a predefined local page data set. The data set must be allocated on a volume shared by all systems in the sysplex and catalogued in the master catalog. In case the systems in the sysplex do not share the master catalog the page data set must be re-catalogued on each system except the one which created the data set using the following IDCAMS statement:

```
DEF PAGESPACE(NAME(lpdsn) VOLUME(volume) RECATALOG)
```

**jobname**

is the name of a job or a name pattern. Specify KEEP or CANCEL for jobs that can or cannot be cancelled. You can use wildcard characters when specifying the job name.

## Automating Auxiliary Storage Shortage Recovery

|              |   |
|--------------|---|
| <b>valid</b> | This is the serial number of a volume where a local page data set can be allocated. You can specify up to 8 volume IDs.   |
| <b>hlq</b>   | The high level qualifiers of those local page data sets that are dynamically allocated. The length of the qualifiers is limited to 23 characters and must follow the naming conventions of MVS data sets.   |
| <b>nnn</b>   | This is the number of cylinders (100 to 999) used for the dynamic allocation of a local page data set. Note that on a 3390 DASD, 100 CYLS are adequate to 70 MB and the formatting process lasts approximately 18 seconds for this amount of space. |

An example of these definitions is shown in Figure 16 on page 41.

---

## Customizing the IBM Health Checker for z/OS and Sysplex

There is no dedicated customization dialog support for automation of the HealthChecker, however, you can specify your HealthChecker user overrides as UET data. To do this:

1. Specify a new entry on the panel *UET entry type selection* with UET Entry HEALTHCHECK and UET Type USERPRACTICES.
2. Define UET keyword data for each User override (see Figure 14 on page 39 and Figure 15 on page 40 for examples) so that each entry is in the form *Lxx*, where *xx* is a number that can be viewed as a (logical) line number, that is:
  - Two adjacent entries need not have sequential numbers
  - There must not be any gaps in these numbers for the entries as a whole, that is, if there are *n* entries then the range for all *xx* must be 1 to *n*
  - These line numbers define the sequence in which the override statements are processed. This sequence must be in accordance with the HealthChecker's syntax requirements.
  - If you want to insert a new line in the UET entries, you do not have to reenter all of the existing entries. Consider an example where you want to change the checking interval for the SYSCONS\_MSCOPE check (L60 in Figure 14 on page 39) to 1 hour. To do this:
    - a. change keys L61–L69 to L62–L70, that is, increment the logical line numbers by 1 (so that L61 becomes L62, and so on)
    - b. then add a new keyword entry, L61 TIMEINT(01:00), as the last entry (remember that consecutive keyword entries do not have to be sequential)



## Customizing the IBM Health Checker for z/OS and Sysplex

```
Command ==>>                                UET Keyword-Data Specification          Row 16 from 447
                                                SCROLL==>> CSR

Entry Type : User E-T Pairs                PolicyDB Name : MSYSRESV_21
Entry Name : HC_BACKUP                    Enterprise Name : MSYSRESV_21
UET Entry  : HEALTHCHECK                  UET Type      : USERPRACTICES

Action  Keyword/Data(partial)
L69
"CHECK(SYSCONS_MASTER)"
L68
"REASON('SYSCONS SHOULD ... D012103');"
L67
"DATE(20030121)"
L66
"CHECK(SYSCONS_PD_MODE)"
L65
"REASON('IF SYSCONS .... D012103');"
L64
"DATE(20030121)"
L63
"CHECK(SYSCONS_ROUTCODES)"
L62
"REASON('IF SYSCONS .... - D012103');"
L61
"DATE(20030121)"
L60
"CHECK(SYSCONS_MSCOPE)"
L59
"REASON('EMCS CONSOLES WITH HARDCOPY ... - D012103');"
L58
"DATE(20030121)"
L57
"CHECK(EMCS_HARDCOPY)"
L56
"REASON('ROUTCODE(ALL) AND NON-LOCAL ... - D012103');"
L55
"DATE(20030121)"
L54
"CHECK(EMCS_MSCOPE_AND_ROUTCODES)"
L53
"REASON('NEEDED IN EMERG. - D012103');"
L52
"DATE(20030121)"
L51
"CHECK(SYSPLEX_MASTER)"
L50
"REASON('NOT REALY - D012103');"
L49
"DATE(20030121)"
L48
"CHECK(CONSOLE_ROUTCODE_11)"
L47
"REASON('AVOIDS LONG CHAINS D012003');"
L46
"DATE(20030120)"
L45
"CHECK(AMRF_AND_MPF_CONSISTENT)"
L44
"REASON('AVOIDS OVERLOADING ... D012003');"
L43
"DATE(20030120)"
L42
"CHECK(CONSOLE_MSCOPE_AND_ROUTCODES)"
L41
"REASON('NEEDED FOR DCCF D012003');"
L40
"DATE(20030120)"
```

Figure 14. UET Keyword-Data Specification Example

## Defining Common Automation Items

```
                                Edit UET Keyword-Data
Command ==>

To change keyword-data pair, specify the following:

Keyword
Data
L69
"CHECK(SYSCONS_MASTER)"
```

Figure 15. UET Keyword-Data Entry for L69

---

## Defining Common Automation Items

There are two definitions that relate to utilities running as a started task. The first one (TEMPHLQ) replaces the usage of the first qualifier of the status file (see also Chapter 5, "Authorizations", on page 47). The second definition (STCJOBNM) allows the unique assignment of started task job names scheduled by the automation in case the user has dedicated job name assignments conflicting with the procedure names provided by the automation.

It is recommended that you define TEMPHLQ. If it is not defined, the automation uses the first qualifier of the AOF status file.

Specify a new entry on the panel UET entry type selection with name ENVIRON and type TEMP@SYSPLEX. Define the following key-data pairs:

```
TEMPHLQ=h1q
STCJOBNM=jobnm
```

where

**hlq** is the high level qualifier which is used to assemble a data set name for allocating temporary data sets needed by programs running as started tasks. The qualifier may consist of up to 17 characters according to the MVS data set naming rules.

Note: Netview must have RACF ALTER access to the qualifier. The user ID of the started tasks must have RACF UPDATE access to the qualifier.

**jobnm** is the job name being assigned to programs running as started tasks. The name can consist of up to 8 characters according to the MVS job naming rules. When not defined, the job name of a started task defaults to the procedure name.

## Defining Common Automation Items

Entry Type : User E-T Pairs            PolicyDB Name : SAMPLE\_PDB  
Entry Name : SYSPLEX\_ENHANCEMENTS    Enterprise Name : REGRTST  
UET Entry : ENVIRON                    UET Type : TEMP@SYSPLEX

| Action | Keyword/Data(partial)                              |
|--------|--|
|        | <b>TEMPHLQ</b>                                     |
|        | AOC.UTIL.TEMPDATA                                  |
|        | <b>STCJOBNM</b>                                    |
|        | UTILSTC  |
|        | <b>LCLPGVOL</b>                                    |
|        | (KEY3PP,KEY4PP)                                    |
|        | <b>LCLPGJOB</b>                                    |
|        | (CICS*,KEEP)                                       |
|        | <b>LCLPGJOB</b>                                    |
|        | (*,CANCEL)   |
|        | <b>LCLPGDSN</b>                                    |
|        | SYS1.LPAGE.PREDEF.PAG1                             |
|        | <b>LCLPGSPC</b>                                    |
|        | 800  |
|        | <b>ENQSDATA</b>                                    |
|        | (CSA GRSQ REGION SUM ALLNUC)                       |
|        | <b>ENQTITLE</b>                                    |
|        | (DUMP PRODUCED DUE TO LONG RUNNING ENQ CONTENTION) |
|        | <b>ENQRES</b>                                      |
|        | (LONGWAIT,*,600)                                   |
|        | <b>ENQRES</b>                                      |
|        | (DEADLOCK,*,30)                                    |
|        | <b>ENQJOB</b>                                      |
|        | (*,DUMP)   |
|        | <b>ENQJOB</b>                                      |
|        | (CICS*,KEEP)                                       |
|        | <b>ENQJOB</b>                                      |
|        | (BATCH*,NODUMP)                                    |
|        | <b>ENQJOB</b>                                      |
|        | (IMS*.KEEP)  |

Figure 16. Sample Definition of Key-Data Pairs for Entry ENVIRON

## Defining Common Automation Items

---

## Chapter 4. Customizing the System to Use the New Functions

If you are using NetView 1.3 or below, uncomment the DSIVSMX statement in member DSICMDB.

---

### Additional Automation Operator IDs

To support the Parallel Sysplex enhancements, you must define the following automation operators:

| Automation Operator ID | Automated Function    | Profile  |
|------------------------|-----------------------|----------|
| AUTXCF                 | XCFOPER               | AOFPRFAO |
| AUTXCF2                | XCFOPER2              | AOFPRFAO |
| AUTPLEX                | PLEXOPER              | AOFPRFAO |
| AUTHW001               | HWOPER01              | AOFPRFAO |
| AUTHW002 ... AUTHW033  | HWOPER02 ... HWOPER33 | AOFPRFHW |

After you made the definitions, you have to build the new definition files via the customization dialog build function. Recycle your automation NetViews to activate the changes in the DSIPARM members.

**Note:** If you have different naming conventions in your setup and you change the NetView autotask IDs in the parmlib member AOFOPFA, you have to change the Primary Automation Operator fields of the AOP definitions accordingly.

---

### Switching Sysplex Functions On and Off

Use the SA OS/390 customization dialog to specify the following new minor resource names:

|                  |   |
|------------------|---|
| <b>CDS</b>       | For the recovery of alternate CDSs.                   |
| <b>ENQ</b>       | For handling long-running ENQs.                       |
| <b>HEALTHCHK</b> | For checking active sysplex settings and definitions. |
| <b>LOG</b>       | For the recovery of the system log.                   |
| <b>LOGGER</b>    | For the recovery of the system logger.                |
| <b>PAGE</b>      | For the recovery of auxiliary storage shortage.       |
| <b>WTO</b>       | For the recovery of WTO(R) buffer shortages.          |
| <b>XCF</b>       | For automating messages IXC102A and IXC402D.          |

By default, all recovery actions are enabled. If you want to disable them, use the customization dialog *Flag Automation Specification* and set the recovery flag to NO (as shown in the example in Figure 17 on page 44).

**Note:** You can change the automation recovery flag during run time by using the command INGAUTO.

## Adding Procedures to PROCLIB

```
COMMANDS  ACTIONS  HELP
-----
A0FGFAS2          Flag Automation Specification
Command ==> _____

Entry Type : MVS Component          PolicyDB Name : DATABASE_NAME
Entry Name : MVS_COMPONENT          Enterprise Name : YOUR_ENTERPRISE

Resource: MVSESA.LOG
Enter level of automation desired.

Automation Flags: Y = Yes    N = No    E = Exits
Assist Flags:      D = Display L = Log  N = None

Actions   Flag           Auto    Assist   Exits
-----   -
Automation . _____  _____  0
Recovery . . NO         _____  0

Enter or Display times to disable automation . . NO      Yes  No

F1=HELP    F2=SPLIT   F3=END     F4=RETURN  F5=RFIND   F6=RCHANGE
F7=UP      F8=DOWN    F9=SWAP    F10=LEFT   F11=RIGHT  F12=RETRIEVE
```

Figure 17. Flag Automation Specification Panel

## Adding Procedures to PROCLIB

The following members of ING.SINGSAMP must be copied into a library that is part of the PROCLIB concatenation:

- INGPXCU
- INGPOM
- INGPIPLC
- HSAPIPLC

These procedures make use of certain data sets and must have appropriate authorizations. For details, see “Access to XCF Utilities” on page 47.

The recording of IPL information should be done immediately after an IPL. This is accomplished by adding the following statement to a COMMNDxx parmlib member that is shared by all systems in the sysplex:

```
COM='S HSAPIPLC,SUB=MSTR'
```

## Message Automation

Messages processed by the automation either via the Netview MAT (message automation table) or by the NetView commands TRAP and WAIT must not be suppressed by any MPF (message processing facility) list being used. For details read the section “Installing SA OS/ 390 on Host Systems — Update MPFLSTxx” in *System Automation for OS/390 Planning and Installation*.

The following messages must be available for the Parallel Sysplex automation:

```
IEA230E IEA231A IEA232A IEA404A IEA405E IEA406I IEA794I
IEE037D IEE041I IEE043I IEE205I IEE400I IEE503I IEE533E IEE600I IEE712I IEE769E IEE889I
ILR009E
INGY1097I
IRA200E IRA201E IRA202I IRA204E
IXC102A IXC247D IXC250I IXC251I IXC255I IXC402D IXC500I IXC501A IXC517I IXC559I
IXC560A
IXG257I IXG261E
IXL126I IXL127A
```

### Important Processor Operations Considerations

Currently, the IXC102A automation and Coupling Facility activation or deactivation is the product automation that uses the new BCP (Basic Control Program) Internal Interface to control the processor hardware.

If you use the automation capabilities of SA OS/390 processor operations in your environment, make sure it does not conflict with the automation supplied by the Parallel Sysplex enhancements.

*System Automation for OS/390 Customizing and Programming* explains how to automate processor operations controlled resources. The section "Message Automation for IXC102A" in the chapter entitled "How to Automate Processor Operations Controlled Resources" describes the automation of message IXC102A using the processor operations facilities to perform processor functions like ACTIVATE or SYSTEM RESET.

With the Parallel Sysplex enhancements, IXC102A and IXC402D automation uses the BCP Internal Interface, which is currently not compatible with processor operations.

If you want to use the IXC102A automation that is supplied as part of the Parallel Sysplex enhancements, make sure there is no processor operations related IXC102A automation defined in your automation policy.

Likewise, if you want to continue to use the processor operations based automation of messages IXC102A and IXC402D, the IXC102A automation flag provided by the Parallel Sysplex enhancements must be disabled.

Processor operations, which is a Focal Point type function, allows you to monitor and control processor hardware, including Coupling Facility images, from a single NetView, the processor operations Focal Point.

The BCP Internal Interface of the Parallel Sysplex enhancements allows you to perform hardware operations from each NetView in your sysplex member, as long as its processor hardware supports this. Refer to "Hardware Prerequisites" on page 3 for more information.

---

### Allocating VSAM Data Sets

The recording of IPL information requires the VSAM data set IPLDATA. The data set must be allocated on a volume shared by all systems in the sysplex. Customize the member INGALLC2 in the SINGSAMP library and run the JCL to allocate the data set. Recatalog the data set on all other systems in the sysplex if the catalog is not shared.

## Allocating VSAM Data Sets



---

## Chapter 5. Authorizations

---

### Granting NetView and the STC-User Access to Data Sets

This section describes what levels of access authorities you need to assign to NetView and to specific started tasks for the functions delivered with this PTF to work correctly.

#### Access to XCF Utilities

The CDS recovery and other operator commands use the XCF utilities to retrieve couple data set information. Because the DD name SYSPRINT is required by the utilities, but can also be assigned by NetView for holding log data, the call of the utilities is implemented as a started task in the PROCLIB. The input and output data sets used by the started tasks are dynamically allocated and deleted by the NetView address space. This requires RACF ALTER access to these data sets for NetView.

When the address space of the started task is created, the operating system assigns a user ID (IBM default: STCUSER) to the started task. This user ID must have RACF UPDATE access to the data sets. The data set names are created as follows:

```
hlq.domain.HSAyyddd.Xhhmss
```

where:

|               |   |
|---------------|---|
| <b>hlq</b>    | is the high-level qualifier for temporary data set defined during the customization |
| <b>domain</b> | is the domain ID of the current NetView   |
| <b>X</b>      | is I, O, or P   |

#### Access to HOM Interface

Sometimes after an IPL an operating system does not know its sender paths to the coupling facilities in the sysplex. In this case the automation functions call the HCD HOM interface to determine the missing path information. As the HOM interface must not run authorized the interface is called via a started task. The input and output data sets used by the started tasks are dynamically allocated and deleted by the NetView address space. This requires the RACF ALTER access to these data sets for NetView.

When the address space of the started task is created, the operating system assigns a user ID (IBM default: STCUSER) to the started task. This user ID must have RACF UPDATE access to the data sets. The data set names are created as follows:

```
hlq.domain.HSAyyddd.Xhhmss
```

where:

|               |   |
|---------------|---|
| <b>hlq</b>    | is the high-level qualifier for temporary data set defined during the customization |
| <b>domain</b> | is the domain ID of the current NetView   |
| <b>X</b>      | O or P  |

## Granting NetView and the STC-User Access to Data Sets

### Access to IPL Information

The new automation function collecting, displaying, comparing, and deleting IPL information uses two started tasks. It is recommended to run the first started task immediately after an IPL as part of COMMNDxx list processing, to collect the IPL information in the SA OS/390 VSAM data set "IPLDATA". The remaining functions are handled by a NetView command. Since the started task as well as the command can delete IPL information both need RACF CONTROL access to the VSAM data set. The started task collecting the information needs RACF READ access to all parmlib members.

When a comparison of IPL information is requested the NetView command schedules the second started task to call ISRSUPC — the compare utility provided by ISPF — as this utility requires fixed ddname. The input and output data sets used by the second started tasks are dynamically allocated and deleted by the NetView address space. This requires the RACF ALTER access to these data sets for NetView.

When the address space of the started task is created, the operating system assigns a user ID (IBM default: STCUSER) to the started task. This user ID must have RACF UPDATE access to the data sets. The data set names are created as follows:

```
hlq.domain.opid.INGPIPLx
```

where:

|               |   |
|---------------|---|
| <b>hlq</b>    | is the high-level qualifier for temporary data set defined during the customization |
| <b>domain</b> | is the domain ID of the current NetView   |
| <b>opid</b>   | is the NetView operator ID  |
| <b>x</b>      | L, N, or O  |

### Access to Spare Couple Data Sets

Because the CDS recovery allocates and deletes spare couple data sets via an XCF utility the user ID assigned to the started task address space must also have RACF ALTER access to these couple data sets. The names of the spare couple data set are built as follows:

```
hlq.cdstype.CDSnn
```

where:

|                |   |
|----------------|---|
| <b>hlq</b>     | is the high-level qualifier for couple data sets defined during the customization |
| <b>cdstype</b> | is ARM, CFRM, LOGR, SFM, SYSPLEX  |
| <b>nn</b>      | is the sequence number corresponding to the volume entry in the list of volumes   |

### Access to User-Defined Couple Data Sets

In addition, the user ID of the started task address space needs RACF READ access to all user-defined couple data sets. And, when LOGGER recovery is enabled, the user ID needs RACF ALTER access to the LOGR couple data sets as well.

## Access to Spare Local Page Data Sets

The new auxiliary shortage recovery allocates and formats spare page data sets. For this reason NetView requires RACF ALTER access to these page data sets. The names of the spare page data set are built as follows:

`hlq.sysname.Vvolume.Snn`

where:

|                |   |
|----------------|---|
| <b>hlq</b>     | is the high-level qualifier for page data sets defined during the customization |
| <b>sysname</b> | is the name of system for which the data set is allocated                       |
| <b>volume</b>  | is the serial number of the volume on which the data set is allocated           |
| <b>nn</b>      | is a unique sequence number   |

---

## Restricting Access to INGPLEX and INGCF Functions

This section describes how you can grant and control access of users to the INGCF and INGPLEX commands.

Access to sensitive functions of the INGPLEX and the INGCF commands should be granted to certain operators only. To do this, add one or more value classes to the operator classes of the operators to authorize them to one or all of the functions.

The following key classes and value classes are applicable:

KEYCLASS=INGPLEX VALCLASS=CDS allows for:

- Allocating an alternate CDS via the INGPLEX CDS command
- Controlling the SDUMP options and the SLIP traps sysplex-wide

KEYCLASS=INGCF VALCLASS=STR allows for:

- Forcing the deallocation of a CF structure via the INGCF STRUCTURE command
- Rebuilding a CF structure on another CF via the INGCF STRUCTURE command
- Controlling the SDUMP options and the SLIP traps sysplex-wide

KEYCLASS=INGCF VALCLASS=CF allows for:

- Preparing a CF for removal from the sysplex via the INGCF DRAIN command
- (Re)integrating a CF into a sysplex via the INGCF ENABLE command
- Including KEYCLASS=INGCF VALCLASS=STR

KEYCLASS=INGPLEX VALCLASS=HW allows for:

- Deactivating the LPAR of a CF via the INGCF DRAIN command
- Activating the LPAR of a CF (=starting the Coupling Facility Control Code) via the INGCF ENABLE command
- Including KEYCLASS=INGCF VALCLASS=CF

To activate the authorization check, add the definition of the SA OS/390 Clist INGRCCCHK, the key classes and the value classes in the NetView DSIPARM member DSICMD, as in the following example:

```
INGRCCCHK CMDMDL MOD=DSICCP,ECHO=N,TYPE=R
      INGPLEX KEYCLASS 3,5
      CDS      VALCLASS 3
```

## Restricting Access to INGPLEX and INGCF Functions

```
HW      VALCLASS 5
INGCF   KEYCLASS 3,4
STR     VALCLASS 3
CF      VALCLASS 4
```

With these definitions operators with `opclass=3` specified in their operator profiles are authorized to issue all functions of the INGPLEX CDS and the INGPLEX CF commands.

Operators with `opclass=4` specified in their operator profiles are authorized to issue all functions of the INGCF CF and the INGCF STRUCTURE commands. Value class 4 includes value class 3 of INGCF but not the value class of INGPLEX.

---

## Controlling Access to the Processor Hardware Functions

This section describes what must be defined in a SAF product such as RACF to enable the usage of the BCP internal interface, in the following referred as HSAET32.

Before you can use the enhanced sysplex functions of SA OS/390 for CF or XCF automation, the hardware resource (HSAET32) must be defined in NetView.

1. Define resource HSA.ET32OAN.HSAET32 in the CLASS FACILITY
2. Permit NetView READ ACCESS to this facility class resource

The following example shows the RACF commands used to define the resource and to grant READ access for the NetView user.

```
SETROPTS CLASSACT(FACILITY)
RDEFINE FACILITY HSA.ET32OAN.HSAET32 UACC(NONE)
PERMIT HSA.ET32OAN.HSAET32 CLASS(FACILITY) ID(stcuser) ACC(READ)
```

With the SETROPTS command, the RACF class FACILITY is made available. The second command RDEFINE fully qualifies the HSAET32 resource and sets universal access to none. With the PERMIT command, the RACF defined user *stcuser* gets READ access to this resource. User ID *stcuser* must be the user ID associated with your NetView started task. If you start NetView as a regular job, the user ID submitting the job must be authorized for the resource.

Note, that you can use a wildcard character to specify the resource more generic if that is suitable for your environment.

## Access to the CPCs

Each CPC must have a corresponding resource profile defined with your SAF product. The skeleton of the CPC resource is:

```
HSA.ET32TGT.netid.nau
HSA.ET32TGT.netid.nau.lpar
```

The *netid.nau* part of the resource name corresponds with the *netid.nau* definition of the CPC entry specified in the customization dialog. The period between *netid* and *nau* is part of the resource name. For LPAR protection define a resource with the *netid.nau.lpar* specification.

The following example shows how to define a CPC resource in RACF.

```
RDEFINE FACILITY HSA.ET32TGT.DEIBMD1.X7F1F30A UACC(NONE)
```

## Controlling Access to the Processor Hardware Functions

The CPC with netid DEIBMD1 and nau X7F1F30A is defined as a resource in the RACF class facility with a universal access attribute of NONE.

Note, that you can use a wildcard character to specify the resource more generic if that is suitable for your environment.

### Levels of CPC Access

The following lists the access levels and their meaning for the CPC resources.

- READ — Retrieve, get configuration information from the CPC
- WRITE — Update, set configuration information of the CPC
- CONTROL — Issue operations management commands of the CPC

Note: this access level scheme is for the CPC and its LPARs.

### Defining the CPC Access Lists

With SA OS/390, several NetView autotasks need to be authorized to access the CPCs that are defined in the customization dialog.

The following NetView autotasks need to be authorized with access level CONTROL for **all** defined CPCs and all its LPARs:

- The XCF autotasks
- The autotasks defined with SYN %AOFOPXCFOPER% in automation table member AOFMSGAO
- AUTRCP
- AUTPLEX
- AUTOBASE
- AUTHWxxx

The autotasks used for the HW interface initialization and communication also need to be authorized. Use access level CONTROL for the AUTHWxxx autotasks in your environment.

If you have backup tasks defined for the listed primary autotasks, the backup autotasks also need to be authorized.

The AUTXCFxx autotasks plus the additional ones from %AOFOPXCFOPER% are used internally once INGCF drain or INGCF enable is invoked by an authorized user. IXC102A message automation is also performed by these autotasks.

The following example shows how to permit access to a CPC resource in RACF:

```
PERMIT HSA.ET32TGT.DEIBMD1.X7F1F30A CLASS(FACILITY) ID(AUTXCF) ACC(CONTROL)
```

The XCF autotask AUTXCF gets access level CONTROL for the CPC resource DEIBMD1.X7F1F30A.

LPAR access example:

```
PERMIT HSA.ET32TGT.DEIBMD1.X7F1F30A.* CLASS(FACILITY) ID(AUTXCF) ACC(CONTROL)
```

The XCF autotask AUTXCF gets access level CONTROL for the CPC resource DEIBMD1.X7F1F30A and all its defined logical partitions.

## Controlling Access to the Processor Hardware Functions

---

## Chapter 6. Sysplex-Related Commands

This section contains reference information about the INGCF, INGCFL, INGHC and INGPLEX commands, which support several functions. Some of these functions impact the system configuration, others serve to display information. The display functions are accessible for every operator that can issue the respective command. Access to related groups of actions that modify the system configuration can be granted or denied to every operator individually.

**Note:** The actions that are controlled by this security mechanism are marked by an asterisk (\*) in the following descriptions.

The appearance of the panels from which you can initiate an action depends on your authorizations. The code or PF key by which you can initiate a certain action is only displayed when you are authorized to perform the action.

---

### Additional Parameters for System Operations Commands

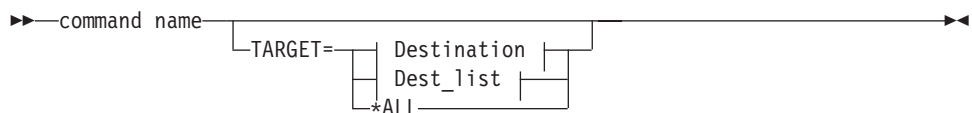
The following parameters are available for a number of system operations commands:

#### TARGET

The TARGET parameter lets you specify the system where the command is to be processed. You can direct the command to:

- A particular system in the sysplex, or enterprise
- A subset of systems in the sysplex, or enterprise
- A sysplex
- All systems currently active in the local sysplex

The syntax is as follows:



#### Destination:



#### Dest\_list:



Where:

*system\_name*  
Specifies the name of the OS/390 system

## Additional Parameters for System Operations Commands

*domain\_ID*

Specifies the NetView domain identifier

*sysplex\_name*

Specifies the name of the sysplex

**\*ALL** SA OS/390 specifies that the command should be routed to all SA OS/390 systems that are currently active in the local sysplex.

Note, that not all of the commands that support the TARGET parameter also support the \*ALL value. Refer to the respective syntax diagrams for information about whether \*ALL is supported.

The search sequence is as follows:

1. System name within the local sysplex
2. Domain ID within the local sysplex
3. Local sysplex name

If it is a human operator, the search continues in the following sequence:

- Domain ID within the enterprise
- System name within the enterprise
- Sysplex name within the enterprise

If no value is specified, and the command does not refer to a defined resource, it is processed on the local system.

**Note:** The following only applies to commands that do **not** operate sysplex-wide.

If you do not specify the TARGET parameter, and the SA OS/390 command refers to a defined resource, SA OS/390 processing is as follows:

- If the resource is only defined on one active system, the command is routed to that specific system.
- If it is an autotask, or when processing the command in line mode, SA OS/390 checks whether or not the resource is defined on the local system. If it is, the command is processed locally. Otherwise, an error message is issued.
- If the resource is defined on more than one active system, and the command is not running on an autotask, SA OS/390 displays the following selection panel where you can select the resource, or resources where the command is to be routed to:

If you enter `dispacf mvsesa` a panel similar to the following is displayed:



## Additional Parameters for System Operations Commands

```
AOFKSEL1          SA OS/390 - Command Dialogs          Line 1 of 4
Domain ID = IPUFA  ----- DISPACF -----           Date = 06/27/00
Operator ID = NETOP1                                Time = 17:43:12

Multiple instances found for MVSESA in sysplex(es) AOCPLX
Select one or more items to be processed, then press ENTER.

      Sel  System  Domain
      ---  -
      -    AOCA   IPUFA
      -    AOCB   IPUFB
      -    AOCC   IPUFC
      -    AOCD   IPUFD
      -

Command ==>
PF1=Help      PF2=End      PF3=Return
PF6=Roll                                PF12=Retrieve
```

Figure 18. Resource Selection Panel 1 – Non-sysplex-wide

If the target is within the local sysplex, the communication method is via XCF facilities. Otherwise, the NetView RMTCMD (LU 6.2) command is used. Sysplex-wide commands are processed locally.

**Note:** The following only applies to sysplex-wide commands. If a target is specified and the resource is not defined on the specified system, SA OS/390 issues an error message.

If you enter `ingvotestdt000*` a panel similar to the following is displayed:

## Additional Parameters for System Operations Commands

```

AOFKSEL4          SA OS/390 - Command Dialogs          Line 1 of 32
Domain ID = IPUFA  ----- INGVOTE -----           Date = 06/27/00
Operator ID = NETOP1                               Time = 17:50:39

Multiple instances found for STDT000*
Select one item to be processed, then press ENTER.

Sel  Name          Type System      Description
-----
-    STDT000AN00    APL  AOCA        Parent for all STD* appl 05/16/00 06:25
-    STDT000AN00    APL  AOCC        Parent for all STD* appl 05/16/00 06:25
-    STDT000AN00    APL  AOCC        Parent for all STD* appl 05/16/00 06:25
-    STDT000AN00    APL  AOCC        Parent for all STD* appl 05/16/00 06:25
-    STDT000AN1A    APL  AOCA        Child of AN10 (child tree --- AN1B)
-    STDT000AN1A    APL  AOCC        Child of AN10 (child tree --- AN1B)
-    STDT000AN1A    APL  AOCC        Child of AN10 (child tree --- AN1B)
-    STDT000AN1A    APL  AOCC        Child of AN10 (child tree --- AN1B)
-    STDT000AN1A    APL  AOCC        Child of AN10 (child tree --- AN1B)
-    STDT000AN1B    APL  AOCA
-    STDT000AN1B    APL  AOCC
-    STDT000AN1B    APL  AOCC

Command ==>
PF1=Help      PF2=End      PF3=Return
PF6=Roll      PF8=Forward  PF12=Retrieve

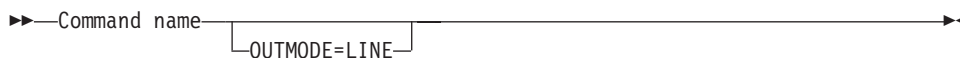
```

Figure 19. Resource Selection Panel 2 – Sysplex-wide

### OUTMODE

This parameter lets you specify the output mode of a command. If you specify **LINE**, the output is displayed in line mode, independent of the task type.

The syntax is as follows:



Further characteristics are the following:

- No color attributes are set for data that is shown in line mode.
- The sequence of the fields may be different in line mode than in fullscreen.
- Not all fields from the fullscreen display may be shown in line mode.
- Line mode output is shown in a multiline message.
- Line mode output is not processed by the message automation table and is not written to the netlog. To obtain output from a command such as **DISPSTAT** in the netlog, use a **PIPE** command, for example:  

```
PIPE NETV DISPSTAT OUTMODE=LINE | LOGTO NETLOG
```
- Line mode output cannot be processed by a **TRAP** and **WAIT**.
- System operations commands can be issued within a NetView **PIPE** by using the **OUTMODE=LINE** parameter, unless noted otherwise in the command description.
- System operations commands supporting the **OUTMODE=LINE** option can be used in user-written clists. Note however, that the format of the output may change for follow-on Releases.
- If you work with **OUTMODE=LINE** no prompt panel is displayed.
- If no value is specified, the decision whether to display the command output by means of a full-screen panel or in line mode is based on the NetView task type the command is running on.

## Additional Parameters for System Operations Commands

### OUTDSN

This parameter lets you specify the name of the data set that is to contain the output of the command. You can specify a sequential data set or a member of a partitioned data set. The minimum record length is 80 bytes, except for the DISPSTAT and INGLIST commands where the minimum record length is 256 bytes. The data set must already exist. The OUTDSN parameter forces OUTMODE=LINE.

---

## INGCF

### Purpose

The INGCF command supports all the functions of SA OS/390 that deal with coupling facilities. It supports full mode and line mode—for full line mode capability, refer to “INGCFL” on page 78. If you issue INGCF in line mode, only the display function is available.

The INGCF command supports the following parameters:

- **DRAIN**  
Serves to remove all allocated structures from the coupling facility, to disconnect the coupling facility from the systems of the sysplex, and to inactivate the coupling facility.
- **ENABLE**  
Serves to activate a coupling facility, connect it with the systems of a sysplex and to populate it with structures.
- **PATH**  
Displays and controls the sender paths of the target coupling facility. It sets the sender paths ONLINE and OFFLINE physically and logically.
- **STRUCTURE**  
Displays detail information and rebuilds or deletes a selected structure on the target coupling facility. It also lets you start and stop duplexing.

INGCF associates a status with every coupling facility, and a condition with every structure (instance) that is allocated on the target coupling facility. The structure condition is influenced by the release level of the system that allocated the structure. The INGCF functions use the coupling facility state and the structure conditions to determine which action can be performed in any given situation. Therefore, the DRAIN and ENABLE functions can enforce a correct sequence of actions for complex tasks such as draining or restoring a coupling facility.

If the selected action impacts the sysplex configuration it must be confirmed before execution.

### Authorizations

The actions that you can initiate with INGCF depend on your authorizations. The panels show your authorization type. Note that the authorization types apply to the current function, and that your authorization type may vary for different functions.

The following authorization types exist:

#### DISPLAY

You cannot initiate any action that affects the sysplex configuration.

## INGCF

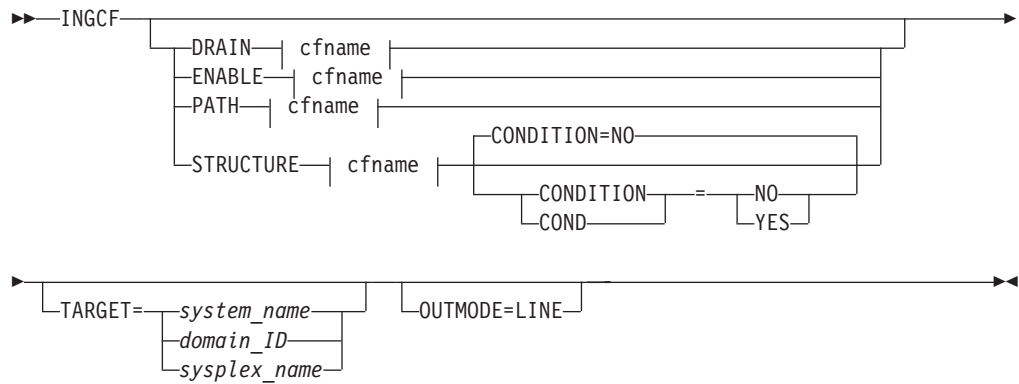
### ALL BUT (ACTIVATE|SHUTDOWN)

This type only occurs in the DRAIN and ENABLE command dialogs. You can rebuild structures, force the deletion of structures and set the sender paths offline and online, but you cannot inactivate or activate the coupling facility.

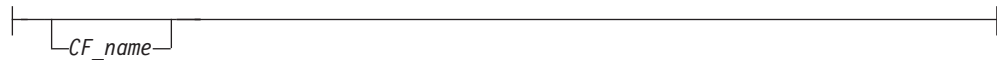
**ALL** You can initiate all actions from the corresponding panel.

Depending on your authorizations, it is possible that you have, for example, authorization type ALL for the STRUCTURE function, and authorization type DISPLAY for the DRAIN function.

## Syntax



### cfname:



## Parameters

### DRAIN

Prepares a coupling facility for removal from the sysplex.

### ENABLE

(Re)integrates a coupling facility into a sysplex.

### PATH

Controls the sender paths of a coupling facility.

### STRUCTURE

Offers manipulation of individual structures (detail information, rebuild, deletion).

### CF\_name

Name of the target coupling facility for the specified function. The default is a selection panel that shows all available coupling facilities of the sysplex.

### CONDITION

Specify YES if you want to get the current condition for each structure. Selecting this option increases the response time required to build the display. The default is NO.

**TARGET**

For information on the TARGET parameter, refer to *System Automation for OS/390 Operator's Commands*.

**OUTMODE**

For information on the OUTMODE parameter, refer to *System Automation for OS/390 Operator's Commands*.

**Restrictions and Limitations**

The ENABLE and the PATH functions require that the active IODF is catalogued. Otherwise, sender path information cannot be retrieved in certain situations.

INGCF ENABLE assumes that the receiver paths from the coupling facility to the systems of the sysplex have been defined and activated. This requires a POR of the CPC on which the coupling facility resides.

**Coupling Facility States**

The status of a coupling facility can be as follows:

**ACTIVATING**

The coupling facility is being activated and will then become DRAINED.

**DEACTIVATING**

The coupling facility is being deactivated and will then become INACTIVE.

**DRAINING**

The coupling facility is being disconnected from the connected systems.

**DRAINED**

The coupling facility has no connection to any system and can be removed from the sysplex.

**DRAINED NOHWACC**

The coupling facility has no connection to any system, but cannot be removed from the sysplex because the BCP (Basic Control Program) internal interface is not available.

**Note:** This status is also displayed when the coupling facility has been deactivated from the HMC (Hardware Management Console) but the XCF display commands still return the name of the coupling facility.

**ENABLING**

The coupling facility is being connected to the systems of the sysplex that use it.

**FORCING**

Allocated structures are being deleted from the coupling facility. This only happens with structures that have no active connectors, and with these only when they cannot be rebuilt by system-managed rebuild.

**INACTIVE**

The coupling facility is not active.

**INACTIVE NOHWACC**

The coupling facility is not active and cannot be activated because the BCP Internal Interface is not available.

**NORMAL**

The coupling facility may have allocated structures and is connected to all systems.

**NORMAL OFFLINE**

The coupling facility may have allocated structures. At least one system has set all its sender paths to this coupling facility to OFFLINE. XES will reject any rebuild request for this coupling facility.

**NOTINPOLICY**

The coupling facility is active but not defined in the active CFRM policy.

**POPULATING**

The coupling facility is being populated with all those structures that have it on the first place in their preference list.

**REBUILDING**

Either all allocated structures that can be rebuilt are being removed from the coupling facility by the XES rebuild process (initiated by DRAIN), or one particular such structure is being removed (initiated by the STRUCTURE).

## Structure Conditions

The condition of an allocated structure can be:

**Rebuild is not supported.**

The structure can neither be rebuilt, nor can its deletion be forced.

The structure has at least one active connector that does not support user-managed rebuild, and at least one active connector that does not support system-managed rebuild.

**System-managed processes not supported.**

The structure cannot be rebuilt, nor can its deletion be forced.

System-managed rebuild, which is a system-managed process, is not possible for one of the following reasons:

- The structure was allocated from a system with OS/390 2.7 or below.
- The CFRM couple data sets have not been formatted to support system-managed processes (ITEM NAME(SMREBLD) NUMBER(1) was not specified.).

**Note:** In certain rare cases system-managed processes are not supported although the condition that is displayed on the DRAIN panel seems to indicate the contrary. Then, the rebuild will be initiated, but will fail with message IXC367I indicating that system-managed processes are not supported for the structure.

**No alternate coupling facility defined or available.**

The structure can neither be rebuilt, nor can its deletion be forced.

The structure has an active connector and supports rebuild but has no alternate coupling facility defined in its preference list, or the alternate coupling facilities defined in the preference list are currently unavailable.

**Insufficient space detected for rebuild.**

The structure can or could not be rebuilt. Its deletion cannot be forced.

No alternate coupling facility has enough space to rebuild the structure.

**Preference list is empty.**

The structure cannot be rebuilt because its preference list is currently empty. A possible reason for this is a pending policy change; for pending policy changes, see “P column” on page 77.

**Structure is pending deallocation.**

XES accepted a forced deletion of the structure but does the real deallocation later.

**Note:** This status can only occur when MVS APAR OW39404 has not been installed.

**Structure is being rebuilt.**

The structure is being rebuilt to another coupling facility.

**Duplex rebuild is being stopped.**

Two instances of the structure were maintained on different coupling facilities. The application is being disconnected from that instance that is allocated on the target coupling facility. After disconnecting, the instance is deleted.

**No connection exists.**

The structure cannot be rebuilt, but you can force its deletion.

The structure has no connections and cannot be rebuilt with system-managed rebuild.

**No alternate coupling facility for structure with no connections.**

The structure cannot be rebuilt, but you can force its deletion.

The structure has no connections. It could be rebuilt with system-managed rebuild, but no alternate coupling facility is defined in its preference list or available.

**No alternate coupling facility for structure with no active connections.**

The structure cannot be rebuilt, but you can force its deletion.

The structure has only DISCONNECTING, FAILED, or FAILED-PERSISTENT connections. It could be rebuilt with system-managed rebuild, but no alternate coupling facility is defined in its preference list or available.

**The structure’s initial size is less than its actual size.**

The structure can be rebuilt, but this can lead to loss of data.

An initial size is specified for the structure in the active CFRM policy. This initial size was used for the allocation of the structure. Afterwards, the size of the structure was increased either by the application itself or an operator command. However, the structure will only be rebuilt with its initial size. Subsequently, INGCf will expand the structure to its actual size again, but this will happen *after* the data have been transferred. To avoid a potential loss of data, the application has to change the initial size to the actual size.

**No active connection exists.**

The structure cannot be rebuilt, but you can force its deletion.

The structure has only DISCONNECTING, FAILED, or FAILED-PERSISTENT connections and cannot be rebuilt with system-managed rebuild.

**Note:** INGCf DRAIN deallocates structures with this condition as part of the REBUILD action (see “REBUILD (F10)” on page 64). INGCf

## INGCF

STRUCTURE accepts a rebuild request for structures with this condition, but deallocates them (see “Rebuild (R)” on page 75).

### **No connections. System-managed rebuild supported.**

The structure can be rebuilt.

The structure has no connections, but can be rebuilt with system-managed rebuild.

### **No active connections. System-managed rebuild supported.**

The structure can be rebuilt with system-managed rebuild.

User-managed rebuild is not possible for the structure because it has only DISCONNECTING, FAILED, or FAILED-PERSISTENT connections.

### **System-managed rebuild is supported**

The structure can be rebuilt.

The structure has active connectors. At least one active connector does not support user-managed rebuild, but all active connectors support system-managed rebuild.

### **Duplex rebuild is active.**

The application is connected to two instances of the same structure on different coupling facilities.

### **[No condition]**

When no condition is displayed, the structure can be rebuilt.

The structure has at least one active connection, and all its active connectors support user-managed rebuild.

### **Structure is awaiting rebuild.**

The structure has been selected for rebuild but has not been processed yet.

### **Structure is currently allocated on *cf\_name*.**

The structure can be rebuilt on the target coupling facility with the POPULATE action of the ENABLE function. It is currently allocated on the *cf\_name* coupling facility, but the target coupling facility precedes *cf\_name* in the structure’s preference list. This condition is displayed only in the ENABLE command dialog.

### **Structure allocated in *cf\_name* cannot be rebuilt to this CF.**

The structure can probably not be rebuilt on the target CF with the POPULATE action of the ENABLE function. It is currently allocated in the *cf\_name* CF, but the target CF precedes *cf\_name* in the structure’s preference list. And, the actual size of the structure is greater than the free space of the target CF. This condition is displayed only in the ENABLE command dialog.

## **Example**

If you issue INGCF without any parameters, a panel with all coupling facilities of the sysplex is displayed:



```

INGLX900          SA OS/390 - Command Dialogs          Line 1 of 2
Domain Id = IPSFO  ----- INGCF -----              Date = 02/23/03
Operator Id = NETOP1                               Time = 13:42:35

Sysplex . . . . . : KEY1PLEX          SM process level . : 12
-----
Cmds: D drain CF / E enable CF / P display sender paths / S display structures

  CF Name  Total Space Free Space Free% V Lvl LP Node Descriptor
-----
_ CF01      507392 K   446976 K 88.09 Y 11 D 009672.RX6.IBM.51.000000064516
_ CF02      245248 K   210944 K 86.01 Y 11 E 009672.RX6.IBM.51.000000064516

Command ==>
F1=Help      F2=End          F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve
    
```

Figure 20. INGCF Selection Panel

Specify a function for a selected coupling facility and press Enter.

# DRAIN

### Purpose

The DRAIN function of INGCF facilitates the removal of a coupling facility from the sysplex, for example, for maintenance purposes. With this option, you can perform the following sequence of tasks:

1. Display information for all allocated structures of the coupling facility.
2. Rebuild all rebuildable structures on *another* coupling facility, and delete instances of structures on the target coupling facility that are being duplexed on another coupling facility.

### Notes:

- a. The scope of the structures that can be rebuilt depends on the release level of the sysplex members.
  - b. INGCF DRAIN rebuilds structures one at a time (SETXCF START,REBUILD,STRNAME=), not globally (SETXCF START,REBUILD,CFNAME=), and always on a coupling facility that is different from the target coupling facility (LOCATION=OTHER).
  - c. Generally, you should be aware that it is XES that performs the actual rebuild. Not all of the factors that XES takes into account when allocating a structure are accessible to SA OS/390. Therefore, a rebuild request for a structure that should be rebuildable according to its condition can fail in certain rare cases.
3. Force the deletion of structures that have no active connectors and cannot be rebuilt.

Note that there are structures that you can neither rebuild nor delete with the force action. These include the structures that have at least one active connector and do not support rebuild. To remove such structures first disconnect all active connectors, and then delete the structure manually if it is persistent or has persistent connections.

4. Disconnect the coupling facility from the systems with which it is connected.
5. Inactivate the target coupling facility.

INGCF DRAIN ensures that these actions are performed in the correct order, as specified above.

### Actions

The following F-keys are supported:

#### \*REBUILD (F10)

Starts the rebuild of structures that can be rebuilt on *another* coupling facility. Thus, a rebuild is only initiated for structures whose preference list contains more than one coupling facility.

There are two methods for rebuild, user-managed and system-managed rebuild. User-managed rebuild is supported for all release levels. System-managed rebuild is only available with systems that have OS/390 2.8 or above; it must have been enabled by formatting the CFRM couple data sets with the specification

```
ITEM NAME(SMREBLD) NUMBER(1)
```

System-managed rebuild is only performed when the requirements for user-managed rebuild are not met. This applies, for example, to structures without active connectors.

The REBUILD action also deletes all structure instances on the target coupling facility that are being duplexed on another coupling facility.

**Note:** The REBUILD action *deallocates* structures with the condition 'No active connection exists.'. See "No active connection exists" on page 61.

**\*FORCE (F5)**

Forces the deallocation of structures with one of the following conditions:

- No connection exists.
- No alternate coupling facility for structure with no active connections.
- No alternate coupling facility for structure with no connections.

This action is only made available after all structures that can be rebuilt have been rebuilt.

**\*DRAIN (F4)**

Disconnects the coupling facility from its connected systems by setting the sender path(s) OFFLINE.

This action is only enabled after all structures of the target coupling facility have been removed to another coupling facility or deallocated. Note that structures that have active connectors but do not support rebuild cannot be removed with F10 or F5. They must be deallocated manually before executing this step is enabled.

**\*SHUTDOWN (F11)**

This action inactivates the coupling facility. It is only made available when all connections between the coupling facility and the systems of the sysplex have been disconnected.

**Note:** This function key is unavailable when running on a z/OS image which runs under z/VM.

Note that these actions can only be performed if INGC F DRAIN is issued in full mode. In line mode, only the display function is available.

To avoid performance degradation due to multiple rebuild processes, or unpredictable results due to multiple executions of an action, all actions are locked. Therefore, an action is rejected if any lock exists even if the action does not affect the action currently being performed. Because the action can take a long time it is also executed asynchronously on a dedicated autotask, preventing the operator from being blocked. To check progress, use the refresh function (F9).

**Example**

In the following example, a coupling facility is drained:

1. All of its structures that can be rebuilt are rebuilt on another coupling facility, and duplexing is stopped.
2. For all structures that have no active connector and cannot be rebuilt deletion is forced.
3. All systems that are connected with the coupling facility are disconnected.
4. The coupling facility is inactivated.

When you issue INGC F with the option DRAIN, you can specify the coupling facility to be drained, for example by entering INGC F DRAIN CF01; in this case, the panel of Figure 21 on page 66 is displayed at once. If you do not specify a coupling

## INGCF DRAIN

facility name, INGLX901, INGCF displays a selection panel with all coupling facilities that are defined in the sysplex. After selection of CF01, INGCF displays the following panel:

```
INGLX901          SA OS/390 - Command Dialogs          Line 1 of 31
Domain Id = IPSFO  ----- INGCF DRAIN -----          Date = 02/13/01
Operator Id = NETOP1                                     Time = 07:01:00

Coupling Facility ==> CF01          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
DFHXQLS_TESTTSQ1  No active connections. System-managed rebuild supported.
DSNG_LOCK1
DSNG_SCA           System-managed rebuild is supported.
ISGLOCK
ISTGENERIC
IXCGRS
IXCPLEX_PATH1
M7SG_LOCK1        *No alternate CF for structure with no active connections.
M7SGEMHQ          No active connections. System-managed rebuild supported.
M7SGMSGQ          No active connections. System-managed rebuild supported.
M7SGMSGQOV        No active connections. System-managed rebuild supported.

Command ==>
F1=Help          F2=End          F3=Return          F6=Roll
                  F8=Forward      F9=Refresh      F10=Rebuild      F12=Retrieve
```

Figure 21. DRAIN Command Dialog Panel: Before any Action

The status of the coupling facility (NORMAL) and the authorization type of the operator (ALL) are displayed on the right side of the panel header. The main part of the panel consists of a list containing the structures allocated in CF01 and their conditions. The conditions are classified by color and an asterisk. The asterisk signifies that a structure cannot be rebuilt.

The only action that is enabled is REBUILD with F10. Pressing F10 calls the following confirmation panel:

```

INGLX92R          SA OS/390 - Command Dialogs
Domain Id   = IPSFO      ----- INGCF DRAIN -----
Operator Id = NETOP1
Date = 02/13/01
Time = 07:01:04

Coupling Facility . : CF01
Sysplex . . . . . : KEY1PLEX

                R E B U I L D Confirmation

The REBUILD process runs asynchronously on the next system in the sysplex that
has access to the CFRM couple data set and can perform all necessary actions.
Each structure that has no * indicator in front of its status is rebuilt to its
status accordingly. The structures are processed in sequence. Once started use
the refresh PF key for getting the current status of the process. When more
than one structure is being rebuilt a timeout occurred indicating that XCF is
very busy. But processing continues. A display without any structure or only
structures that cannot be rebuilt indicates a successful completion.

Command ==>
                F2=End      F3=Return      F6=Roll
                                F10=Go      F11=Cancel  F12=Retrieve

```

Figure 22. DRAIN Command Dialog: Confirmation Panel for REBUILD

After F10 was pressed and the rebuild is complete the command dialog can be refreshed with F9. It looks as follows:

```

INGLX901          SA OS/390 - Command Dialogs          Line 1 of 1
Domain Id   = IPSFO      ----- INGCF DRAIN -----
Operator Id = NETOP1
Date = 02/13/01
Time = 07:53:36

Coupling Facility ==> CF01          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . : ALL
-----
Structure      Condition
-----
M7SG_LOCK1     *No alternate CF for structure with no active connections.

Command ==>
F1=Help      F2=End      F3=Return      F5=Force      F6=Roll
                                F9=Refresh      F12=Retrieve

```

Figure 23. DRAIN Command Dialog Panel: After Rebuild

One structure could not be rebuilt because no alternate coupling facility is specified in its preference list. The REBUILD action is no longer available. Instead, the FORCE action (F5) is available because the structure that could not be rebuilt has a condition that allows forcing the deallocation of the structure. Pressing F5 calls a confirmation panel similar to that for REBUILD. Pressing F10 on the

## INGCF DRAIN

confirmation panel and refreshing the command dialog after the action has been completed results in the following panel:

```
INGLX901          SA OS/390 - Command Dialogs          Line
Domain Id   = IPSFO          ----- INGCF DRAIN -----          Date = 02/13/01
Operator Id = NETOP1                                     Time = 08:12:28

Coupling Facility ==> CF01          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . : ALL
-----
Structure          Condition
-----

Command ==>
F1=Help          F2=End          F3=Return          F4=Drain          F6=Roll
                  F9=Refresh          F12=Retrieve
```

Figure 24. DRAIN Command Dialog Panel: After Forcing

No more structures are allocated in the coupling facility, so that the coupling facility can be released from the connections with the systems of the sysplex. Consequently, INGC F DRAIN enables the DRAIN action (F4). After completion of that action, the status of the coupling facility changes to DRAINED, as shown on the following panel:

```

INGLX901          SA OS/390 - Command Dialogs      Line
Domain Id   = IPSFO      ----- INGCF DRAIN -----      Date = 02/13/01
Operator Id = NETOP1                                          Time = 08:12:32

Coupling Facility ==> CF01          Status . . . . . : DRAINED
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . : ALL
-----
Structure      Condition
-----

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
F9=Refresh      F11=Shutdown  F12=Retrieve
    
```

Figure 25. DRAIN Command Dialog Panel: After Draining

Because the coupling facility is no longer connected to any system, it can be inactivated. After pressing F11 the status of the coupling facility changes to INACTIVE:

```

INGLX901          SA OS/390 - Command Dialogs      Line
Domain Id   = IPSFO      ----- INGCF DRAIN -----      Date = 02/13/01
Operator Id = NETOP1                                          Time = 08:12:32

Coupling Facility ==> CF01          Status . . . . . : INACTIVE
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . : ALL
-----
Structure      Condition
-----

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
F9=Refresh      F12=Retrieve
    
```

Figure 26. DRAIN Command Dialog Panel: After Inactivation

## INGCF ENABLE

### ENABLE

#### **Purpose**

The ENABLE function of the INGCF command is intended to support the integration AND re-integration of a coupling facility into a sysplex. With this option, you can:

1. Activate the target coupling facility.
2. Connect the systems of the sysplex with the coupling facility.
3. Switch to another CFRM policy if the target coupling facility is not defined in the active policy and a suitable policy is available.

A suitable CFRM policy must contain:

- A definition of the target coupling facility
- Appropriate definitions for every active coupling facility and every allocated structure

4. Rebuild all structures on the target coupling facility whose preference list starts with this coupling facility, unless this is excluded by other requirements.

INGCF ENABLE ensures that these actions are performed in the correct order, as specified above.

#### **Actions**

The possible actions and the associated F-keys are:

##### **\*ACTIVATE (F11)**

This action activates the CFCC (Coupling Facility Control Code) through the BCP Internal Interface by an ACTIVATE command.

**Note:** This function key is unavailable when running on a z/OS image which runs under z/VM.

##### **\*ENABLE (F4)**

Sets the sender path(s) of all systems of the sysplex to ONLINE. This action is enabled when the coupling facility is active.

##### **\*SWITCH (F5)**

Switches to another CFRM policy when the target coupling facility is not defined in the active CFRM policy and a suitable policy is available. When there is more than one suitable policy you can choose one of these from a selection panel.

A CFRM policy is suitable when it contains:

- A definition of the target coupling facility
- Definitions for every active coupling facility and every allocated structure

This action is only made available when the target coupling facility is active, but not defined in the current CFRM policy.

##### **\*POPULATE (F10)**

Starts a rebuild process by which all structures that have the target coupling facility at the beginning of their preference list but are currently allocated on another coupling facility are allocated on the target coupling facility.

This action requires that the coupling facility be enabled, connected to all members of the sysplex, and defined in the current CFRM policy. The



action is offered whenever INGCN ENABLE detects that a structure is not allocated on the target coupling facility although it is the preferred coupling facility of that structure.

**Note:** When you have drained a coupling facility with INGCN DRAIN and then reintegrate it with INGCN ENABLE, be aware that the set of structures that are allocated on the target coupling facility after population can be different from the original set before the draining. Typically, this happens when the original set does not contain exactly those structures that have the target coupling facility at the first position in their preference list.

Note that these actions can only be performed when INGCN ENABLE is called in full mode. In line mode, only the display function is available.

**Example**

In the following example, a coupling facility that has already been activated is reintegrated into the sysplex in two steps:

1. The coupling facility is connected to all systems of the sysplex.
2. All structures that have the target coupling facility as the first coupling facility in their preference list are allocated on the target coupling facility.

If you issue INGCN with the option ENABLE, you can specify the coupling facility to be reintegrated, for example by entering INGCN ENABLE CF02. In this case, the panel of Figure 27 is displayed at once. If you do not specify a coupling facility name, INGCN shows a selection panel with all coupling facilities that are defined in the sysplex. After selection of CF02, INGCN displays the following panel:

```

INGLX901                SA OS/390 - Command Dialogs          Line
Domain Id = IPSFO      ----- INGCN ENABLE -----          Date = 02/20/01
Operator Id = NETOP1                                     Time = 11:06:06

Coupling Facility ==> CF02                Status . . . . . : DRAINED
Sysplex . . . . . ==> KEY1PLEX           Permission . . . . : ALL
-----
Structure          Condition
-----
-----

Command ==>
F1=Help          F2=End          F3=Return      F4=Enable          F6=Roll
F9=Refresh                                     F12=Retrieve
    
```

Figure 27. ENABLE Command Dialog: Panel Before Any Action

The selected coupling facility has already been activated manually, therefore its status, as shown on the right side of the panel header, is DRAINED. The authorization type of the operator (ALL) is also displayed on the right side of the panel header. The main part of the panel is empty because no structures are

## INGCF ENABLE

allocated in CF02. The only action that is activated is ENABLE with F4. If you press F4 the following confirmation panel is displayed:

```
INGLX92E          SA OS/390 - Command Dialogs          Date = 02/20/01
Domain Id = IPSFO  ----- INGCF ENABLE -----        Time = 11:06:20
Operator Id = NETOP1

Coupling Facility . : CF02
Sysplex . . . . . : KEYIPLEX

                E N A B L E Confirmation

The ENABLE process runs asynchronously on the next system in the Sysplex that
has access to the CFRM couple data set. All sender paths of all system in the
sysplex are set to ONLINE. Once started use the refresh PF key for getting
the current status of the process. The status NORMAL indicates a successful
completion.

Command ==>>>
                F2=End          F3=Return          F6=Ro11
                                F10=Go          F11=Cancel      F12=Retrieve
```

Figure 28. Confirmation Panel for ENABLE

After pressing F10 on the confirmation panel, the command dialog changes as follows:

```
INGLX901          SA OS/390 - Command Dialogs          Line 1 of 3
Domain Id = IPSFO  ----- INGCF ENABLE -----        Date = 02/20/01
Operator Id = NETOP1                                     Time = 11:06:39

Coupling Facility ==> CF02          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . . : ALL
-----

Structure          Condition
-----
GRPYCSQ_ADMIN      Structure is currently allocated in CF01.
GRPYHSAQUEUE       Structure is currently allocated in CF01.
HSA_LOG            Structure is currently allocated in CF01.

Command ==>>>
F1=Help          F2=End          F3=Return          F6=Ro11
                F9=Refresh F10=Populate      F12=Retrieve
```

Figure 29. ENABLE Command Dialog: Panel After Enabling

The status has changed to NORMAL, and F10 is enabled for populating the coupling facility. This implies that the target coupling facility is defined in the active CFRM policy.

## INGCF ENABLE

The structure list contains three entries with the condition 'Structure is currently allocated in CF01.'. These are the structures that are currently allocated in CF01, but have CF02 at the first position in their preference list.

Pressing F10 populates the coupling facility, and the refreshed panel looks as follows:

```
INGLX901          SA OS/390 - Command Dialogs          Line 1 of 3
Domain Id = IPSFO  ----- INCGF ENABLE -----          Date = 02/20/01
Operator Id = NETOP1                                     Time = 11:17:35

Coupling Facility ==> CF02          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEYIPLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
GRPYCSQ_ADMIN      System-managed rebuild is supported.
GRPYHSAQUEUE       System-managed rebuild is supported.
HSA_LOG

Command ==>
F1=Help           F2=End           F3=Return          F6=Roll
                  F9=Refresh          F12=Retrieve
```

Figure 30. ENABLE Command Dialog Panel: After Populating

The POPULATE action is no longer available because all structures whose preference list starts with CF02 are allocated in CF02.

# INGCF PATH

## PATH

### Purpose

The INGLX PATH function displays the sender paths, that is, the paths from the connected systems to the specified coupling facility.

### Restrictions

The last sender path of each system can only be set to OFFLINE when no more structures are allocated.

### Example

```

INGLX903                SA OS/390 - Command Dialogs          Line 1    of 14
Domain Id = IPSFN      ----- INGCF PATH -----          Date = 06/20/01
Operator ID = HIR                                           Time = 10:28:49

Coupling Facility ==> CF01                                Allocated Structures: 37
Sysplex . . . . . ==> KEYIPLEX                          Permission . . . . . : ALL
-----
Cmds: F set OFFLINE / N set ONLINE

  System  CHPID  Physical          Logical  Type
  -----  -----  -----
- KEY1    A5    ONLINE           ONLINE  CFS
-         A9    ONLINE           ONLINE  CFS
- KEY2    A5    ONLINE           ONLINE  CFS
-         A9    ONLINE           ONLINE  CFS
- KEY3    A5    ONLINE           ONLINE  CFS
-         A9    ONLINE           ONLINE  CFS
- KEY4    05    ONLINE           ONLINE  CFS
- KEY6    A5    ONLINE           ONLINE  CFS
-         A9    ONLINE           ONLINE  CFS
-

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F8=Forward  F9=Refresh    F12=Retrieve
  
```

Figure 31. PATH Dialog Panel

The following command codes are available:

**F** Sets the sender path OFFLINE.

**N** Sets the sender path ONLINE.

- If you have issued INGLX with the PATH parameter, the Coupling Facility field is an input field. To display the path list of another coupling facility specify the name of the coupling facility in this field and press ENTER.
- The Allocated Structures field shows the number of allocated structures.
- The Permission field shows your authorization level.
- The System column contains the names of the systems that are connected to the target coupling facility.
- The CHPID column shows the IDs of the sender channel paths.
- The Physical column shows the status of the sender channel paths.
- The Logical column shows the logical status of the paths to that coupling facility.
- The Type column shows the type of the sender channel paths.

# STRUCTURE

## Purpose

The STRUCTURE function of the INGC displays the allocated structures of a coupling facility. You can initiate a rebuild or deallocation of a selected structure if the conditions for these actions are satisfied.

## Example

```

INGLX904          SA OS/390 - Command Dialogs          Line 1    of 15
Domain ID = IPSFM  ----- INGC STRUCTURE -----      Date = 02/22/02
Operator ID = NETOP1                                     Time = 16:09:04

Coupling Facility ==> CF01
Sysplex . . . . . ==> KEYIPLEX          Permission . . . . . : ALL
Include condition ==> YES (Yes/No - Condition retrieval takes longer)
-----
Cmds: D display details / F force / P stop duplex / R rebuild / S start duplex

  Structure      P D Condition
  -----
- DSNA_GBP0      U Duplex rebuild is active.
- DSNA_GBP32K    P U
- DSNA_LOCK1     S Duplex rebuild is active.
- DSNA_SCA       S System-managed rebuild is supported.
- ISGLOCK
- ISTGENERIC     System-managed rebuild is supported.
- IXCGRS
- IXCRLF

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve

```

Figure 32. STRUCTURE Dialog Panel

The following action codes are available:

- D** Displays detail information about the structure.
- \*F** Forces the deallocation of the structure if it has one of the following conditions:
  - No connection exists.
  - No alternate CF for structure with no active connections.
  - No alternate CF for structure with no connections.

When you try to force the deallocation of a structure that can be rebuilt, an error message is issued.

- \*P** Stops duplexing of the selected structure.
- \*R** Starts the rebuild of the selected structure. Depending on the PENDING status, the automation starts the rebuild with a different LOCATION parameter (PENDING uses the parameter LOCATION=NORMAL, otherwise LOCATION=OTHER). A rebuild with the parameter LOCATION=OTHER is only initiated for structures whose preference list contains more than one coupling facility.

There are two methods for rebuild, user-managed and system-managed rebuild. User-managed rebuild is supported for all release levels.

## INGCF STRUCTURE

System-managed rebuild is only available with systems that have OS/390 2.8 and above ; it must have been enabled by formatting the CFRM couple data sets with the specification

```
ITEM NAME(SMREBLD) NUMBER(1)
```

System-managed rebuild is only performed when the requirements for user-managed rebuild are not met. This applies, for example, to structures without active connectors.

INGCF STRUCTURE accepts a rebuild request for structures with the condition 'No active connection exists.', but *deallocates* them. See "No active connection exists" on page 61.

\*S Starts duplexing of the selected structure.

There are two methods for duplexing, user-managed and system-managed duplexing. User-managed duplexing is supported for all release levels. System-managed duplexing is only available when all systems in the Parallel Sysplex have been upgraded to z/OS 1.2 or later with APAR OW41617, and appropriate APARs listed in the CFDUPLEX PSP bucket (for more information, see *System-Managed CF Structure Duplexing*, GM13-0103-03). System-managed duplexing must have been enabled by formatting the CFRM couple data sets with the specification

```
ITEM NAME(SMDUPLEX) NUMBER(1)
```

System-managed duplexing is only performed when the requirements for user-managed duplexing are not met. This applies, for example, to structures without active connectors.

Starting the duplex rebuild of a structure requires at least the policy entry allowing the duplex rebuild of the structure. If there is no entry the duplex rebuild is disabled. The other requirements depend on the type of the duplex rebuild. When all connectors to a structure allow user-managed duplex rebuild, this type takes precedence over system-managed duplex rebuild. However, user-managed rebuild also requires at least one active connector. Thus, when the operator starts the duplex rebuild for a structure allowing user-managed duplex rebuild as well as system-managed rebuild but without having active connectors, XCF tries to initiate a system-managed duplex rebuild. System-managed duplex rebuild has the following requirements:

- System-managed rebuild must be supported by all connectors.
  - The structure must be allocated in a coupling facility supporting system-managed duplexing and another coupling facility supporting system-managed duplexing must be defined in its preference list.
  - The CFRM couple data set must support system-managed duplex rebuild and the structure must not have a policy change pending.
  - The structure must be defined in the active CFRM policy when any connection state is not active.
- If you have specified INGCf with the STR parameter, the **Coupling Facility** field is an input field. To display the structure list of another coupling facility, specify the name of the coupling facility in this field and press ENTER.
  - The **Include Condition** field is an input field. By specifying Yes or No in this field you determine whether or not the conditions of the structures are displayed in the **Structure** column.

## INGCF STRUCTURE

- The **Permission** field shows your authorization level. There are two possible values, ALL and DISPLAY. DISPLAY signifies that you can only use the display functions. ALL signifies that you can also rebuild and delete structures.
- You can specify an action code before every structure entry. The codes you can enter depend on your authorization level
- The **Structure** column shows the names of the structures.
- The letter P in the **P** column indicates that policy changes are pending for the structure.

A structure has policy changes pending when it was allocated at the time of a CFRM policy switch, and XES could not bring the switch into effect for that structure. One reason for a pending policy change is that the old and the new policy define the structure differently, for example, with different preference lists.

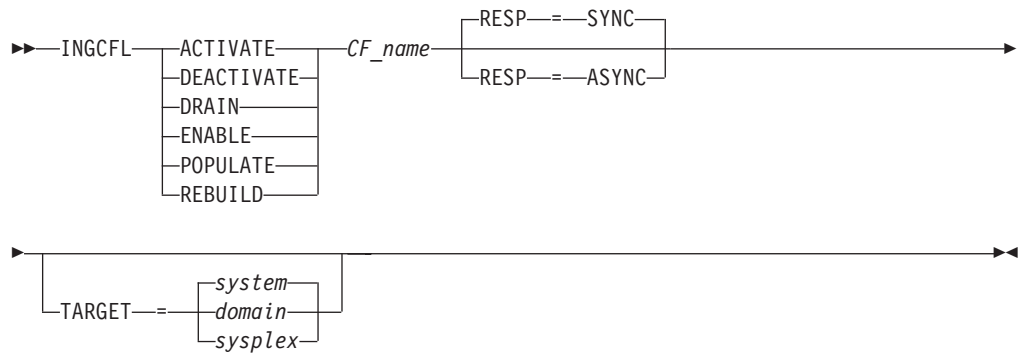
- The **Condition** column shows the status of the structures. You can switch on and off the display of the conditions through the **Include Condition** field.
- The D field indicates the type of duplexing being possible. The following values are possible:
  - U User-managed duplexing
  - S System-managed duplexing
  - B User-managed and system-managed duplexing

## INGCFL

### Purpose

The INGCFL routine supports line mode for INGCF other than display capability. For further information refer to “INGCF” on page 57.

### Syntax



### Parameters

*cfname*

Is the name of the CF

#### ACTIVATE

Activates the coupling facility

#### DEACTIVATE

Deactivates the coupling facility after performing DRAIN

#### DRAIN

Sets the sender paths to OFFLINE after performing a REBUILD

#### ENABLE

Sets the sender paths to ONLINE after performing ACTIVATE

#### POPULATE

Starts the populate process of the coupling facility after performing ENABLE

#### REBUILD

Starts the rebuild process of the coupling facility

#### RESP

Specifies whether the final result is returned synchronously via return code or asynchronously via message (default: synchronous response)

#### TARGET

Specifies the system where the command is executed (default: local system)

**Note:** The real activation and deactivation of a coupling facility are unavailable when running on a z/OS image which runs under z/VM.



## INGHC

### Purpose

This command serves two purposes:

1. Allows you to view the reports of the IBM Health Checker for z/OS and Sysplex (HealthChecker)
2. Allows you to request the HealthChecker to perform individual checks according to your filtering options

**Note:** If you want to override IBM's best practice values with your own values, use the INGAMS REFRESH command.

### Types of reports

#### About the reports

The following rule applies for each check overridden in the user policy: If there is some error in your specification, the check is not performed at all, that is, the IBM values are not used either. To make the check active again, remove your override or fix it.

The HealthChecker reports reflect values at a point in time (snapshot). The report is comprised of a series of records in the Sytem Logger. These records have the following components:

- Message text and explanation
- Recommendations of actions that can be taken to address an exception
- IBM suggestions
- Reasons for IBM's suggestions

The HealthChecker generates two report formats:

- **Regular**

The regular format produces confirmation messages of those checks where the results meet either IBM's or your override values. For selected checks, such as several related to consoles or UNIX System Services file systems, additional information about these resources is provided.

- **Exception**

The exception format provides status on checks that do not meet the criteria for the check.

To help distinguish a successful check from one encountering an exception, the record is explicitly marked in column 'E' as an I(BM) or U(ser) exception. In addition, the status of an exception is explicitly noted in the reports as:

\*Exception: IBM criteria not met\*

or

\*Exception: User criteria not met\*

Unless you take any of the actions given in "Types of actions" on page 80, the HealthChecker performs regular checks at predefined time intervals. The time intervals are defined individually for each check as part of IBM's best practices and can be overridden. The checks are done based on IBM's best practices or your overrides.

### Types of actions

You can request the HealthChecker to run selected checks or all checks at a point in time when you want it to.

### Recommendation

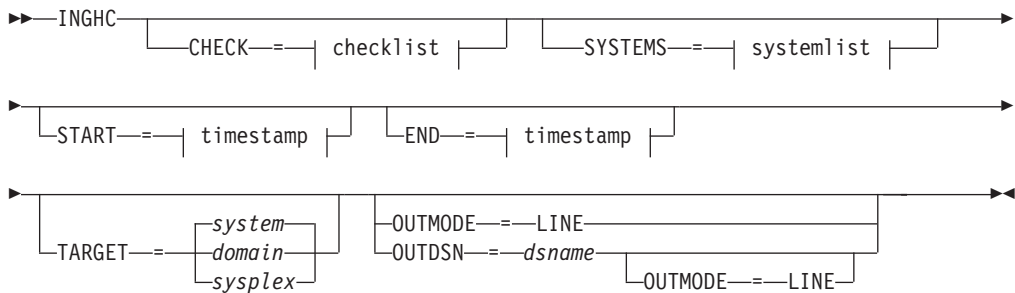
You should iteratively run the HealthChecker function and take corrective action until you have no exceptions. You should either update the values used in your environment, override the IBM values, or suppress the IBM check. This is important so that on subsequent runs of the HealthChecker, you will only see exceptions that you should attend to. Otherwise, the reports may contain a mixture of messages that you regularly ignore and those that could reflect a new potential problem, making it more likely that you could miss a key exception message.

Minimally, you should run the HealthChecker when you reIPL. However, many values can change between IPLs. You may therefore want to consider the following:

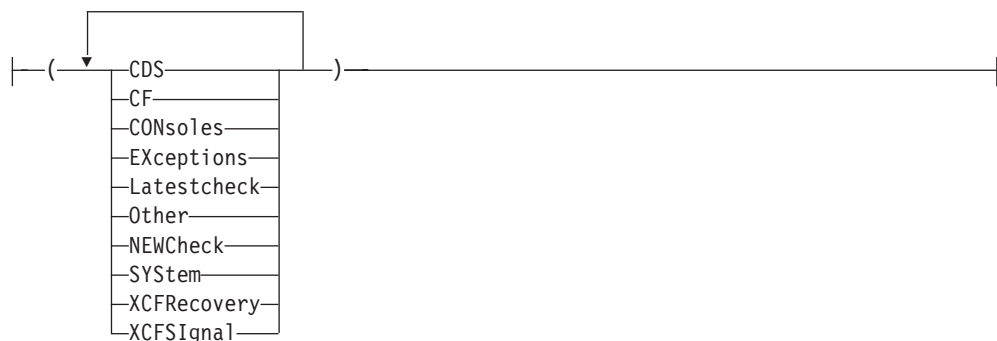
- permanently having the HealthChecker perform the checks repeatedly based on their respective, defined time interval. If the time intervals that are predefined by IBM do not suit your needs, you can always override them for individual checks using the TIMEINT parameter.
- if you don't want to have the HealthChecker permanently active, you can activate it at regular intervals (for example, once a day) and then deactivate it.

## Syntax

### INGHC



### checklist:



**systemlist:****timestamp:**

## Parameters

**CHECK**

Defines the filter options for the data to be displayed (default: the result of all checks):

|                    |   |
|--------------------|---|
| <b>CDS</b>         | Retrieves results relating to all of the various checks of all the couple datasets defined in the sysplex.  |
| <b>CF</b>          | Retrieves results relating to all of the various checks of all coupling facilities and structures in the sysplex.   |
| <b>CONsoles</b>    | Retrieves results relating to all of the various checks of all consoles defined in the sysplex.   |
| <b>EXceptions</b>  | Retrieves only results indicating an exception. This means the resource being checked does not meet either the IBM criteria or the user criteria.                               |
| <b>SYStem</b>      | Retrieves results relating to system resource checks.   |
| <b>Latestcheck</b> | Retrieves only the latest results of any kind of check.   |
| <b>Other</b>       | Retrieves results which do not belong to any of the filters.  |
| <b>NEWCheck</b>    | Requests the HealthChecker to immediately run checks as specified in the filter options and display the reports for those checks. The request is sent to all specified systems. |
| <b>XCFREcovery</b> | Retrieves results relating to checks of XCF recovery settings.  |
| <b>XCFSignal</b>   | Retrieves results relating to the XCF path checks.  |

If you specify more than one filter option, they must be enclosed by parentheses, for example, `INGHC CHECK=(EX L)`. When the **CHECK** parameter is not provided, the **DEFAULT** will assume **ALL** checks.

**SYSTEMS**

Specifies the list of systems for which the HealthChecker results should be retrieved, and where the specified actions are to be performed. If you specify more than one system name, they must be enclosed by parentheses, for example, `INGHC SYSTEMS=(sys1 sys2)`. When the **SYSTEM** parameter is not provided, the **DEFAULT** will be all systems in the sysplex.

*sysname*

The name of the system.

**START**

Is the start date and, optionally, start time for the display of the history data. The format is *yyyy-mm-dd [hh:mm:ss]*. If omitted, the history data from the last hour will be displayed, even if other parameters (such as check, systems) are specified. If you specify more than one value, they must be enclosed by parentheses, for example *INGHC START=(2002-09-26 08:00:00)*.

**END**

Is the end date and, optionally, end time for the display of the history data. The format is the same as for the START parameter.

*timestamp*

The date and time in the format *YYYY-MM-DD [hh:mm:ss]*.

**TARGET**

For information on the TARGET parameter, refer to *System Automation for OS/390 Operator's Commands*.

**OUTMODE**

For information on the OUTMODE parameter, refer to *System Automation for OS/390 Operator's Commands*.

**OUTDSN**

For information on the OUTDSN parameter, refer to *System Automation for OS/390 Operator's Commands*.

**Examples**

When you issue the INGHC command, the panel in Figure 33 is displayed.

```

INGLX350          SA OS/390 - Command Dialogs          Line 1    of 82
Domain Id   = IPXNH          ----- INGHC -----          Date = 04/10/03
Operator Id = KHH           Sysplex = KEYAPLEX           Time = 09:53:16

Start time . ==> 2003-04-10 08:53:00   format: yyyy-mm-dd hh:mm:ss
End time ... ==>                      Exceptions . ==> Latest Check ==>
Consoles ... ==> X CDS ..... ==> X CF/STR ..... ==> X XCF signal. ==> X
XCF recovery ==> X System Res. ==> X Other ..... ==> X
System(s) .. ==>

-----
Cmds: + / - Expand/Collapse check results

Timestamp          System   E S Footprint
-----
2003-04-10 09:52:15 KEYA   I H USS_FILESYS_CONFIG
- 2003-04-10 09:52:15 KEYA   M SDUMP_AVAILABILITY
- 2003-04-10 09:52:15 KEYA   I M XCF_FAILURE_DETECTION_INTERVAL
- 2003-04-10 09:52:15 KEYA   I L XCF_CLEANUP_VALUE
- 2003-04-10 09:52:15 KEYA   L RSU_STORAGE_AVAILABILITY
- 2003-04-10 09:52:15 KEYA   I L REAL_STORAGE_AVAILABILITY

Command ==>>>
F1=Help      F2=End      F3=Return      F5=Coll. All  F6=Roll
              F8=Forward  F9=Refresh    F10=NewCheck  F12=Retrieve
    
```

Figure 33. INGHC Panel

This panel displays the results of all Health Check requests. The fields in the non-scrollable area, in the top portion of the screen, allow filtering of Health Check requests as follows:

**Start time**

The date and time start filter in YYYY-MM-DD HH:MM:SS format converted to the local timezone. This defaults to the current time less one hour if not provided.

|                     |  |
|---------------------|--|
| <b>End time</b>     | The date and time end filter in YYYY-MM-DD HH:MM:SS format converted to the local timezone. This defaults to the current time if not provided.   |
| <b>Exceptions</b>   | The Exceptions filter returns <i>only</i> checks that show an exception that occurred between the Start and End times. This display can also be limited by using the other filters in this area.   |
| <b>Latest Check</b> | The Latestcheck filter returns <i>only</i> the latest checks that have been performed. This display can also be limited by using the other filters in this area. You may have no output if the Latestcheck was performed at a time outside the Start and End times provided. |
| <b>System(s)</b>    | The System(s) field enables you to restrict data to a specific system or group of systems in a sysplex.  |

**Note:** All systems are assumed if this field is left blank.

The following allows you to filter the checks you are interested in. You cannot filter individual checks, however, because the checks are grouped into categories. The following categories have been defined:

**Consoles**

The Consoles field returns all console-related results.

**CDS** The CDS field returns all Couple-Data-Set-related results.

**CF/STR**

The CF/STR field returns all Coupling-Facility-Structure-related results.

**XCF signal.**

The XCF Signal field returns all XCF-Signalling-related results.

**XCF recovery**

The XCF Recovery field returns all XCF-RECOVERY-related results.

**System Res.**

The System Res. field returns all system-related check results.

**Other** The Other field returns all data not covered in the previous filters.

The lower portion of the panel is a scrollable area where the results of your requests are displayed. The output fields contain the data in the following format:

|                    |  |
|--------------------|--|
| <b>Timestamp</b>   | The Timestamp field indicates the actual date and time that the health check was performed.  |
| <b>System</b>      | The System field displays the system that the health check was performed on.   |
| <b>E(xception)</b> | The Exception field indicates whether there is a deviation from the specified best practices (either IBM or User defined). An 'I' will indicate an IBM exception exists, a 'U' indicates that a User exception exists. A blank indicates that there are no exceptions.               |
| <b>S(everity)</b>  | The Severity field indicates the importance of the item. Its value is defined in the IBM best practices or user overrides. This field contains either L (Low), M (Medium), H (High).   |
| <b>Footprint</b>   | The Footprint contains the name of the check item. For the list of all valid names see the online help. To view an item or group of items in more detail, enter a '+' in the field to the left of the item(s) you wish to display and press Enter. To reset the display, enter a '-' |

in the field to the left of the item and press Enter to collapse it. The amount of detail displayed is limited by the size of one record in the system logger. If the output exceeds this limit, it is truncated, and the respective footprint is displayed in a different color.

Two PF keys are specific to this panel.

**Coll. All (PF5)** Collapses the detail description of all check results.

**NewCheck (PF10)**

Requests the HealthChecker to immediately run checks as specified in the filter options. The request is sent to all specified systems, the default is ALL. The report data is displayed, according to the filter options.

**Note:** Even if the input fields of the filter options show only an 'X' when selected they must be 2 characters long to support up to 26 footprint lines due to NetView restrictions.

**Note:** You should check that the systems listed in the New Check confirmation panel are those for which you want to perform a new check. This is because PF keys work such that they do not accept new values in input fields. Instead, they reset the input fields to the values last entered with the Enter key and then run the requested function. If Newcheck is wanted for another system or for some other filter in general (systems are a filter criterion) you first need to change those values and press Enter. The new values are then validated for correctness, and then the respective PF key can be executed correctly.

Pressing the PF10 key to request a NewCheck displays the Health Check confirmation screen, as shown in Figure 34.

```

INGLX35C          SA OS/390 - Command Dialogs
Domain ID = IPSFM  ----- INGHC -----      Date = 07/20/02
Operator ID = HIR          Sysplex = KEY1PLEX      Time = 17:13:51

                H E A L T H   C H E C K Confirmation

You have requested an additional check of the resources below on the indicated
systems. Press the GO function to perform the request.

Check(s) . .: CONSOLES      CDS          CF/STR      XCF SIGNAL.
              XCF RECOVERY  SYSTEM RES.  OTHER

System(s) . .: *ALL

Command ==>>>
              F2=End          F3=Return          F6=Roll
              F10=Go         F11=Cancel        F12=Retrieve
    
```

Figure 34. INGH C Check Confirmation Panel

This panel shows the selected check criteria to be performed and the systems involved. If you want to cancel the new check, press PF11, otherwise press PF10 to perform the request.

The output, when returned, will be sorted in descending Timestamp order, as shown in Figure 33 on page 82. You may sort the output by issuing the `SORT` command on the command line, followed by the sort direction (ascending or descending) and the column to sort. For example, to sort on Severity in descending order issue:

```
sort d 4
```

To search for text strings, issue the `FIND`, `F`, `RFIN`D or `RF` commands. For example, to find the string `consoles`, enter the following:

```
f consoles n
```

**Note:** The `FIND` command can search *only* the text for those check results that have been expanded, even when the text is not visible on the action screen.

For more information about sorting output and searching for text strings, refer to the online help.

To view an item or group of items in more detail, enter a '+' in the field to the left of the item(s) you wish to display. To reset the display, enter a '-' in the field to the left of the item to 'collapse', or use PF5 to collapse all expanded items.

## Line mode output

If you issue the `INGHC` command with `OUTMODE=LINE`, the output shows both the footprint data as well as the detail data, and will be similar to that shown in Figure 35.

```
NVSS V 1 R 4 IPXNG      Tivoli NetView  IPXNG XJIVENS  03/11/03 12:30:06
| IPXNG
Sysplex = KEYAPLEX

Timestamp           System   E S Footprint                11 Mar 2003 12:29:05
-----
2003-03-11 12:10:50 KEYB      HEALTH_CHECKER_ENDED
                    z/OS Sysplex Health-Checker Version 01.02 5 Mar 2003 06:53:
                    Ended for system KEYB in sysplex KEYAPLEX
                    At 12:10:50 on 11 Mar 2003
2003-03-11 12:10:50 KEYB      I H CDS_DATASET_SEPARATION
                    The following PRIMARY couple datasets resides on Unique volumes:
                    SYS1.KEYAPLEX.PXCFCD5: Primary SYSPLEX Couple dataset

                    This is consistent with the IBM recommendation that the primary
                    SYSPLEX Couple dataset, the primary CFRM Couple dataset, and the
                    primary LOGR Couple dataset, should be placed on different volumes.

                    CDS_DATASET_SEPARATION          *Exception: IBM Criteria not met*
                    The following PRIMARY couple datasets resides on the same volume
                    (KEYAXP):
                    =X= ***
```

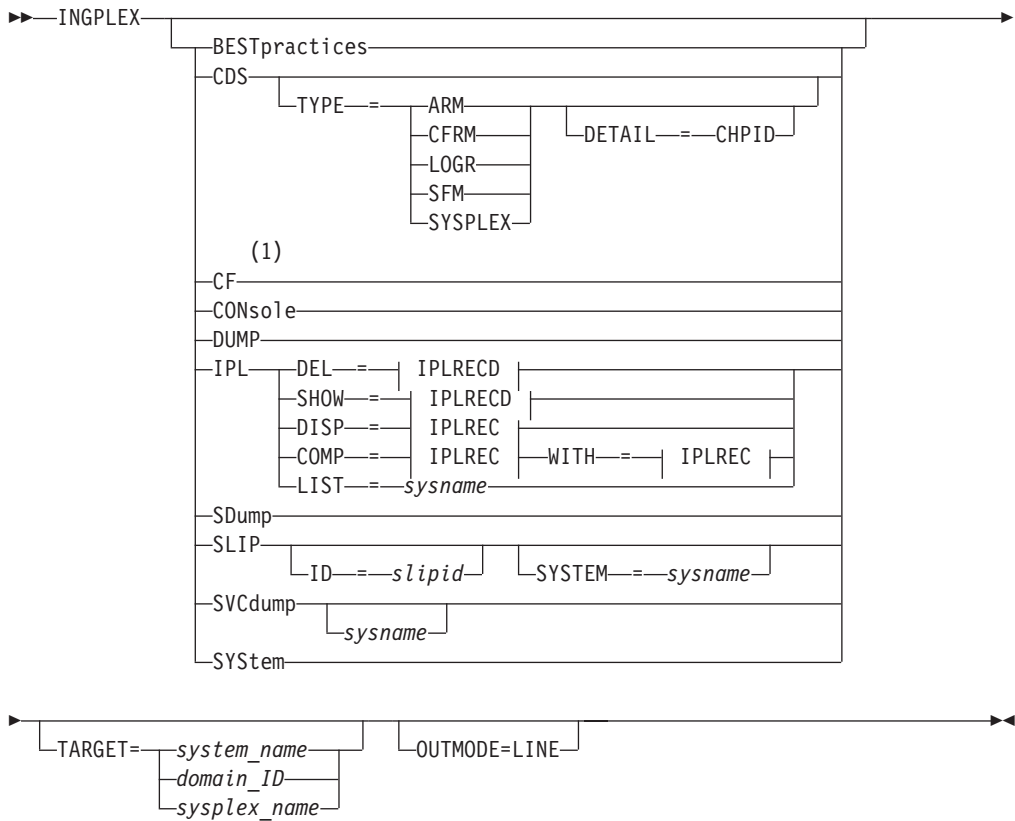
Figure 35. `INGHC` line mode output

# INGPLEX

## Purpose

The INGPLEX command comprises all the sysplex-related functions of SA OS/390. It can be called in full mode and in line mode. If it is called in line mode, only the display functions are available.

## Syntax



### IPLREC:

|---sysname---/---timestamp---[/---member---[/---suffix---]]

### IPLRECD:

|---sysname---/---timestamp

### Notes:

- 1 For details see "INGCF" on page 57.



## Parameters

### **BESTpractices**

Displays information about the currently active HealthChecker best practices. This information is retrieved from the system that performs the global and local checks.

### **CDS**

Displays information about CDSs and supports replacement of the current alternate CDS by a new one as well as making the alternate CDS the new primary. For further information about INGPLEX CDS refer to “CDS” on page 93.

### **TYPE**

The type of CDS for which the CDS function is issued. Possible values are ARM, CFRM, LOGR, SFM, and SYSPLEX.

### **DETAIL**

If you specify this parameter with the CDS function, the channel paths for the respective CDS type are displayed.

### **CF**

This is the equivalent of the INGCF command.

### **CONsole**

Displays information about consoles.

### **DUMP**

Shows the DUMP submenu.

### **IPL**

Shows and compares IPL information. It can be issued with the following options:

#### **DEL**

Deletes a single IPL record and all its related information. Note that the DEL parameter is supported in line mode only.

#### **SHOW**

Shows the details panel of the specified IPL record.

#### **DISP**

Shows all, one, or particular PARMLIB members used by the IPL of the specified system and at the specified date and time.

#### **COMP**

Compares all, one, or particular PARMLIB members used by the IPL of the specified system and at the specified date and time with those specified in the WITH parameter.

#### **LIST**

Shows the IPL summary records of the specified system.

#### **WITH**

The COMP parameter compares all, one, or particular PARMLIB members used by the IPL of the specified system, at the specified date and time with those specified in parameter WITH.

#### *sysname*

Is the name of the system in the sysplex.

#### **timestamp**

Is the IPL date and time. The format is YYYYMMDDhhmm.

## INGPLEX

### *member*

Is the name of the PARMLIB member without the suffix.

### **suffix**

Is the suffix of the PARMLIB member.

For further information about INGPLEX IPL refer to "IPL" on page 105.

### **SDUMP**

Displays and controls the SDUMP options being set on all systems in the sysplex. For further information about INGPLEX SDUMP refer to "SDUMP" on page 107.

### **SLIP**

Displays and controls all SLIP traps of all systems in the sysplex. Controlling is limited to DISABLE, ENABLE, or REMOVE a SLIP trap. The following parameters are supported:

**ID** Limits the line mode output and the initial full screen display to the particular SLIP trap ID

### *slipid*

Is the ID of a SLIP trap. It can consist of one to four characters. Wildcards are not supported.

### **SYSTEM**

Limits the line mode output and the initial full screen display to the particular system.

For further information about INGPLEX SLIP refer to "SLIP" on page 113.

### **SVCDUMP**

Allows you to issue a multisystem dump of up to 15 address spaces including data spaces owned by the address spaces, structures used by the address spaces, and XCF group members on the same or on other systems in the sysplex of those groups the address spaces have joined. The following parameter is supported:

### **sysname**

Is the name of the system having joined the XCF group of the NetView the operator is logged on to.

For further information about INGPLEX SVCDUMP refer to "SVCdump" on page 110.

### **SYSTEM**

Displays information about a member system of the sysplex.

### **TARGET**

For information on the TARGET parameter, refer to *System Automation for OS/390 Operator's Commands*.

### **OUTMODE**

For information on the OUTMODE parameter, refer to *System Automation for OS/390 Operator's Commands*.

## **Example**

If you specify INGPLEX without parameters, the following selection panel is displayed:

```

INGLX000          SA OS/390 - Command Dialogs
Domain Id   = IPSFM      ----- INGPLEX -----
Operator Id = HIR
Date = 07/20/02
Time = 23:26:27

Sysplex . . . . . : KEY1PLEX

Select the desired command:

    1 Display systems (including ETR & signalling paths)
    2 Display consoles
    3 Control coupling facilities
    4 Control couple data sets

    6 Display IPL information
    7 Control dumps
    8 Health Checker best practices
    9 Health Checker results

Command ==>
F1=Help      F2=End      F3=Return
F6=Roll     F12=Retrieve

```

Figure 36. INGPLEX selection panel

Specify the number or the function and press Enter.

## BESTpractices

### Purpose

This command allows you to view the currently active best practices from the system doing global checks, which is shown on the panel.

### Example

When you issue the INGPLEX BEST command, to display the IBM and User-defined best practices, the panel in Figure 37 is displayed.

```

INGLX351          SA OS/390 - Command Dialogs          Line 139 of 217
Domain ID   = IPXNH          -- INGPLEX BESTPRACTICES --          Date = 04/10/03
Operator ID = KHH                               Time = 09:50:09

System . . . . . ==> KEYB                               Sysplex . . . . . : KEYAPLEX
-----
Check
  Keyword      IBM policy value                          D User policy value
-----
AVAILABLE_FRAME_QUEUE_THRESHOLDS
Severity..: High
Parms.....: 400,600,200,400                            * 401,601,201,401
Interval..: 24:00                                       * 0:10
Version...: HBB7703
Date.....: 20030211                                     * 20030410
Reason....: System may not recover in time * WE NEED OTHER PARAMETERS FOR
              if set too low                          * OUR SYSTEM
REAL_STORAGE_AVAILABILITY
Severity..: Low
Interval..: 24:00

Command ==>
F1=Help      F2=End      F3=Return          F6=Roll
F7=Backward  F8=Forward   F9=Refresh          F12=Retrieve
    
```

Figure 37. INGPLEX BESTpractices panel

This panel displays the IBM's and user best practices of the HealthChecker function. The following fields are shown in the non-scrollable area of the screen.

**System** Name of the system from which the best practices are retrieved.  
 The best practices can only be retrieved from a system where the HealthChecker function is active. If multiple systems are eligible, the system where the checks with sysplex scope (global checks) are done is chosen by default.

You may choose another system by overtyping the system name with the name of the desired system. If the system name is cleared, the best practices are retrieved from the default system.

**Sysplex** Name of the sysplex that the system named above is part of.

The scrollable area of the screen lists the IBM best practice recommendation and, if defined, the user override value.

**Check** Best practice checkname is displayed in white.

**Keyword** Associated keywords for a check are displayed below the checkname.

**IBM policy value**

Details the IBM Bestpractice value. The following values are defined:

|                 |  |
|-----------------|--|
| <b>Severity</b> | Expresses a sense of urgency about the need to fix the exceptional situation for the check. Possible values are High, Medium, Low. |
| <b>Parms</b>    | IBM's recommended settings for the check.  |
| <b>Interval</b> | IBM's recommendation of how often to perform the check. The time interval is shown in the format <i>hh:mm</i> .                    |
| <b>Version</b>  | Shows the FMID of the operating system release for which the check is applicable. This can be a range.                             |
| <b>Date</b>     | Shows the date when IBM introduced or last modified the check.   |
| <b>Reason</b>   | Documents the reason why the check should be done.   |

**D** An asterisk in this column represents a discrepancy between the IBM recommended value and a User override.

**User policy value**

Details the user override values. The following values can be overridden:

- Parms, where applicable
- Interval
- Date
- Reason
- Severity

The value for Interval is also used to mark checks which are not performed on the system for the following reasons:

**NOCALL specified**

Indicates that in the user policy the check is specified explicitly with NOCALL.

**NOCALL - Check failed**

Indicates the checker failed 3 times.

**NOCALL - System error**

Indicates an unrecoverable system error in this check. It might also indicate an error in the IBM Parms.

**NOCALL - User Error**

Indicates an error in the user parms for this check.

**NOCALL - n/a**

Indicates the check is not applicable on the system. For example if the system is set up in Monoplex mode, certain checks are not applicable.

**NOCALL - Global check n/a**

Indicates that the check is not executed because some other system performs the global checks.

## INGPLEX BEST

### NOCALL - ?????

Indicates that the check is not executed for some undefined reason.

When a User value does not match an IBM recommended value, along with the discrepancy flag, the user value is displayed in a different color.

The display of a particular keyword is suppressed if it is not applicable to the check.

## CDS

### Purpose

The CDS function displays information about all the couple data sets in the system, including details of the corresponding policies. For every CDS type that is required by the implementation INGPLEX CDS allows the operator to:

- Switch from the primary to the alternate CDS
- Define a new alternate CDS
- Change the active policy (if applicable)

Actions are started by specifying an action code for a selected CDS type on the panel.

### Actions

The possible action codes are:

#### \*allocate alternate CDS (A)

Replaces the current alternate CDS for a selected CDS type by a new one. There are two options how to do this:

- The alternate CDS is allocated automatically by SA OS/390.  
This automatic allocation requires that spare volumes have been defined, and that one of these spare volumes is available.
- Specify the data set that is to be used as the new alternate CDS.  
If you specify your own data set, observe the following:
  - The data set must exist
  - It must have been formatted with the XCF formatting tool
  - It must be at least as large as the current primary CDS, which means that every value you have passed to the XCF formatting tool (for example, in the case of a sysplex CDS, the maximum number of systems supported) must be equal to or greater than the corresponding value of the primary CDS.

#### display CHPIDs (C)

Displays information about the channel paths for the selected CDS type.

#### display CDS information (I)

Displays detail information about the selected CDS type. This comprises the formatting parameters and the policies that are contained in the CDS, if applicable. When the CDSs of the selected type contain policies, the detail information panel provides further actions, namely:

#### display policy (D)

Displays details about the selected policy.

#### start policy (S)

Makes the selected policy the active policy.

The policy switch must be confirmed before it is executed.

#### \*switch alternate CDS to primary CDS (P)

Makes the alternate CDS the primary one. Because an alternate CDS is no longer available after the switch, SA OS/390 shows a confirmation panel before the action is performed. On the panel, you can specify a new alternate CDS. When CDS recovery is switched on and you do not supply your own alternate CDS, SA OS/390 tries to allocate a new alternate CDS

automatically. The special requirements for manual and automatic creation of the new alternate CDS are the same as those for the replacement of the alternate CDS (action code A).

**Examples**

The following example illustrates the switch from the primary to the alternate CDS.

The following examples start with issuing INGPLEX CDS and pressing F8 on the CDS command dialog to scroll down the CDS list. The following panel is displayed:

```

INGKX300                SA OS/390 - Command Dialogs          Line 7    of 18
Domain ID = IPSFO      ----- INGPLEX CDS -----         Date = 03/01/01
Operator ID = NETOP1   Sysplex = KEY1PLEX                  Time = 10:08:10

System..: KEY3          Interval...: 86400                OPNotify: 86400
Maxmsg..: 999999       Cleanup...: 60                    Retry...: 255
Classlen: 956          Max CFlevel: 9                    COUPLExx: COUPLER1
SMREBLD.: 1           Max SMlevel: 9

Cmds: A allocate alternate CDS / C display CHPIDs
      D display CDS information / P switch alternate CDS to primary CDS

  Type      MS   Volume  Dev   Couple Dataset Name
  -----
-  CFMR
   PRIMARY..: 16  KEY1SP  260B  SYS1.KEY1.PXESCDS
   ALTERNATE: 16  KEYUSR  261C  SYS1.KEY1.AXESCDS
-  LOGR
   PRIMARY..: 8   KEY1SP  260B  SYS1.KEY1.PLOGCDS
   ALTERNATE: 8   KEYUSR  261C  SYS1.KEY1.ALOGCDS

Command ==>
F1=Help      F2=End      F3=Return          F6=Roll
PF7=Back     PF8=Forward  F9=Refresh        F12=Retrieve
    
```

Figure 38. INGPLEX CDS dialog panel

The panel header contains sysplex-related information about the system on which the INGPLEX command was executed. The details are as follows:

- The **System** field shows the name of the system.
- The **Interval** field shows the system failure detection interval in seconds. This interval is the amount of time XCF lets elapse without a status update before assuming that the system failed.
- The **OPNotify** field shows the number of seconds that XCF waits before notifying the operator of a potential system problem.
- The **Maxmsg** field shows the default value for the maximum amount of kilobytes of message buffer space. This default value is used when MAXMSG is not specified on SETXCF START commands.
- The **Cleanup** field shows the number of seconds that XCF waits for cleanup of members.
- The **Retry** field shows the default value for the retry limit. This value is used when the RETRY keyword is not specified on SETXCF START commands.
- The **Classlen** field shows the default length (in bytes) of messages allowed for a transport class. This value is used when CLASSLEN is not specified on the SETXCF START CLASSDEF command.



- The **Max CFlevel** field shows the maximum CFLEVEL supported by this system. This system can connect to a coupling facility with a higher CFLEVEL than the value of **Max CFlevel** but would not be enabled to use any functions supported by the higher level coupling facility.
- The **COUPLExx** field shows the COUPLExx Parmlib member used for system IPL.
- The **SMRBLD** field shows whether (value 1) or not (value 0) system-managed rebuild has been activated in the CFRM couple dat set.
- The **Max SMlevel** field shows the maximum system-managed process level supported by this system.

The main part of the screen shows information about the primary and alternate CDSs for every CDS type. Press F8 to scroll and display further entries. The **MS** column shows the maximum number of systems that are supported by the CDS.

**Making an alternate CDS the primary CDS:** In this example, the alternate LOGR couple data set is made the new primary CDS. A new alternate CDS is automatically generated.

To switch the LOGR couple data set, enter P before LOGR on the panel displayed in Figure 38 on page 94, and press ENTER. INGPLEX CDS displays the following confirmation panel:

```

INGKX30A                SA OS/390 - Command Dialogs
Domain ID   = IPSFO      ----- INGPLEX CDS -----          Date = 03/01/01
Operator Id = NETOP1     Sysplex = KEY1PLEX                    Time = 10:08:13

                          SETXCF PSWITCH Confirmation

You are going to remove the LOGR   primary couple data set.
The alternate couple data set  SYS1.KEY1.ALOGCDS
becomes the primary as soon as you proceed with the GO function key.
Immediately after the switch, automation will try to allocate a new alternate
couple data set on one of the spare volumes defined during the customization.
If you want the automation to allocate your own alternate couple data set
complete the necessary information below.

Your alternate couple dataset...

Name   ==> _____
Volume ==> _____

Command ==>
          F2=End      F3=Return      F6=Roll
          F10=Go      F11=Cancel   F12=Retrieve
    
```

Figure 39. Confirmation panel for switching from the current primary CDS to the alternate CDS

Use this panel to determine how a new alternate CDS is to be created after the switch. You can either specify your own new alternate CDS or let SA OS/390 create it for you. When you specify the new alternate CDS yourself, the data set must exist and must have been formatted with the XCF formatting tool. Automatic creation requires that spare volumes have been defined for LOGR couple data sets.

## INGPLEX CDS

Pressing F10 causes SA OS/390 to generate the new alternate CDS. After returning to the CDS command dialog, refreshing the panel, and scrolling down with F8, the panel looks as follows:

```
INGKX300          SA OS/390 - Command Dialogs          Line 7   of 18
Domain ID = IPSFO  ----- INGPLEX CDS -----         Date = 03/01/01
Operator ID = NETOP1      Sysplex = KEY1PLEX          Time = 10:08:25

System..: KEY3          Interval...: 86400          OPNotify: 86400
Maxmsg..: 999999       Cleanup....: 60           Retry...: 255
Classlen: 956         Max CFlevel: 9           COUPLExx: COUPLER1
SMREBLD.: 1          Max SMlevel: 9

Cmds: A allocate alternate CDS / C display CHPIDs
      D display CDS information / P switch alternate CDS to primary CDS

  Type      MS   Volume  Dev   Couple Dataset Name
  -----  --   -----  ---   -----
  - CFRM
    PRIMARY...: 16  KEY1SP  260B  SYS1.KEY1.PXESCDS
    ALTERNATE: 16  KEYUSR  261C  SYS1.KEY1.AXESCDS
  - LOGR
    PRIMARY...: 8   KEYUSR  261C  SYS1.KEY1.ALOGCDS
    ALTERNATE: 8   AOCUSR  262B  AOC.CDS.TEST.LOGR.CDS02

Command ==>>
F1=Help      F2=End      F3=Return   F6=Roll
PF7=Back     PF8=Forward F9=Refresh  F12=Retrieve
```

Figure 40. INGPLEX CDS dialog panel after the switch

The previous alternate LOGR CDS has become the primary, and there is a new alternate, which was created by SA OS/390.

**Switching the CFRM policy:** In this example, the active CFRM policy is switched.

Enter D before CFRM on the panel displayed in Figure 38 on page 94, and press ENTER. The following panel is displayed:

```

INGKX311          SA OS/390 - Command Dialogs      Line 1   of 5
Domain ID   = IPSFO          ----- INGPLEX CDS -----   Date = 03/01/01
Operator ID = NETOP1          Sysplex = KEY1PLEX           Time = 10:13:13
                                CFRM Couple Data Set Information

Data Set Information
Volume Device FORMAT TOD          Data Set Name
-----
KEY1SP 260B 08/29/2000 08:51:30 SYS1.KEY1.PXESCDS
KEYUSR 261C 08/29/2000 08:47:42 SYS1.KEY1.AXESCDS
Control Card Information
MS  POLICY  CF  STR  CONNECT  SMREBLD  SMDUPLEX
--  -----  --  ---  -----  -----  -----
16      8   4   64      16         1         0
Policy Information
Cmds: D display policy / S start policy
Name          CF  Str  Date      Time      Userid
-----
_ BZOEPOL  ACTIVE  2   19  02/10/2001 10:05:47  BZOE
_ HIRPOL           2   19  02/19/2001 19:45:57  HIR
_ HIRPOL1          1   8   08/25/2000 09:20:04  HIR

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              PF8=Forward  F9=Refresh      F12=Retrieve

```

Figure 41. CFRM couple data set information panel before policy switch

The panel shows information about the names and locations of the CDSs. The panel also shows the parameters that were used by the formatting tool of XCF for the allocation of the CDS. The **POLICY** field, for example, displays the maximum number of policies the CDS can contain. Furthermore, the panel shows information about the policies in the CDS, for example, how many coupling facilities and structures are defined in every policy, and which policy is currently active.

To switch to the HIRPOL policy, enter S before this policy and press ENTER. INGPLEX CDS displays the following confirmation panel:

```

INGKX30C          SA OS/390 - Command Dialogs
Domain ID   = IPSFO   ----- INGPLEX CDS -----      Date = 03/01/01
Operator Id = NETOP1          Sysplex = KEY1PLEX      Time = 10:13:17

                          SETXCF START   Confirmation

You are going to start a new CFRM   CDS policy named  HIRPOL   .

The current policy

                          BZOEPOL

will be stopped as soon as you proceed with the GO function key,

Command ==>

                          F2=End           F3=Return
                          F10=Go          F11=Cancel   F6=Roll
                                          F12=Retrieve
    
```

Figure 42. Confirmation panel for policy switch

**Displaying the channel paths for a CDS type:** In this example, the channel paths for the CFRM couple data sets are displayed.

Enter C before CFRM on the panel displayed in Figure 38 on page 94, and press ENTER. The following panel is displayed:

```

INGKX318          SA OS/390 - Command Dialogs          Line 1   of 4
Domain ID   = IPSFO   ----- INGPLEX CDS -----      Date = 03/02/01
Operator ID = NETOP1          Sysplex = KEY1PLEX      Time = 08:05:46

                          CFRM Channel Path Information

System   T   DEVN  CHPIDs          SSID
-----  -   -
KEY1    P   260A  E4=+ E5=+ E2=+ E3=+      2600
        A   2610  E4=+ E5=+ E2=+ E3=+      2600
KEY2    P   260A  E4=+ E5=+ E2=+ E3=+      2600
        A   2610  E4=+ E5=+ E2=+ E3=+      2600
KEY3    P   260A  E4=+ E5=+ E2=+ E3=+      2600
        A   2610  E4=+ E5=+ E2=+ E3=+      2600
KEY4    P   260A  13=+ 22=+ 30=+ 94=+      2600
        A   2610  13=+ 22=+ 30=+ 94=+      2600

Command ==>
F1=Help           F2=End           F3=Return          F6=Roll
                  F9=Refresh          F12=Retrieve
    
```

Figure 43. Channel path information for CFRM couple data sets

- The System column shows the name of the sysplex members.

- The T column (for 'type') indicates whether the CDS is the primary (value 'P') or alternate (value 'A').
- The DEVN displays the number of the device on which the CDS resides.
- The CHPIDs column shows the status of the paths to the devices in the format *chpid=status\_code*. The codes are those of the operating system. They have the following meaning:
  - + The path is logically and physically available and I/O on the path was successful.
  - \* The path is physically, but not logically available. The subchannel's logical path indicator is off but I/O to the path is successful. You can use the command `VARY PATH (ddd,nn),ONLINE` to make channel path *nn* logically available to device *ddd*.
  - The path is neither logically nor physically available. The subchannel's logical and physical indicators are both off for this channel path. You can use the command `CONFIG CHP(nn),ONLINE` to make the channel path logically available to all devices connected to the channel.
  - & The device is reserved to another path. This indicator applies to devices with the dynamic pathing selection feature.
  - < The path is installed but not physically available. The start subchannel request received a condition code of 3.
  - > The device microcode has detected an error and will not allow I/O to complete on the path.
  - B The path is unable to communicate. The device indicates that a busy or reserve condition exists on the path.
  - C A controller error occurred while accessing the device.
  - D A device error occurred while accessing the device.
  - I Intervention is required; the device is not ready.
  - R The path is available and the device is reserved to this path/group. This only applies to devices with the dynamic pathing feature.
  - T A time out has occurred; there is no response from the device. The cause of the time out is undetermined and this condition is transient.
  - U A storage control unit or storage director error occurred while accessing the device.
  - X Unable to determine the failing unit.
- The SSID field displays the storage subsystem to which the device belongs.

# INGPLEX SYSTEM

## SYStem

### Purpose

The SYSTEM function displays the target sysplex name, its GRS mode and its member systems.

### Example

```
AOFKX100          SA OS/390 - Command Dialogs          Line 1 of 4
Domain ID = IPSFP  ----- INGPLEX SYSTEM -----      Date = 03/05/01
Operator ID = NETOP1                                     Time = 09:44:37

Sysplex . . . . . : KEY1PLEX
GRS Mode . . . . . : STAR

Display more info: C CPU E ETR I IPL O IOS S STOR/ESTOR
Signalling Path : D device T structure

Cmd  System      Status      Monitor
-----
Timestamp INTERVAL Action      SSUM -----
TIME      WEIGHT
-----
-      KEY1        ACTIVE      09:44:34  86400    ISOLATE    50      50
-      KEY2        ACTIVE      09:44:35  86400    ISOLATE    50      15
-      KEY3        ACTIVE      09:44:34  86400    ISOLATE    50      15
-      KEY4        ACTIVE      09:44:36  86400    ISOLATE    50      15

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
F9=Refresh      F12=Retrieve
```

Figure 44. INGPLEX SYSTEM dialog panel

The following command codes are available:

- C** Displays the online or offline status of one or more processors and any vector facilities, or ICRFs attached to those processors
- E** Displays the timer synchronization mode and ETR ports
- I** Displays IPL information
- O** Displays IOS-related configuration information
- S** Displays the number of megabytes of central and expanded storage assigned and available to the system
- D** Displays the device number of one or more in-/outbound signalling paths that XCF can use and information about in-/outbound XCF signalling paths to this system
- T** Displays detailed signalling path information for all coupling facility structures
  - The Sysplex field shows the name of the sysplex.
  - The GRS Mode field shows the GRS mode of the target system. The mode can be either STAR or RING.
  - The CMD column allows you to specify command codes. To use one of the command codes shown, type the appropriate letter next to the resource name, and press ENTER.
  - The System column shows the name of the system.
  - The Status column shows the status of the system.

- The Monitor Timestamp column shows the last time stamp recorded for status monitoring on this system.
- The INTERVAL column shows the system failure detection interval in seconds. This interval is the time XCF allows to elapse without a status update before assuming that the system failed.

The last three columns contain configuration data of the SFM policy (if applicable).

- The SSUM Action field shows the SSUM action. It can be one of the following:
  - ISOLATE
  - DEACTIVATE
  - RESET
  - PROMPT
  - N/A
- The SSUM TIME field shows the SSUM interval as specified in the current SFM policy.
- The SSUM WEIGHT field shows the SSUM weight specified in the current SFM policy. This value is used in sysplex reconfigurations after a signalling connectivity failure.

## CONsole

### Purpose

The CONSOLE function displays the following information for the target sysplex:

- The name of the master console
- WTO & WTOR buffer utilization
- Number of queued messages (replies) of various types
- Awaiting mounts
- Operator requests and list of consoles (name, status, authority, number of WTOR buffers, UD, device, system, ALTGRP, MSCOPE)

### Example

```

INGLX400                SA OS/390 - Command Dialogs                Line 1 of 6
Domain Id = IPSFP      ----- INGPLEX CONSOLE -----          Date = 04/12/01
Operator Id = NETOP1                                       Time = 10:36:26

Sysplex . . . . . : KEY1PLEX                Master Console . . . : --none--
Message Buffer Usage : 14 / 9999             Reply Buffer Usage . . : 14 / 99
Awaiting Replies . . : 14                   Eventual Action . . . : 0
Immediate Action . . : 0                     Awaiting Mounts . . . : 0
Critical Action . . : 0                       Operator Requests . . : 0
-----

Cmds: D Details / R Requests

  Console  Status  AUTH  NBUF  UD  Device  System  ALTGRP  MSCOPE
  -----  -
- MASTER   INACTIVE  MASTER  n/a  Y  -none-  --none-- --none-- *ALL
- MASTER1  INACTIVE  ALL     n/a  N  -none-  --none-- --none-- *ALL
- 03      INACTIVE  MASTER  n/a  N  -none-  --none-- --none-- *ALL
- 04      INACTIVE  MASTER  n/a  N  -none-  --none-- --none-- *ALL
- 05      INACTIVE  MASTER  n/a  N  -none-  --none-- --none-- *ALL
- 06      INACTIVE  MASTER  n/a  N  -none-  --none-- --none-- *ALL
-

Command ==>
F1=Help      F2=End          F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve
    
```

Figure 45. INGPLEX CONS dialog panel

The following command codes are available:

**D** Displays details for the console

**R** Displays the actual requests for the console

- The **Sysplex** field shows the name of the sysplex.
- The **Message Buffer Usage** field shows the limit of the number of WTO message buffers allowed outstanding.
- The **Awaiting Replies** field shows a decimal number representing the number of messages awaiting replies.
- The **Immediate Action** field shows a decimal number representing the number of outstanding immediate action messages (with descriptor codes 1 or 2). If the number is greater than 99999, asterisks appear in this field.
- The **Critical Action** field shows a decimal number representing the number of outstanding critical eventual action messages (with descriptor code 11). If the number is greater than 99999, asterisks appear in this field.
- The **Master Console** field shows the name of the master console.



- The **Reply Buffer Usage** field shows the limit of the number of WTOR message buffers allowed outstanding. The maximum value of yyyy is specified by the RMAX parameter in the CONSOLxx parmlib member.
- The **Eventual Action** field shows a decimal number representing the number of outstanding eventual action messages (with descriptor code 3). If the number is greater than 99999, asterisks appear in this field.
- The **Awaiting Mounts** field shows a decimal number representing the number of outstanding mount requests.
- The **Operator Requests** field shows a decimal number representing the number of outstanding requests for operator intervention.
- The **CMD** column lets you specify the command codes shown on the panel. Enter the appropriate letter next to the resource name, and press ENTER.
- The **Console** column shows the name of the console as specified in the CONSOLxx parmlib member.
- The **Status** field shows the status of the console. The following values can occur:
 

|                 |   |
|-----------------|---|
| <b>HARDCOPY</b> | Hardcopy log. This condition is only indicated if the console is active on the system where the command processes.  |
| <b>ACTIVE</b>   | Active console  |
| <b>ACTIVE-P</b> | In the process of becoming an active console. This condition is only indicated if the console is active on the system where the command is processing.    |
| <b>MASTER</b>   | Master console  |
| <b>INACTIVE</b> | Inactive console  |
| <b>INACT-P</b>  | In the process of becoming a non-active console. This condition is only indicated if the console is active on the system where the command is processing. |
| <b>PROB-DET</b> | The active system console is in the problem determination mode. PD is indicated only for the system console.  |
| <b>SUBSYS</b>   | Subsystem-allocatable console   |
- The **AUTH** column shows which commands may be entered from this console. The following values can occur:
 

|               |  |
|---------------|--|
| <b>ALL</b>    | Any INFO, SYS, IO, or CONS command may be entered from this console.                                   |
| <b>CONS</b>   | INFO commands and any commands from the console command group may be entered from this console.        |
| <b>INFO</b>   | Any command from the informational command group may be entered from this console.                     |
| <b>IO</b>     | INFO commands and any commands from the I/O Control command group may be entered from this console.    |
| <b>MASTER</b> | The specified console is authorized to enter any operator command.                                     |
| <b>NONE</b>   | This console has no command authority.   |
| <b>SYS</b>    | INFO commands and any commands from the system control command group may be entered from this console. |
- The **NBUF** column shows the number of WTO message buffers currently queued to this console. If nnnn is greater than 9999, asterisks (\*\*\*\*) appear in this field.

## INGPLEX CONSOLE

- The **UD** column shows whether this console is receiving messages with the UD attribute.
- The **Device** column shows the device number of the console as specified in the CONSOLxx parmlib member.
- The **System** column shows the system name of the active console.
- The **ALTGRP** column shows the alternate group defined for this console.
- The **MSCOPE** column lists the name of the system or systems from which this console is receiving unsolicited messages. Note that these systems might be different from the system where this console is physically attached.

## IPL

**Purpose**

With the INGPLEX IPL command you can view and compare the IPL information of the operating system. If a system does not behave after IPL as expected, the IPL recording function enables you to identify parameters that were changed, for example, since the last IPL. The recording function enables you to compare different IPL scenarios. INGPLEX IPL is a tool that helps to identify and resolve the cause of startup problems. The following information can be displayed:

- The selected system (or blank)
- The name of the sysplex
- The maximum number of IPLs that are stored for each system
- An indicator showing whether comments in PARMLIB members are ignored when collecting information

**Example**

```

INGLX200          SA OS/390 - Command Dialogs          Line 1 of 6
Domain ID = IPSFM  ----- INGPLEX IPL -----          Date = 02/22/02
Operator ID = NETOP1                                Time = 17:59:27

System . . . . . ==>          Max. number of IPL records/system : 10
Sysplex . . . . . ==> KEY1PLEX  Suppression of PARMLIB comments . : N
-----
Cmds: C compare record / D display details / E erase record

  System  IPL Timestamp      Dev  Volume  OpSys  Release  FMID
  -----
-  KEYA   2002-02-22 13:52   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYA   2002-02-09 09:28   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYA   2002-02-08 15:28   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYA   2001-12-10 14:31   0707 120147  z/OS   SP7.0.2  HBB7705
-  KEYB   2002-02-22 13:59   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYB   2002-02-14 16:24   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYB   2002-02-11 18:46   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYB   2002-02-11 15:36   770E 120204  z/OS   SP7.0.2  HBB7705
-  KEYB   2002-02-11 14:22   770E 120204  z/OS   SP7.0.2  HBB7705

Command ==>>
F1=Help      F2=End      F3=Return      F6=Ro11
              F8=Forward  F9=Refresh  F10=Previous  F11=Next      F12=Retrieve

```

Figure 46. INGPLEX IPL main panel

Use F10 and F11 to scroll through all available columns. SORT by column numbers is supported as well as the FIND and RFind command to locate information on the panel. You can also limit the display to a particular system by specifying the system name in the appropriate entry field.

The following command codes are available:

- C** Compares the complete IPL information with another IPL record. A second panel will be displayed where you can select the second record.
- D** Displays detailed information about this IPL record.
- E** Erases the IPL information records. This action must be confirmed.
  - The **Sysplex** field shows the name of the sysplex.
  - The **System** field shows the name of the system in the sysplex.

## INGPLEX IPL

- The **IPL Timestamp** field shows the date and time of the IPL. The format is YYYY-MM-DD HH:MM converted to local timezone.
- The **Dev** field shows the IPL device number.
- The **Volume** field shows the volume serial of the IPL device.
- The **OpSys** field shows the name of the operating system, for example, z/OS or OS/390.
- The **Release** field shows the release level of the operating system.
- The **FMID** field shows the FMID of the operating system.

For further information about the panel fields refer to the online help.

## SDUMP

### Purpose

The INGPLEX SDUMP command lets you control the default dump options sysplex-wide.

### Example

The dump functions can be invoked directly by specifying the commands, or from the dump panel of the INGPLEX command selecting the appropriate command. In addition, you can invoke the dump submenu from the main panel of the INGPLEX command selecting command 7. The following panel is displayed:

```

INGLX250          SA OS/390 - Command Dialogs          Line  1  of 12
Domain Id   = IPSFP          ----- INGPLEX -----          Date = 02/26/02
Operator Id = NETOP1                                     Time = 16:30:36

Sysplex . . . . . : KEY1PLEX

Select the desired command:                               INGPLEX ...

  1 Control default SDUMP options                          SDUMP
  2 Issue SVC dumps                                       SVCDUMP
  3 Control SLIP trap settings                             SLIP

Command ==>
F1=Help      F2=End      F3=Return                          F6=Roll
                                                       F12=Retrieve

```

Figure 47. INGPLEX dump options panel

If you select option 1, the following panel is displayed:

## INGPLEX SDUMP

```

INGLX251          SA OS/390 - Command Dialogs          Line 1 of 12
Domain Id = IPSFP  ----- INGPLEX SDUMP -----      Date = 02/26/02
Operator Id = NETOP1                               Time = 15:44:58

Sysplex . . . . . ==> KEY1PLEX          Permission . . . . . : ALL
-----
Cmds: C change

  System  Dump options
-----
_ KEY1    Q=      Type=      Buffers=  0K  MaxSpace=  500M  MsgTime=99999
          LSQA
          TRT
_ KEY2    Q=      Type=      Buffers=  0K  MaxSpace=  500M  MsgTime=99999
          LSQA
          TRT
_ KEY3    Q=      Type=      Buffers=  0K  MaxSpace=  500M  MsgTime=99999
          LSQA
          TRT
_ KEY4    Q=      Type=      Buffers=  0K  MaxSpace=  500M  MsgTime=99999

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F8=Forward  F9=Refresh      F12=Retrieve
  
```

Figure 48. INGPLEX SDUMP panel

The following command code is available:

### C change

Invokes the modification panel by providing the options of the selected system as input

- The Sysplex field shows the name of the sysplex.
- The System field shows the name of the system in the sysplex.
- The Permission field shows your authorization level.
- The Dump options field shows the default SDUMP options of all systems in the sysplex. For each system the following details are displayed:

**Q=** Shows whether or not SDUMP quiesces the system while dumping the contents of the SQA or CSA.

**TYPE=** Causes SVC dump to dump the cross memory address spaces that the caller has when SVC dump gets control (XMEM) or when the error causing the dump occurs (XMEME).

**BUFFERS=** Shows the reserved storage exclusively used by SVC dump. This storage can be used while capturing the contents of the common area storage.

**MaxSpace** Shows the maximum amount of virtual storage that SVC dump can use to capture volatile virtual storage data, summary dump data, and component-specific data before writing the dump to DASD.

**MsgTime** Shows for which amount of time (mm) the message IEA793A is shown at the console. When the system deletes the message, it also deletes the captured dump.

The FIND and RFOUND commands are supported. If you specify command code C, the following panel is displayed:

```

INGLX252                SA OS/390 - Command Dialogs                Line 1 of 12
Domain Id = IPSFP        ----- INGPLEX SDUMP -----                Date = 02/26/02
Operator Id = NETOP1                                          Time = 16:18:08

System . . . . . : KEY1
Sysplex . . . . . : KEYIPLEX                Recommended options are underlined.

NODUMP ... ==> N    (all other options below are ignored)

ALLNUC ... ==> -    ALLPSA(*) ==> -    COUPLE ... ==> -    CSA ..... ==> -
GRSQ ..... ==> -    LPA ..... ==> -    LSQA ..... ==> Y    NUC ..... ==> -
PSA ..... ==> -    RGN ..... ==> -    SERVERS .. ==> -    SQA(*) ... ==> -
SUMSUMP(*) ==> -    SWA ..... ==> -    TRT ..... ==> Y    WLM ..... ==> -
XESDATA .. ==> -    (*) = The NOxxx option is generated when not selected.

Q(uiesce) ==> -    (YES / NO)
Type ..... ==> -    (XMEM / XMEME)
Buffers .. ==> 0K    (nnnnK / nnnM)
MaxSpace . ==> 500    (MB)
MsgTime .. ==> 99999 (minutes)

Command ==>
F1=Help    F2=End    F3=Return    F4=Set SYS    F5=Undo all    F6=Roll
F10=Set SYSS    F11=Set SYSP    F12=Retrieve

```

Figure 49. INGPLEX SDUMP modification panel

The modification panel allows to modify all SDUMP options. Furthermore, you can delete SDUMP options. After entering your changes you can set the new options for:

- The selected system
- All systems in the sysplex
- Selected systems in the sysplex

To set the options press the appropriate F-key. If you want to modify selected systems in the sysplex, you are prompted for the systems on which the SDUMP options are being changed. To reset the options to the state when the modification panel was invoked press F5 Undo all.

**Note:** The user must be authorized to change any SDUMP option. The authorization can be any of those which are used for controlling coupling facilities and couple data sets.

For further information about the panel fields refer to the online help.

## INGPLEX SVCdump

### SVCdump

#### Purpose

The INGPLEX SVCDUMP function allows you to issue a multisystem dump of up to 15 address spaces of a single system including their data spaces and structures.

#### Example

```
INGLX26S          SA OS/390 - Command Dialogs          Line 1 of 6
Domain Id = IPSFP  ----- INGPLEX SVCDUMP -----      Date = 02/06/02
Operator Id = NETOP1                                     Time = 17:05:17

The following systems of sysplex KEY1PLEX are registered to the automation.
Use any non-blank character to select one system and then press ENTER.

      Sel  System
      ---  -
      -    KEY2
      -    KEY3
      -    KEY4

Command ==>
F1=Help      F2=End      F3=Return          F6=Ro11
                          F12=Retrieve
```

Figure 50. INGPLEX SVCDUMP target system selection panel

- The Sel field lets you select a system from which a multisystem dump is issued.
- The System field shows the name of the system having joined the same XCF group the operator is logged on to.

For further information about the panel fields refer to the online help. After selecting a system and pressing ENTER, the following panel is displayed:



```

INGLX260          SA OS/390 - Command Dialogs          Line 38 of 63
Domain Id = IPXFG      ----- INGPLEX SVCDUMP -----      Date = 03/11/02
Operator Id = NETOP1                                     Time = 12:26:26

System . . . . . ==> KEYA
Sysplex . . . . . ==> KEYAPLEX
-----
Cmds: D/S de-/select job names for the SVC dump (up to 15 can be specified)

  Jobname  ASID  WorkUnitID  Userid
  -----  ----  -
  TNF      0024
- TRACE   0004
- TSO     003B   STC05983   STCUSER
- VLF     0019
- VMCF    0025
- VTAM    001E   STC05982   STCUSER      selected
- WATS    0217   TSU06587   -             selected
- WLM     000B
- XCFAS   0006

Command ==>
F1=Help      F2=End      F3=Return      F5=NextPnl    F6=Roll
              F8=Forward   F9=Refresh

```

Figure 51. INGPLEX SVCDUMP address space selection panel

If you select VTAM address space and WATS address space, which is a user, press ENTER, then F5, the following panel is displayed:

```

INGLX261          SA OS/390 - Command Dialogs          Line 1 of 9
Domain Id = IPXFG      ----- INGPLEX SVCDUMP -----      Date = 03/11/02
Operator Id = NETOP1                                     Time = 12:34:04

System . . . . . : KEYA
Sysplex . . . . . : KEYAPLEX
-----
Cmds: D/S de-/select the areas to be dumped (max. 113 structures)
      A selection of the job name includes all related areas.

  Jobname  ASID  T Data Space/XCF Group Member/Structure
  -----  ----  -
  VTAM     001E
-          D IST90C95
-          D 00012IXL
-          D 00013IXL
-          L ISTGENERIC                               selected
-          M ISTCFS01.KEYB.VTAM.IPXVH__DEIBMIPS      selected
-          M ISTXCF.KEYB.VTAM.IPXVH__DEIBMIPS      selected
-          M IXCLO008.KEYB.VTAM.M28                 selected
- WATS     0217

Command ==>
F1=Help      F2=End      F3=Return      F4=PrevPnl    F5=NextPnl    F6=Roll
              F8=Forward   F9=Refresh

```

Figure 52. INGPLEX SVCDUMP address space detail panel

Address space VTAM has some data spaces (D), one list structure (L) and some XCF group members (M). TSO user WATS has nothing.

The following command codes are supported:

- D** Deselects the previous selection

## INGPLEX SVCdump

- S Selects a local address space, data space, structure, or XCF group member address space for the SVC dump.

If you press F5, the dump option selection panel is displayed:

```
INGLX262                SA OS/390 - Command Dialogs
Domain Id = IPSFP        ----- INGPLEX SVC -----           Date = 02/26/02
Operator Id = NETOP1                                           Time = 18:02:56

System . . . . . : KEY3
Sysplex . . . . . : KEY1PLEX

Title .... ==> _____
                ==> _____

SDATA Dump Options (recommended options are underlined)
ALLNUC ... ==> -   ALLPSA(*) ==> Y   COUPLE ... ==> -   CSA ..... ==> Y
GRSQ ..... ==> Y   LPA ..... ==> -   LSQA ..... ==> -   NUC ..... ==> Y
PSA ..... ==> -   RGN ..... ==> Y   SERVERS .. ==> -   SQA(*) ... ==> Y
SUMSUMP(*) ==> Y   SWA ..... ==> -   TRT ..... ==> Y   WLM ..... ==> -
XESDATA .. ==> -   (*) = The NOxxx option is used when not selected.

Structure Dump Options (SUMMARY and ADJUNCT/ENTRYDATA are mutually exclusive)
COCLASS .. ==> -   EMCONTROLS ==> -   LISTNUM .. ==> -   STGCLASS . ==> -
ADJUNCT .. ==> -   ENTRYDATA ==> -   SUMMARY .. ==> -

Command ==>>>
F1=Help      F2=End      F3=Return    F4=PrevPn1  F5=Dump      F6=Roll
F12=Retrieve
```

Figure 53. INGPLEX SVCDUMP dump option panel

The panel shows the default dump options being set on invocation. After specifying the dump title, press F5 to issue the dump. When the dump is taken, the function returns to the address space selection panel with all selections cleared. The SORT, FIND and RFIND commands are supported for selection panels only. For further information about the panel fields refer to the online help.

## SLIP

**Purpose**

With the INGPLEX SLIP command you can display serviceability level indication processing (SLIP) traps being set at all systems in the sysplex. With INGPLEX SLIP you can view, enable, disable, and delete the SLIP trap defined in the sysplex.

**Example**

```

INGLX270          SA OS/390 - Command Dialogs          Line 1 of 96
Domain Id = IPSFP      ----- INGPLEX SLIP -----      Date = 02/26/02
Operator Id = NETOP1          Time = 18:20:21

System . . . . . ==> _____ (leave blank for all systems)
Slip Trap Id . . ==> _____ (leave blank for all ids)
Sysplex . . . . . ==> KEY1PLEX          Permission . . . . : ALL
-----
Cmds: +/- display/hide settings D disable E enable R remove

  System   Id     Status   Settings
  -----
- KEY1     XB37  ENABLED
- KEY1     XD37  ENABLED
- KEY1     XE37  ENABLED
- KEY1     X0E7  ENABLED
- KEY1     X0F3  ENABLED
- KEY1     X013  ENABLED
- KEY1     X028  ENABLED
- KEY1     X13E  ENABLED

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F8=Forward   F9=Refresh     F12=Retrieve

```

Figure 54. INGPLEX SLIP main panel

The following command codes are available:

- + Shows the settings of the SLIP trap.
- Hides the settings of the SLIP trap.
- D** Disables the SLIP trap.
- E** Enables the SLIP trap.
- R** Deletes the SLIP trap.

The SORT, FIND and RFIND commands are supported.

**Note:** The user must be authorized to enable, disable, and delete a SLIP trap. The authorization can be any of those which are used for controlling coupling facilities and couple data sets.

For information about the panel fields refer to the online help.

## INGPLEX SLIP

## Chapter 7. Messages

**AOF924A** AUTOMATION OF MESSAGE *ixc\_msg*  
 TERMINATED. REASON: *reason*[,  
 {PROCESSOR OPERATIONS | BCPII}  
 COMMAND RC=*rc*]. SYSID: *sysname*.

**Explanation:** The variable *ixc\_msg* shows the message that triggered the automation. It can have the following values and explanations:

**IXC102A** XCF is removing a system from the sysplex.

**IXC402D** XCF determined that a system in the sysplex appears to be inoperative.

XCF waits for the reply to proceed. However, the reply could not be automated.

The variable *reason* shows the reason code that was issued. It can have the following values:

- 10 The message being automated has not been formatted as expected. The message identifier could not be located.
- 11 A command was issued to the MVS system which reported that a system left the sysplex. A timeout occurred while waiting for a reply to this command.
- 12 The proxy resource name for the system leaving the sysplex could not be determined.
- 13 The Support Element of the system leaving the sysplex cannot be reached.
- 14 The target system name of the ISQ900I message could not be obtained or the target system which sent the ISQ900I message is not initialized to processor operations.
- 15 The replyid for the message being automated could not be determined.
- 16 The system name could not be located in the automated message.
- 17 The message that triggered the automation could not be retrieved for automation.
- 18 The automation requirements for the system leaving the sysplex could not be determined.
- 19 An error occurred while checking if the message was still outstanding.
- 30 A processor operations command failed. Refer to the appropriate command description.

31 A timeout occurred while waiting for the response of the Processor Management command.

32 The reply to the outstanding WTOR could not be sent.

33 An error occurred while determining the status of the local sysplex.

The variable *rc* shows the value of the return code.

**System Action:** Processing terminates.

**Operator Response:** Depending on which message triggered the automation, respond as follows:

**IXC102A** Complete the shutdown of the system leaving the sysplex. Then reply DOWN to the outstanding WTOR.

**IXC402D** Either reply 'INTERVAL=*sssss*' (range 0 to 86400) to give the system the specified interval to become operative again. Or, complete the shutdown of the system leaving the sysplex. Then reply DOWN to the outstanding WTOR.

**System Programmer Response:** Correct the problem. If reason code 11 was issued, no action is required.

**Module:** AOFRX700, AOFRX701, AOFRX702, INGRX705, INGRX706

**Classes:** 40, 43

**TEC:** YES

**AOF925I** AUTOMATION OF MESSAGE *ixc\_msg*  
 FOR *system* COMPLETED  
 SUCCESSFULLY

**Explanation:** The automation of message IXC102A or IXC402D for system *system* completed successfully. The system is no longer part of the sysplex.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** None.

**Module:** AOFRX700, AOFRX701, AOFRX702, INGRX705, INGRX706.

**Classes:** None.

**TEC:** NO

## Messages

---

**AOF926I**     **ERROR** *error* **DETECTED DURING  
AUTOMATION OF MESSAGE** *ixc\_msg*

**Explanation:** The routine responsible for the automation of messages IXC102A and IXC402D found an error.

- The variable *error* shows the error condition. The following error conditions can occur:
  - 10     The message is neither the IXC102A nor the IXC402D message.
  - 11     The same message is being processed by another task.
  - 12     Two or more commands were defined in the customization dialogs for message IXC102A. However, only one ISQCCMD can be issued.
  - 13     The command defined for IXC102A message is not an ISQCCMD command.
  - 14     The reply is no longer outstanding.
  - 15     Incorrect call of a subsequent clist.
  - 30     Using the supplied or default command, an attempt was made to deactivate the system leaving the sysplex. Another attempt will be made using the default command.

**System Action:** Processing terminates for conditions 10, 11, 14, and 15. For conditions 12, 13 and 30 processing continues using the default processor management command SYSRESET CLEAR.

**Operator Response:** None.

**System Programmer Response:** If error conditions 12, 13 or 30 occurred, correct the definitions and reload the automation control file.

**Module:** AOFRX700, AOFRX701, AOFRX702, INGRX705, INGRX706.

**Classes:** None.

**TEC:** NO

---

**AOF960E**     **HARDWARE INFORMATION OF  
*system* COULD NOT BE VALIDATED.**

**Explanation:** The automation detected that neither the hardware information of the indicated system has been defined, nor a connection to the Support Element of the indicated system has been made for any of the registered systems. If the system fails, the automation (if enabled) is not able to take the appropriate hardware actions to prevent possible hardware-related outages caused by the system.

The following variables are used:

*system*     The name of a system or a coupling facility.

**System Action:** Processing continues.

---

**Operator Response:** None.

**System Programmer Response:** Add the hardware definitions and make them available to all registered systems using the ACF command. You can ignore this message if: the indicated system will run the automation, you have defined the necessary hardware information, and the system is able to contact the hardware.

**Module:** INGRX804, INGRX809

**Classes:** 40.

**TEC:** NO

---

**AOF961I**     **UNABLE TO CANCEL UN-NAMED  
JOB  
(SYSTEM=*sysname*/ASID=*asid*/TCB=*tcbaddr*).  
RESOURCE=*resource*.**

**Explanation:** Automation detected a long running enqueue but is unable to cancel the job because the job name is unknown and it is running on an un-automated system.

The following variables are used:

*sysname*     The name of the system running the address space.

*asid*     The address space id running the task.

*tcbaddr*     The TCB address of the task holding the enqueue.

*resource*     The enqueue resource major and minor name.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** Ensure the enqueue is released and terminate the job if necessary.

**Module:** INGRX741

**Classes:** 40, 43.

**TEC:** YES

---

**AOF962I**     **UNABLE TO TERMINATE UN-NAMED  
JOB  
(SYSTEM=*sysname*/ASID=*asid*/TCB=*tcbaddr*).  
RESOURCE=*resource*.**

**Explanation:** Automation detected a long running enqueue but is unable to cancel the job because the job name is unknown. An attempt to abend the task has also failed. Message AOF200I will detail why the abend has failed.

The following variables are used:

*sysname*     The name of the system running the address space.

*asid* The address space id running the task.

*tcbaddr* The TCB address of the task holding the enqueue.

*resource* The enqueue resource major and minor name.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** Ensure the enqueue is released and terminate the job if necessary.

**Module:** INGRX741

**Classes:** 40, 43.

**TEC:** YES

---

**AOF963I UN-NAMED JOB**  
**(SYSTEM=*sysname*/ASID=*asid*/TCB=*tcbaddr*)**  
**IS BEING TERMINATED.**  
**RESOURCE=*resource*.**

**Explanation:** Automation detected a long running enqueue but is unable to cancel the job because the job name is unknown. Automation is attempting to abend the task.

The following variables are used:

*sysname* The name of the system running the address space.

*asid* The address space id running the task.

*tcbaddr* The TCB address of the task holding the enqueue.

*resource* The enqueue resource major and minor name.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** Check that the job has abended and ensure that the enqueue is released.

**Module:** INGRX741

**Classes:** 40, 43.

**TEC:** YES

---

**AOF964I Due to the detection of a long *minor\_res* lock the task *taskid* in address space *asid* on system *sysname* is being abended.**

**Explanation:** The automation detected a lock on the indicated minor system resource being held for more than 10 seconds. To prevent the lockout of further commands the task holding the lock is being abended with the ability to do its own recovery.

The following variables are used:

*minor\_res* The minor resource name of the lock. The major name is SYSIEFSD.

*taskid* The task id holding the lock.

*asid* The address space id running the task.

*sysname* The name of the system running the address space.

**System Action:** The automation calls the Recovery Termination Manager to abend the indicated task.

**Operator Response:** None.

**System Programmer Response:** None.

**Module:** INGRX743

**Classes:** 40, 43.

**TEC:** YES

---

**AOF965I The command *command* issued by *jobname* is being purged due to a hung command detection.**

**Explanation:** The automation detected a command that is still executing. The command is abended to avoid lockouts of other commands.

The following variables are used:

*command* The first two words of the command text when applicable.

*jobname* The job name issued the command.

**System Action:** The automation abends the indicated command.

**Operator Response:** None.

**System Programmer Response:** None.

**Module:** INGRX743

**Classes:** 40

**TEC:** NO

---

**AOF966I Value *value* of type *type* for *sysname* could not be evaluated.**

**Explanation:** The value for the indicated type could not be verified. The reason is that the BCP internal interface to the corresponding Support Elements could not be established on any of the registered systems in the sysplex.

The following variables are used:

*sysname* The name of the defined operating system.

*value* The defined value.

*type* The type in question. This can be one of the following:

**CPC** The CPC name.

**LPAR** The LPAR name.

## Messages

**SYSPLEX** The SYSLEX name.  
**TYPE** The operating system type, such as MVS or CF.

**System Action:** Processing continues.

**Operator Response:** None.

**System Programmer Response:** None.

**Module:** INGRX809

**Classes:** 40

**TEC:** NO

---

**AOF967E** Value mismatch detected between *system1* and *system2* for *system3* and type *type*.

**Explanation:** The automation detected that the value of the indicated type could not be verified. The reason is that the BCP internal interface to the corresponding Support Elements wasn't established on any of the registered systems in the sysplex. In addition, at least two different definitions exist for the indicated type on different msys systems.

As soon as the automation gets access to the Support Element, the value will be re-evaluated and automatically corrected.

The following variables are used:

*system1* The name of a system running msys for Operations.  
*system2* The name of a system running msys for Operations.  
*system3* The name of the defined operating system.  
*type* The type in question. This can be one of the following:  
**CPC** The CPC name.  
**LPAR** The LPAR name.  
**SYSPLEX** The SYSLEX name.  
**TYPE** The operating system type, such as MVS or CF.

**System Action:** Processing continues.

**Operator Response:** None.

**System Programmer Response:** Check and correct the definitions before the next start-up of the affected systems.

**Module:** INGRX809

**Classes:** 40

**TEC:** NO

---

**AOF968E** Value *oldvalue* of type *type* for *sysname1* on *sysname2* has been replaced by *newvalue*.

**Explanation:** The automation detected that the user's hardware definition differs from the actual hardware. If the local system name is not shown in the message, a different setup other than the local system has been used. This should generally be avoided.

The following variables are used:

*sysname1* The name of the defined operating system.  
*newvalue* The new value.  
*oldvalue* The improper value. This may be **(NULL)** if a value has been found in the hardware configuration but there is no definition in AOFCUST.  
*sysname2* The name of the system where the improper setting was detected.  
*type* The type in question. This can be one of the following:  
**CPC** The CPC name.  
**LPAR** The LPAR name.  
**SYSPLEX** The SYSLEX name.  
**TYPE** The operating system type, such as MVS or CF.

**System Action:** The improper definition is temporarily replaced by the actual value to prevent any outage that could be caused by the old value.

**Operator Response:** None.

**System Programmer Response:** Check and correct the definitions in AOFCUST before the next start-up of the indicated system.

**Module:** INGRX809

**Classes:** 40

**TEC:** NO

---

**HSAM5211I** MEMBER *member* FOUND IN *dsn*.

**Explanation:** The indicated member has been found in the indicated data set of the PARMLIB concatenation.

The variable *member* shows the name of the member being processed using the MVS PARMLIB service.

The variable *dsn* shows the data set name from which the member has been read.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** None.

**Module:** HSAPSIPL



---

**HSAM5212E I/O ERROR READING MEMBER**  
*member.*

**Explanation:** An I/O error occurred when trying to read the indicated PARMLIB member.

The variable *member* shows the name of the member being processed using the MVS PARMLIB service.

**System Action:** None.

**Operator Response:** Inform your system programmer.

**System Programmer Response:** Correct the problem and re-run the program.

**Module:** HSAPSIPL

---

**ING805I** *requestor* **REQUESTS TO CONNECT TO CPC** *cpcaddr.*

**Explanation:** The hardware interface tries to establish a connection to the indicated processor hardware.

The variable *requestor* shows the originator of the request.

The variable *cpcaddr* shows the address of the CPC.

**System Action:** Processing continues.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** 40.

**Module:** INGRVX80

---

**ING806E** **COMMUNICATION WITH CPC** *cpcaddr*  
**CANNOT BE ESTABLISHED**

**Explanation:** A failure occurred while the processor hardware was contacted through the hardware interface.

The variable *cpcaddr* shows the address of the CPC with which no session could not be established.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** Check the netlog for AOFAXxxx messages to obtain more information, for example the available condition and sense codes. Correct the problem and restart the session to the PC.

---

**ING810I** *requestor* **REQUESTS TO DISCONNECT FROM CPC** *cpcaddr.*

**Explanation:** The hardware interface terminates the communication with the indicated processor hardware.

The variable *requestor* shows the originator of the request.

The variable *cpcaddr* shows the address of the CPC.

**System Action:** Processing continues.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** 40.

**Module:** INGRVX80

---

**ING910I** **HEALTH CHECKER BACKEND TASK IS ACTIVE**

**Explanation:** The customer has turned on the health checking function. This causes the NetView task that runs the health checker backend (AOFHC) to be started.

**System Action:** The health checking function is activated.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** None.

---

**ING911I** **HEALTH CHECKER BACKEND TASK HAS TERMINATED**

**Explanation:** The customer has turned off the health checking function. This causes the NetView task that runs the health checker backend (AOFHC) to be terminated.

**System Action:** The health checking function is deactivated.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** None.

---

**ING912E** **ENVIRONMENT PROBLEM WITH HEALTH CHECKER BACKEND, REASON:**

**Explanation:** The NetView task running the health checker backend is either not active or has detected some error situation in the run time environment.

**System Action:** The requested function cannot be performed. If the task is not already inactive, the task might terminate depending on the severity of the problem.

**Operator Response:** Contact the system programmer.

**System Programmer Response:** Try to analyze the problem to see whether there might be a shortage of system resources. If you cannot resolve the problem, please call IBM support.

**Classes:** None.

## Messages

---

**ING913I ERROR IN LINE *x* POSITION *y* IN  
USERPARM FILE**

**Explanation:** This prefix is used for messages of the parser of the health checker function. The cause of the problem is some syntax error in the customer's override of IBM's best practices.

This message extends over multiple lines, the follow on lines have message prefix ING917I.

**System Action:** The health checker continues, the override in error is not ignored. This means that the check with the erroneous override is not performed at all until the problem is fixed.

**Operator Response:** Contact the system programmer.

**System Programmer Response:** The reason explains the cause of the error as well as the check which detected the error. Please use this information to correct the problem.

Please note that the line number does not refer to your original data. Instead, this message refers to the NetView global variables AOF.0INGPKMAI.\*.

Please use command 'qryglobl  
vars=AOF.0INGPKMAI.\*' to display the values of these variables to analyze the problem.

Go back to the original definition of your overrides, locate the line with the error, and correct it.

The line you identified with this procedure is the line which triggered the parser to detect the error. The actual line of error could be before this line.

**Classes:** None.

---

**ING914E CUSTOMIZATION ERROR FOR  
HEALTH CHECKER BACKEND,  
REASON:**

**Explanation:** The NetView task running the health checker backend has detected some error situation in your user overrides of IBM's best practices.

If this message extends over multiple lines, the follow on lines have message prefix ING917I.

**System Action:** The health checker continues, the override in error is not ignored. This means that the check with the erroneous override is not performed at all until the problem is fixed.

**Operator Response:** Contact the system programmer.

**System Programmer Response:** The reason explains the cause of the error as well as the check which detected the error. Please use this information to correct the problem.

These messages may refer to 'Line *x* in file USERPARM'. In such case the reference actually means the NetView variable AOF.0INGPKMAI.*x*.

Please use command 'qryglobl

vars=AOF.0INGPKMAI.\*' to display the values of these variables to analyze the problem.

Go back to the original definition of your overrides, locate the line with the error, and correct it.

**Classes:** None.

---

**ING915I EXCEPTION DETECTED:**

**Explanation:** This message is used for automation reasons. It is issued when the Health Checker function detects an exception during a check. The name and severity of the particular check that raised the exception is shown in the message text.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** Use command INGHC to look at the report of the Health Checker function to determine the cause of the exception.

**Classes:** 40, 46.

---

**ING916I *text***

**Explanation:** These messages are used internally by the health checker function and would normally not be visible on the console or in the netlog. The messages have varying contents, they are used to send data back and forth between frontend and backend.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** None.

---

**ING917I *text***

**Explanation:** This message is used for formatting reasons. It extends other messages with prefix 'ING91*x*' if these messages get longer than one line.

Please use the help for the message with prefix 'ING91*x*' preceding this message.

**System Action:** None.

**Operator Response:** None.

**System Programmer Response:** None.

**Classes:** None.

---

**ING918I BEST PRACTICES POLICIES ARE  
UNAVAILABLE**

**Explanation:** You requested the best practices policy information for the health checker function.

However, the system from where the information is to be retrieved currently does not run the health checker function.





## Appendix A. The IBM Health Checker for z/OS and Sysplex Checks

This appendix provides details of the checks carried out by the IBM Health Checker for z/OS and Sysplex.

Table 1 gives a list of the check names and indicates whether they are local or global, and what their interval is for repetitive checks:

*Table 1.*

| Check name                       | Page | Type   | Interval |
|----------------------------------|------|--------|----------|
| ALTERNATE_CONSOLE_GROUPS         | 129  | local  | 24 hours |
| AMRF_AND_MPF_CONSISTENT          | 130  | local  | 24 hours |
| AVAILABLE_FRAME_QUEUE_THRESHOLDS | 124  | local  | 24 hours |
| CDS_DATASET_SEPARATION           | 125  | global | 1 hour   |
| CONSOLE_MASTER                   | 129  | local  | 24 hours |
| CONSOLE_MSCOPE_AND_ROUTCODES     | 130  | local  | 24 hours |
| CONSOLE_NAMES                    | 128  | local  | 24 hours |
| CONSOLE_ROUTCODE_11              | 130  | local  | 24 hours |
| COUPLINGFACILITY_STRUCTURE       | 126  | local  | 12 hours |
| EMCS_HARDCOPY                    | 131  | local  | 12 hours |
| EMCS_MSCOPE_AND_ROUTCODES        | 131  | local  | 12 hours |
| GRS_MODE                         | 136  | global | 24 hours |
| NUMBER_EMCS_CONSOLES             | 132  | global | 12 hours |
| REAL_STORAGE_AVAILABILITY        | 133  | local  | 24 hours |
| RSU_STORAGE_AVAILABILITY         | 134  | local  | 24 hours |
| SDUMP_AVAILABILITY               | 135  | local  | 24 hours |
| SYS_CF_STR_REPORT                | 126  | global | 24 hours |
| SYSCONS_MASTER                   | 133  | local  | 8 hours  |
| SYSCONS_MSCOPE                   | 132  | local  | 24 hours |
| SYSCONS_PD_MODE                  | 133  | local  | 24 hours |
| SYSCONS_ROUTCODES                | 132  | local  | 24 hours |
| SYSPLEX_MASTER                   | 129  | global | 24 hours |
| USS_FILESYS_CONFIG               | 124  | local  | 24 hours |
| XCF_CLEANUP_VALUE                | 134  | local  | 24 hours |
| XCF_FAILURE_DETECTION_INTERVAL   | 134  | local  | 24 hours |
| XCF_SIGNALLING                   | 127  | local  | 12 hours |
| XCF_SIGNALLING_STRUCTURES_IN_CF  | 128  | local  | 1 hour   |
| XCF_SYSPLEX_FAILURE_MANAGEMENT   | 135  | global | 24 hours |

## The IBM Health Checker for z/OS and Sysplex checks

**Note:** In the following list of checks, "User override" refers to your ability to specify parameters that override the IBM values. A subset of the checks support this. However, all checks can be individually disabled so that the check is not run.

- **Automove setup verification**

**Check name:** USS\_FILESYS\_CONFIG

**Best practice:** You should define your version and sysplex root HFS data as AUTOMOVE, and define your system-specific file systems as UNMOUNT. Do not define a file system as NOAUTOMOVE or UNMOUNT and a file system underneath it as AUTOMOVE. If you do, the file system defined as AUTOMOVE will not be available until the failing system is restarted. A sysplex file system that changes ownership as the result of a system failure, will only be accessible in the new environment if its mount point is also accessible. The Automove check verifies that your file systems are setup according to these rules. This check is only applicable for images that are part of a sysplex.

The AUTOMOVE|NOAUTOMOVE|UNMOUNT parameters on ROOT and MOUNT indicate what happens to the file system if the system that owns that file system goes down. The AUTOMOVE parameter specifies that ownership of the file system is automatically moved to another system. It is the default. The NOAUTOMOVE parameter specifies that the file system will not be moved if the owning system goes down and the file system is not accessible. – UNMOUNT specifies that the file system will be unmounted when the system leaves the sysplex.

**User override:** Yes

**Parameters:** For file system MODE, the parameter SYSPLEX ensures Automove support. For other file modes, the parameter NOPLEX will not check for Automove support.

**Syntax:**

```
"CHECK(USS_FILESYS_CONFIG)"
"SEVERITY(High)"
"DATE(20030102)"
"PARMS(SYSPLEX)"
"REASON('USS Automove moves a file system to a new system in
the Sysplex when the owning system fails');"
```

**Reference:** See *z/OS UNIX System Services Planning*, GA22-7800 and APAR II3129.

- **Available frame queue threshold, reclaiming storage frames**

**Check name:** Available\_Frame\_Queue\_Thresholds

**Best practice:** To avoid situations where the system does not start to reclaim storage frames soon enough, you should evaluate the values for storage. If you are running in 31-bit mode, then both the MCCAFACTH and the MCCAECTH values are used. If you are running in 64-bit mode, then only the MCCAECTH value is used. For migrations to a 64-bit environment, this check is critical because the same value used in 31-bit mode could introduce problems. IBM suggests that the IEAOPTxx parameters are set as follows:

## The IBM Health Checker for z/OS and Sysplex checks

### – MCCAFACTH

MCCAFACTH specifies the low and the OK threshold values for central storage. The *lowvalue* indicates the number of frames on the available frame queue when stealing begins. The *okvalue* indicates the number of frames on the available frame queue when stealing ends. You can monitor actual conditions on the RMF Paging Activity Report (RMF Monitor 1) or equivalent performance monitoring product and adjust accordingly.

### – MCCAECTH

MCCAECTH specifies the low and the OK threshold values for expanded storage. The *lowvalue* indicates the number of frames on the available frame queue when real storage manager (RSM) frame stealing begins. The *okvalue* indicates the number of frames on the available frame queue when stealing ends. You can monitor actual conditions on the RMF Paging Activity Report (RMF Monitor 1) or equivalent performance monitoring product and adjust accordingly.

**Note:** This parameter is ignored in 64-bit mode. In 31-bit mode, the defaults are sufficient. For these two parameters, the defaults are MCCAFACTH=(50,100), and MCCAECTH=(150,300). The OK point for available frames in a 31-bit mode implementation is 400 frames, 100 from central storage and 300 from expanded storage.

For 64-bit mode, after installing APARs OW55902 and OW55729, the default values for MCCAFACTH are (400,600). These are IBM's minimum suggested settings. It is suggested that you allow MCCAFACTH to default to (400,600). Higher values are acceptable.

**User override:** Yes

#### Parameters:

1. 64 bit Minimum LOW threshold (special action commences).
2. 64 bit Minimum OK threshold (special action ceases).
3. 31 bit Minimum LOW threshold (special action commences).
4. 31 bit Minimum OK threshold (special action ceases).

#### Syntax:

```
"CHECK(Available_Frame_Queue_Thresholds)"  
"SEVERITY(High)"  
"DATE(20030102)"  
"PARMS(400,600,200,400)"  
"REASON('System may not recover in time if set too low');"
```

#### Reference:

See *z/OS MVS Initialization and Tuning Reference*, SA22-7592 for information about the MCCAFACTH and MCCAECTH IEAOPTxx parameters, and *z/OS RMF Report Analysis*, SC33-7991 for information about using the Paging Activity report. You should also be familiar with the whitepaper *z/OS Performance: Managing Processor Storage in a 64-bit environment*, WP100269.

### • Couple data set separation

**Check name:** CDS\_Dataset\_Separation

## The IBM Health Checker for z/OS and Sysplex checks

**Best practice:** There are three facets to this check:

- The primary sysplex, CFRM, and LOGR couple data sets should not reside on the same volume due to the amount of I/O activity for each of these data sets.
- For all couple data sets, the primary couple data sets should reside on a separate volume from the alternate couple data set.
- Each primary couple data set has an active alternate couple data set.

**User override:** No

**Parameters:** Not applicable.

**Syntax:**

```
"CHECK(CDS_Dataset_Separation)"  
"SEVERITY(High)"  
"DATE(20030102)"  
"REASON('Ensure that CDS separation has been maintained');"
```

**Reference:** The publication, *Parallel Sysplex Availability Checklist*, provides detailed recommendations and characteristics about the placement of primary and alternate couple data sets. See also the section, "Planning for the couple data sets," in *z/OS MVS Setting Up a Sysplex*, SA22-7625.

### • Coupling facility structure attributes and location

**Check name:** CouplingFacility\_Structure

**Best practice:** This check also displays each of the defined coupling facilities, their status, and the relationship between the coupling facilities and structures. The check compares placement based on the preference list, specified in the CFRM policy, which is used to designate the location of coupling facility structures for performance and capacity considerations.

This check shows current status and attributes of each coupling facility. For example, it shows whether a coupling facility is volatile or nonvolatile. Determine if the current status differs from your expectations or requirements.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(CouplingFacility_Structure)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"REASON('Check CF and Structure location');"
```

**Reference:** Refer to the following sections in *z/OS MVS Setting Up a Sysplex*, SA22-7625: "Understanding preference and exclusion lists" for information about specification of preferences; "Using the POPULATECF Function to Rebuild Coupling Facility Structures" if you want to rebuild any of the coupling facility structures in their preferred coupling facility.

### • Create report for coupling facilities, structures, and systems

**Check name:** Sys\_CF\_STR\_Report



## The IBM Health Checker for z/OS and Sysplex checks

**Best practice:** This check produces a report displaying systems, coupling facilities, structures and status of these resources.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(Sys_CF_STR_Report)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('Create System, CF, Structure report');"
```

**Reference:** See the topic about Sysplex policies in *Parallel Sysplex Availability Checklist* for recommendations about structure placement, preferences, and characteristics of structures.

### • Cross system coupling facility (XCF) signalling

**Check name:** XCF\_Signalling

**Best practice:** This check verifies the following:

1. all transport classes should be set up to service the pseudo-group name 'UNDESIG'. This ensures that any XCF message can use each transport class.
2. all defined Transport Classes are assigned to at least one pathout (outbound path).
3. most pathouts have a transport class defined with a "small" (parameter #4) classlength, and at least one other transport class is defined with a higher "large" (parameter #5) classlength.
4. multiple pathout/pathin pairs (at least parameter #3) are in the operational state for each system in the sysplex that is connected to the current system.
5. a MAXMSG value of a minimum size (parameter #1) is defined for each transport class.
6. each inbound signal path can support a minimum number of messages (parameter #2) from the sending system.

These actions avoid a single point of failure. Exception conditions flagged by this check can reflect a hardware or configuration problem.

**User override:** Yes

**Parameters:** Check #1: None required.

Check #2: None required.

Check #3: parameter 4: Specifies the maximum value to be interpreted as a "small" (XCF transport) classlength. This is an *integer*. The maximum acceptable value is 9999. The specified value does not include the 68 additional bytes used by XCF for internal control blocks.

Check #3 parameter 5: Specifies the minimum value to be interpreted as a "large" (XCF transport) classlength. This is an *integer*. The maximum acceptable value is 62464. The minimum acceptable value is 4028. The specified value does not include the 68 additional bytes used by XCF for internal control blocks

## The IBM Health Checker for z/OS and Sysplex checks

Check #4 parameter 3: Specifies the minimum pathout/pathin pair count for a system. This is an *integer*. The maximum acceptable value is 9.

Check #5 parameter 1: The minimum MAXMSG value for transport classes. This is an *integer*. The maximum acceptable value is 999999.

Check #6 parameter 2: The minimum number of XCF messages that an inbound XCF signal path should support to avoid message backup. This is an *integer*. The maximum acceptable value is 999999.

**Syntax:**

```
"CHECK(XCF_Signalling)"
"SEVERITY(Low)"
"DATE(20030102)"
"PARMS(750,30,2,956,4028)"
"REASON('Avoid problems with XCF signalling.');
```

**Reference:** See the topic about Sysplex policies in *Parallel Sysplex Availability Checklist* for recommendations about structure placement, preferences, and characteristics of structures.

- **Cross system coupling facility (XCF) structure location**

**Check name:** XCF\_Signalling\_Structures\_in\_CF

**Best practice:** If multiple XCF signaling structures are in use, then all of them should not reside on the same coupling facility. There should be at least two online, operational links to each coupling facility. Also, there should not be fewer operational links (CHPID) than there are active links. These actions avoid a single point of failure. Conditions flagged by this check can reflect a hardware problem.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(XCF_Signalling_Structures_in_CF)"
"SEVERITY(Medium)"
"DATE(20030102)"
"REASON('Avoid problems with XCF signalling in CFs.');
```

**Reference:** See the topic about Sysplex policies in *Parallel Sysplex Availability Checklist* for recommendations about structure placement, preferences, and characteristics of structures.

- **Sysplex console checks**

The following group of checks is performed:

- Consoles are assigned names.

**Check name:** Console\_Names

**Best practice:** IBM suggests that MCS, SNA\_MCS, and subsystem consoles are assigned names; this reduces the number of console IDs to help address the limit of 99 consoles per sysplex. Console names are specified within the CONSOLxx parmlib entry, using the NAME parameter. The assignment of names to consoles is also required to use alternate groups for consoles.

**User override:** No

## The IBM Health Checker for z/OS and Sysplex checks

**Parameters:** None required.

**Syntax:**

```
"CHECK(Console_Names)"  
"SEVERITY(High)"  
"DATE(20030102)"  
"REASON('Like named consoles are matched across the sysplex');"
```

- Alternate groups are defined for consoles.

**Check name:** Alternate\_Console\_groups

**Best practice:** IBM suggests that you define alternate groups for consoles (using the ALTGRP parameter of the CONSOLxx parmlib member). This increases availability if there is a console failure. In such cases, MVS will attempt to switch to another console. Specifying alternate groups (ALTGRP) is preferable to the use of alternate consoles (ALTCONS).

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(Alternate_Console_groups)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"REASON('Provides good recovery from console loss');"
```

- Consoles on each system have a console with master authority that has been defined with command association.

**Check name:** Console\_master

**Best practice:** IBM suggests there is a console defined with both MASTER authority and command association for each system in the sysplex.

For the Console\_master check to be successful, each system in the sysplex requires a console. If you did not configure your sysplex so that each system has a console, then you should consider disabling this check using the NOCALL parameter. IBM requests feedback on the value of this check.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(Console_master)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"REASON('Needed for DCCF and other situations');"
```

- Master console is active

**Check name:** Sysplex\_master

**Best practice:** IBM suggests that the Sysplex Master Console is active within the sysplex.

**User override:** No

**Parameters:** None required.

**Syntax:**

## The IBM Health Checker for z/OS and Sysplex checks

```
"CHECK(Sysplex_master)"
"SEVERITY(High)"
"DATE(20030102)"
"REASON('Needed in emergencies');"
```

- Console message scope and routing codes

**Check name:** Console\_MSCOPE\_and\_Routcodes

**Best practice:** Due to the potentially high volume of messages that could be received by a console, IBM suggests that consoles limit the messages and routing codes received to that console's functions. This will improve availability by improving performance and preventing buffer shortages. For example, a console that has a multisystem scope, should receive messages specific to that console's function. Conversely, consoles that are configured ROUTCODE(ALL) should limit the scope of messages received to a single system.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(Console_MSCOPE_and_Routcodes)"
"SEVERITY(Medium)"
"DATE(20030102)"
"REASON('Avoids overloading any console. Reduces number of
messages sent to Sysplex consoles');"
```

- Use of Action message retention facility (AMRF) and retention of eventual action messages

**Check name:** AMRF\_and\_MPF\_consistent

**Best practice:** IBM performs this check only if you are using AMRF. The messages can be retrieved at a later time (using the DISPLAY R command). Also, eventual action messages should not be retained to keep the message from becoming too long.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(AMRF_and_MPF_consistent)"
"SEVERITY(Medium)"
"DATE(20030102)"
"REASON('Avoids long chains of messages in storage');"
```

- No console is receiving route code 11 messages

**Check name:** Console\_routcode\_11

**Best practice:** Operator consoles do not need to receive routing code 11, which are system programmer messages. This keeps unnecessary messages from being delivered to a console. Route code 11 messages can be retrieved using the DISPLAY R,CE command.

**User override:** No

**Parameters:** None required.

**Syntax:**

## The IBM Health Checker for z/OS and Sysplex checks

```
"CHECK(Console_routcode_11)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('Not really needed as for programmer info only');"
```

**Reference:** See *z/OS MVS Planning: Operations*, SA22-7601; the Consoles topic in *Parallel Sysplex Availability Checklist*; and *Parallel Sysplex Managing Software for Availability*, SG24-5451.

### • Extended master console (EMCS) checks

To extend the number of consoles on MVS systems, or to allow applications and programs to access MVS messages and send commands, an installation can use extended MCS consoles. The use of these consoles can help alleviate the constraint of the 99 MCS console limit. Moving to an extended MCS console base from a subsystem-allocatable console base will allow for easier expansion in a sysplex.

Once an EMCS console is defined and activated, it lives for the life of the sysplex—whether it remains active or not. After the number of EMCS consoles (including inactive consoles) becomes very large, console initialization during IPL can be elongated by minutes. This may occur due to an error in NetView setup or if a CLIST does not reuse EMCS console names. This results in an on-going increase in the number of EMCS consoles defined.

- Extended master console messages scope and routing codes

**Check name:** EMCS\_Mscope\_and\_Routcode

**Best practice:** Due to the potentially high volume of messages that could be received by a console, IBM suggests that EMCS consoles limit the messages and routing codes received to that console's functions. This will improve availability by improving performance and preventing buffer shortages. For example, if an EMCS console is receiving messages from multiple systems, limit the number of route codes assigned to this console. You should not specify ROUTCODE( ALL). Conversely, if an EMCS console is intended to receive all route codes, the scope should be limited to a single system.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(EMCS_Mscope_and_Routcode)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"REASON('ROUTCODE(ALL) and non-local MSCOPE will cause a large  
number of messages to be processed');"
```

- Extended consoles with master authority should not be allowed to receive hardcopy messages or to be backup devices for hardcopy medium.

**Check name:** EMCS\_hardcopy

**Best practice:** An EMCS console should not be defined to receive hardcopy messages if the message scope (MSCOPE) is greater than 1.

**User override:** No

**Parameters:** None required.

**Syntax:**

## The IBM Health Checker for z/OS and Sysplex checks

```
"CHECK(EMCS_hardcopy) "  
"SEVERITY(Medium) "  
"DATE(20030102) "  
"REASON('EMCS consoles with HARDCOPY specified will process an  
excessive number of messages');"
```

- Number of EMCS consoles is within recommended range

**Check name:** Number\_EMCS\_consoles

**Best practice:** If the combined total of active and inactive EMCS consoles is excessive, performance can be impacted.

**User override:** Yes

**Parameters:**

1. Maximum number of *active* EMCS consoles on this system. Values between 0 and 99999999 are accepted. Must be numeric.
2. Maximum number of *inactive* EMCS consoles on the entire sysplex. Values between 0 and 99999999 are accepted. Must be numeric.

**Syntax:**

```
"CHECK(Number_EMCS_consoles) "  
"SEVERITY(High) "  
"DATE(20030102) "  
"PARMS(5000,10000) "  
"REASON('Excessive numbers of EMCS consoles cause slowdown');"
```

**Reference:** See: *z/OS MVS Planning: Operations*, SA22-7601; the Consoles topic in *Parallel Sysplex Availability Checklist*; and *Parallel Sysplex Managing Software for Availability*, SG24-5451.

### • MVS system console checks

The following group of checks is performed:

- System console is defined to have a local message scope

**Check name:** SYSCONS\_MSCOPE

**Best practice:** MVS system consoles should be defined to have a local message scope. This reduces the amount of message traffic and improves performance and availability. This is of particular importance when the MVS system console is used during recovery actions.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(SYSCONS_MSCOPE) "  
"SEVERITY(Medium) "  
"DATE(20030102) "  
"REASON('If SYSCONS is used in emergencies it should not have  
to process large numbers of messages');"
```

- System console is defined to have a limited number of routing codes

**Check name:** SYSCONS\_ROUTCODES

**Best practice:** MVS system consoles should be defined to have a limited set of routing codes. This reduces the amount of message traffic and improves performance and availability. The console should be defined with either ROUTCODE(1,2,10) or

## The IBM Health Checker for z/OS and Sysplex checks

ROUTCODE(NONE). This is of particular importance when the MVS system console is used during recovery actions.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(SYSCONS_ROUTCODES)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('If SYSCONS is used in emergencies it should not have  
to process large numbers of messages');"
```

- System consoles are not running in problem determination mode

**Check name:** SYSCONS\_PDMODE

**Best practice:** System consoles should not be running in problem determination mode during normal operations. Problem determination mode degrades performance.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(SYSCONS_PDMODE)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('SYSCONS should be run in Problem Determination mode  
only when there is a problem');"
```

- Active system console is defined with MASTER authority

**Check name:** SYSCONS\_MASTER

**Best practice:** The active MCS system console should be defined to have MASTER authority. This is of particular importance when the MVS system console is used as a backup to the sysplex master console.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(SYSCONS_MASTER)"  
"SEVERITY(High)"  
"DATE(20030102)"  
"REASON('SYSCONS needs MASTER authority to resolve problems in  
emergency situations');"
```

**Reference:** See: *z/OS MVS Planning: Operations*, SA22-7601; Consoles topic in *Parallel Sysplex Availability Checklist*; and *Parallel Sysplex Managing Software for Availability*, SG24-5451.

### • Real storage settings

**Check name:** Real\_Storage\_Availability

**Best practice:** IBM suggests that both the real and reconfigurable storage parameters should be set to 0. However, this would not be valid if you need to reconfigure storage or to run V=R jobs. The IEASYSxx parmlib member should specify the REAL parameter as REAL=0. This will improve performance.

**User override:** No

## The IBM Health Checker for z/OS and Sysplex checks

**Parameters:** None required.

**Syntax:**

```
"CHECK(Real_Storage_Availability)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('Performance may be impacted');"
```

**Reference:** See *z/OS MVS Initialization and Tuning Reference*, SA22-7592.

- **Reconfigurable storage settings**

**Check name:** RSU\_Storage\_Availability

**Best practice:** IBM suggests that both the real and reconfigurable storage parameters should be set to 0. RSU reflects the amount of central storage to be made available for storage reconfiguration. The IEASYSxx parmlib member should specify the RSU parameter as RSU=0.

**User override:** No

**Parameters:** None required.

**Syntax:**

```
"CHECK(RSU_Storage_Availability)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"REASON('Performance may be impacted');"
```

**Reference:** See *z/OS MVS Initialization and Tuning Reference*, SA22-7592.

- **XCF cleanup value**

**Check name:** XCF\_Cleanup\_Value

**Best practice:** You should specify a value of 15 for the CLEANUP parameter in the COUPLExx parmlib member. Cleanup specifies how many seconds the system waits for before notifying members that this system is terminating, and loading a nonrestartable wait state. This is the amount of time that members of the sysplex have to perform cleanup processing.

**User override:** Yes

**Parameters:** Recommended XCF cleanup time in seconds. The maximum acceptable value is 86400.

**Syntax:**

```
"CHECK(XCF_Cleanup_Value)"  
"SEVERITY(Low)"  
"DATE(20030102)"  
"PARMS(15)"  
"REASON('Quick removal of a dead system from SYSPLEX');"
```

**Reference:** See *z/OS MVS Initialization and Tuning Reference*, SA22-7592.

- **Sysplex failure detection interval**

**Check name:** XCF\_Failure\_Detection\_Interval

**Best practice:** The CLEANUP INTERVAL parameter in the COUPLE xx parmlib member must be coordinated with the spin recovery actions (SPINRCVY) statement in the EXSPATxx parmlib member. The HealthChecker checks that the CLEANUP INTERVAL value conforms to the IBM formula (2\*SPINRCVT+5).



## The IBM Health Checker for z/OS and Sysplex checks

The spintime should be defined as 10 seconds for a system in either basic mode or LPAR mode with dedicated CPs. The spintime should be defined as 40 seconds for LPAR mode when the CPs are shared.

**User override:** Yes

**Parameters:** PARM1 and PARM2 in the formula PARM1\*SPINRCVT+PARM2.

**Syntax:**

```
"CHECK(XCF_Failure_Detection_Interval)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"PARMS(2,5)"  
"REASON('Allow adequate time to recover from spin situation  
before system is assumed dead');"
```

**Reference:** For information about the EXSPATxx parmlib member, refer to *z/OS MVS Initialization and Tuning Reference*, SA22-7592 and to *z/OS MVS Setting Up a Sysplex*, SA22-7625.

### • Sysplex failure management (SFM) is active

**Check name:** XCF\_SYSPLEX\_Failure\_Management

**Best practice:** IBM suggests that you use sysplex failure management (SFM) to define actions to be performed in the event of:

- Signaling connectivity failures in the sysplex
- System failures, indicated by a status update missing condition
- The need to reconfigure systems in a PR/SM environment.

**User override:** Yes

**Parameters:** Recommended SFM status (ACTIVE/INACTIVE).

**Syntax:**

```
"CHECK(XCF_SYSPLEX_Failure_Management)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"PARMS(ACTIVE)"  
"REASON('An SFM policy provides better failure management');"
```

**Reference:** See *z/OS MVS Setting Up a Sysplex*, SA22-7625 for information about defining SFM policies and the *Parallel Sysplex Availability Checklist*.

### • SVC- dump is using dynamically allocated data sets

**Check name:** SDUMP\_Availability

**Best practice:** IBM suggests that you use dynamic allocation for your dump data sets to ensure that complete diagnostic data is captured at the first occurrence. If your dump data sets are not dynamically allocated and become full, you can lose important diagnostic information.

**User override:** No

**Parameters:** None required.

**Syntax:**

## The IBM Health Checker for z/OS and Sysplex checks

```
"CHECK(SDUMP_Availability)"  
"SEVERITY(Medium)"  
"DATE(20030102)"  
"REASON('SDUMP setup should ensure adequate diagnostics are  
gathered on the 1st occurrence of problems');"
```

**Reference:** See *z/OS MVS Diagnosis: Tools and Service Aids*, GA22-7589 for information about allocating stand-alone dump data sets.

- **Global Resource Serialization (GRS) STAR configuration**

**Check name:** GRS\_Mode

**Best practice:** A STAR configuration is recommended due to the advantages that it provides with regard to availability, real storage consumption, processing capacity, and response time.

**User override:** Yes

**Parameters:** Mode required, STAR, RING or NONE.

**Syntax:**

```
"CHECK(GRS_Mode)"  
"SEVERITY(High)"  
"DATE(20030102)"  
"PARMS(STAR)"  
"REASON('GRS should run in STAR mode to improve performance.');
```

**Reference:** See *z/OS MVS Planning: Global Resource Serialization*, SA22-7600.

## Appendix B. Response Messages, Error Strings, Condition Codes

### Response Messages (AOFA0000 – AOFA0018)

Automation returns the following messages to indicate command-invocation, parameter-list, or parameter-resolution problems.

#### AOFA0000

**Explanation:** This response message is returned as an indicator for command-invocation, parameter-list, or parameter-resolution problems. If the AOFA0000 response message is returned from the INGHWCMD command list, its data portion is an error string (see Table 2). If the AOFA0000 response message is returned from the INGHWCOM communication task command processor, its data portion contains a condition code from 001 through 033.

Table 2. AOFA0000 Response Message Error Strings

| Error type    | Error strings  |
|---------------|--|
| Parm error    | <p><i>p</i>_has_invalid_event_specification.<br/>           TRACE_option_must_be_ON_or_OFF<br/>           Proc_or_Sys_name_and_HW_function_name_is_required<br/>           Timeout_range_ttt_already_defined<br/>           Timeout_tt_out_of_range_1-59.<br/>           Timeout_specification_range_tt_is_not_valid.<br/>           Timeout_specification_tt_is_not_valid.<br/>           Timeout_specification_ttt_ends_invalid.<br/>           hwcmd_with_FORCE_operand_is_not_valid.<br/>           hwcmd_is_not_a_supported_HW-function.<br/>           p_must_be_a_decimal_integer_value_or_ALL<br/>           p_EXTERNAL_CPU_definition_error<br/>           CN_Activation_profile_name_not_alphanumeric<br/>           CN_Profile_name_is_a_positional_parm<br/>           p_does_not_support_target_wildcard.<br/>           p_is_in_wrong_position.<br/>           lparm_load_parm_length_must_be_8.<br/>           devnum_device_address_not_hexadecimal.<br/>           devnum_mandatory_load_address_invalid.<br/>           lval_Load_value_definition_error.<br/>           lval_Load_value_is_a_positional_parm.<br/>           pn_load_profile_name_not_alphanumeric.<br/>           pn_Load_profile_definition_error.<br/>           pn_Profile_name_is_a_positional_parm.<br/>           spc_P_and_LV_specs_are_mutually_exclusive.<br/>           name_invalid_chars_in_proc_or_sys_name.<br/>           name_name_longer_than_8_characters.<br/>           parm_Parm_is_unknown_or_in_wrong_position.</p> |
| Resolve error | <p>sysname_null_string_BCP_command_error<br/>           pname_has_no_IP_address_defined.<br/>           No_HWOPER_task_defined.<br/>           pname_has_no_AUTHTKN_defined.<br/>           name_Name_is_not_defined.<br/>           sysname_for_CFs_LOAD/SYSRESET_are_not_supported.<br/>           sysname_type_specification_missing_or_invalid.<br/>           pname_has_invalid_CPC_address_format.</p>   |

Table 2. AOFA0000 Response Message Error Strings (continued)

| Error type          | Error strings   |
|---------------------|---|
| Check Task          | <i>hwtask_reached QueueLimit qlim</i><br><i>hwtask_task_msqqeue_data_is_invalid</i><br><i>hwtask_task_is_not_available</i>                |
| Hardware Interface  | <i>internal_interface_is_disabled_or_not_active</i><br><i>internal_interface_status_cannot_be_determined</i>                              |
| Authorization error | <i>hwcmd_has_undefined_access_level</i><br><i>accllevel_to_resname_not_allowed_for_user</i><br><i>BadRC_during_access_chk_for_resname</i> |

**Examples:** 1. The INGHWCMD command failed returning an AOFA0000 error string:

```
INGHWCMD MYSYS GETISTAT
```

```
AOFA0000 Resolve error:
"MYSYS" _is_not_a_predefined_system_or_CF-name
```

2. The INGHWCMD command failed. Message AOFA0000 was returned by INGHWCOM command processor. The condition code 00B00003 indicates that an unknown communication interface name was passed from INGHWCMD to INGHWCOM.

```
INGHWCMD SC50 GETISTAT
```

```
AOFA0000 GETISTAT STATUS(REJECTED) CONDITION(00B00003) SENSE() CPCSNAME()
TSTIME(020111073708)
```

#### AOFA0001

**Explanation:** This response message is returned from a request of the following hardware command functions: ACTIVATE, DEACTIVATE, LOAD, RESTART, SYSRESET, START, STOP, CBU, EXTERNAL

**Examples:** 1. The hardware function STOP was successfully performed for system KEY7:

```
INGHWCMD KEY7 STOP
```

```
AOFA0001 STOP KEY STATUS(SUCCESS)
CPCSNAME(DEIBMD1.X7E1FA0A)TSTIME(020111135810)
```

2. The hardware function SYSRESET was rejected by INGHWCOM. The condition code 00B00056 indicates that system KEY6 is still operational and cannot be disrupted. In order to perform a disruptive hardware operation, the FORCE option must be specified:

```
INGHWCMD KEY6 SYSRESET
```

```
AOFA0001 SYSRESET KEY6
CONDITION(00B00056)SENSE()CPCSNAME(DEIBMD1.X7E1FA0A)TSTIME(020111142827)
```

#### AOFA0002

**Explanation:** This message is the response to an INITCOM request. INITCOM establishes a session between INGHWCOM and the Processor Support Element of the addressed hardware.

**Example:** The session between the INGHWCOM and the processor Support Element of the CPC DEIBMD1.X7E1FA0A, configured with the hardware name "YORAMA" is established successfully:

```
INGHWCMD YORAMA INITCOM
```

```
AOFA0002 INITCOM YORAMA STATUS(SUCCESS)
CPCSNAME(DEIBMD1.X7E1FA0A)TSTIME(020111143851)
```

---

### AOFA0003

**Explanation:** This message is the response to an INITCOM request to a HMC. INITCOM establishes a session between INGHWCOM and the addressed CPC. In case this CPC is defined over an HMC, for each CPC found on the HMC, an extra line is shown in the report.

**Example:** The session between INGHWCOM and the HMC where SERVER1 is defined, is established successfully. Implicitly, the sessions to the other CPCs of that HMC are also established:

```
INGHWCMD SERVER1 INITCOM

AOFA0003 INITCOM SERVER1 STATUS(SUCCESS)
          TSTIME(030117084549)
AOFA0003 INITCOM CPCSNAME(DEIBMIPS.IP3T1000)
AOFA0003 INITCOM CPCSNAME(AUIBMQXP.QXPthes1)
AOFA0003 INITCOM CPCSNAME(AUIBMQXP.QXPthes9)
AOFA0003 INITCOM CPCSNAME(DEIBMD1.X7E1FA0A)
AOFA0003 INITCOM CPCSNAME(DEIBMD1.X7F1E30A)
AOFA0003 INITCOM CPCSNAME(DEIBMD1.X7F1F20A)
AOFA0003 INITCOM REPORT COMPLETE
```

---

### AOFA0004

**Explanation:** This message is the response to a TERMCOM request. TERMCOM ends a session between INGHWCOM and the Processor Support Element of the addressed hardware.

**Examples:** 1. The session between the INGHWCOM and the Processor Support Element of the CPC USIBMSC.SCZP107 configured with the hardware name "P701" is terminated successfully:

```
INGHWCMD P701 TERMCOM

AOFA0004 TERMCOM P701 STATUS(SUCCESS)
          CPCSNAME(USIBMSC.SCZP701)TSTIME(020111090930)
```

2. The session termination between the INGHWCOM and the Processor Support Element of the CPC USIBMSC.SCZP701 configured with the hardware name "P701" was rejected. Condition code 00B00033 indicates that no session existed to terminate:

```
INGHWCMD P701 TERMCOM

AOFA0004 TERMCOM P701 STATUS(REJECTED) CONDITION(00B00033) SENSE()
          CPCSNAME(USIBMSC.SCZP701) TSTIME(020111091447)
```

---

### AOFA0005

**Explanation:** This message is the response to a TERMCOM request for a CPC, which is defined over an HMC connection. In this case, TERMCOM terminates the session between the INGHWCOM task and the HMC.

**Example:** The session between INGHWCOM and the HMC where SERVER1 is defined, is terminated successfully. Implicitly the sessions the other CPCs of that HMC are also terminated.

```
INGHWCMD SERVER1 TERMCOM

AOFA0005 TERMCOM SERVER1 STATUS(SUCCESS)
          TSTIME(030117085107)
AOFA0005 TERMCOM CPCSNAME(DEIBMIPS.IP3T1000)
AOFA0005 TERMCOM CPCSNAME(AUIBMQXP.QXPthes1)
AOFA0005 TERMCOM CPCSNAME(AUIBMQXP.QXPthes9)
AOFA0005 TERMCOM CPCSNAME(DEIBMD1.X7E1FA0A)
AOFA0005 TERMCOM CPCSNAME(DEIBMD1.X7F1E30A)
AOFA0005 TERMCOM CPCSNAME(DEIBMD1.X7F1F20A)
AOFA0005 TERMCOM REPORT COMPLETE
```

---

---

## AOFA0016

**Explanation:** This message is the response to a CPCDATA request. It returns a report consisting of multiple AOFA0016 messages. The CPCDATA request combines the GETSINFO request for a CPC with the list of GETIINFO request, one for each image of the CPC.

**Examples:** 1. The AOFA0016 report message consists of three line record types. The first line type is always the CPC report. The last line is always the report completion type. In between, 1–nIMAGE report lines may be displayed, depending on the number of images that are defined for the CPC.

```
AOFA0016 CPCDATA FREEWAY STATUS(OPERATING)
                PDATA(TYPE(2064),MODEL(107),S/N(000020051528))
                APROF(DEFAULT) MODE(LPAR) CPCSNAME(DEIBMD1.X7F1E30A)
                TIME(020701083608)
AOFA0016 CPCDATA CPCINAME(CF1) STATUS(OPERATING) IDATA() MODE(CF)
AOFA0016 CPCDATA CPCINAME(KEY3)STATUS(OPERATING)
                IDATA(OSNAME(KEY3),OSTYPE(MVS),OSLEVEL(V1R2),SYSPLEX(KEY1PLEX))
                MODE(ESA390)
AOFA0016 CPCDATA CPCINAME(VMA) STATUS(OPERATING)
                IDATA(OSNAME(BOEVMA),OSTYPE(VM)) MODE(ESA390)
AOFA0016 CPCDATA CPCINAME(DER1) STATUS(OPERATING) IDATA() MODE(LINUXONLY)
AOFA0016 CPCDATA CPCINAME(DER2) STATUS(NOT_OPERATING) IDATA() MODE(LINUXONLY)
AOFA0016 CPCDATA REPORT COMPLETE
```

The STATUS field of line one, the CPC status, can have the following values:

```
OPERATING
NOT_OPERATING
NO_POWER
STATUS_CHECK
EXCEPTIONS
POWERSAVE
SERVICE
LINKNOTACTIVE
SERVICE_REQ
UNKNOWN
```

The PDATA field of line one contains type, model, and serial number of the CPC. The APROF field of line one contains the last used activation profile name to activate the CPC. The MODE field of line one, the CPC mode, can have the following values:

```
ESA390
S370
FM
FMAE
HM
HMEA
LPAR
ESA390TPF
CF
FMEX
HMAS
LINUXONLY
```

For each identified CPC image, an AOFA0016 report line is generated. The CPCINAME field of an image report line contains the image name of an identified image. The IDATA field contains a collection of the available information supplied by the image BCP. This information can be OSNAME, OSTYPE, or OSLEVEL. For BCPs of type MVS it can be SYSPLEX. Note, that one or more IDATA fields may not be available in the AOFA0016, AOFA0017 response reports. This is because not all BCPs may supply the complete field set. The STATUS field of an image report line contains the same status values as supplied with the GETISTAT report message AOFA0017.

2. The processor, defined as YORAMA was initialized in ESA390 mode and has a NOT\_OPERATING status. The last ACTIVATE was performed using profile KEY6BASIC. Due to its non operational status, no BCP information is available in the IDATA field.

```

AOFA0016 CPCDATA YORAMA STATUS(NOT_OPERATING)
          PDATA(TYPE(9672),MODEL(RX4),S/N(000510064523)) MODE(ESA390)
          APROF(KEY6BASIC) CPCNAME(DEIBMD1.X7E1FA0A) TSTIME(020703094909)
AOFA0016 CPCDATA CPCINAME(X7E1FA0A:Image) IDATA()
AOFA0016 CPCDATA REPORT COMPLETE

```

---

## AOFA0017

**Explanation:** This message is the response to a GETISTAT or GETSSTAT request. GETISTAT queries the status of an image object and GETSSTAT queries the status of a CPC object. After successful completion, the status field of message AOFA0017 may have one of the following values:

| GETISTAT      | GETSSTAT      |
|---------------|---------------|
| -----         | -----         |
| OPERATING     | OPERATING     |
| NOT_OPERATING | NOT_OPERATING |
| NOT_ACTIVATED | NO_POWER      |
| STATUS_CHECK  | STATUS_CHECK  |
| EXCEPTIONS    | EXCEPTIONS    |
| POWERSAVE     | POWERSAVE     |
|               | SERVICE       |
|               | LINKNOTACTIVE |
|               | SERVICE_REQ   |

**Examples:** 1. The CPC USIBMSC.SCZP801 is currently powered off:

```

INGHWCMD P801 GETSSTAT

AOFA0017 GETSSTAT P801 STATUS(NO_POWER)
CPCNAME(USIBMSC.SCZP801)TSTIME(020111095319)

```

2. The own system (\*), which runs on LPAR A3 of CPC USIBMSC.SCZP801 has a status of OPERATING and its system name is SC50:

```

INGHWCMD * GETISTAT

AOFA0017 GETISTAT SC50
STATUS(OPERATING)CPCINAME(A3)CPCNAME(USIBMSC.SCZP801)
TSTIME(020111095940)

```

3. On processor YORAMA, the logical partition KEY7 has a status of OPERATING:

```

INGHWCMD YORAMA.KEY7 GETISTAT

AOFA0017 GETISTAT YORAMA STATUS (OPERATING) CPCINAME(KEY7)
CSNAME(DEIBMD1.X7E1FA0A) TSTIME(020204130403)

```

---

## AOFA0018

**Explanation:**

**Examples:** 1. From the own system (\*), the CPC addresses list in PDATA are in your scope of control. With an BCP internal interface connection, this list is determined internally from the local SE by contacting the HMC in your processor LAN which has the "Change Management" function enabled. The content of the Defined CPCs group of this HMC represents the CPCs you can contact through this BCP internal interface session. Each scope list is terminated with a "report complete" message. The PDATA field of the AOFA0018 message contains CPC related information. The first PDATA entry is always the full qualified address of the CPC (cpcname). Other PDATA information may be added in the future, separated by a comma.

```

INGHWCMD * GETCLUSTER

AOFA0018 GETCLUSTER SC50 STATUS(SUCCESS)
CPCNAME(USIBMSC.SCZP801)TSTIME(020112054842)
AOFA0018 GETCLUSTER PDATA(USIBMSC.SCZP801)
AOFA0018 GETCLUSTER PDATA(USIBMSC.SCZP701)
AOFA0018 GETCLUSTER PDATA(USIBMSC.SCZP702)
AOFA0018 GETCLUSTER PDATA(USIBMSC.SCZP601)
AOFA0018 GETCLUSTER REPORT COMPLETE

```

2. This GETCLUSTER request failed with a condition code of 0B100224 representing a BCP internal interface transport timeout condition:

```
INGHWCMD * GETCLUSTER
```

```
AOFA0018 GETCLUSTER SC50 STATUS(FAILED) CONDITION(0B100224)
SENSE(00000000 0000 00000000)
CPCSNAME(USIBMSC.SCZP801)TSTIME(020111085916)
```

---

## AOFA0019

**Explanation:** This message is the response to a FILTER LIST command.

**Example:** The filter list report shows the filters that are in place for the SERVER1 CPC. Only images that have at least one filter set, can forward their events to NetView operators or operator groups.

```
INGHWCMD SERVER1 FILTER LIST
```

```
AOFA0019 FILTER SERVER1 STATUS(SUCCESS)
CPCSNAME(DEIBMD1.X7F1F20A) TSTIME(030128090248)
AOFA0019 FILTER CPC PDATA(OP(TIL ) PFX(ISQ900I ))
AOFA0019 FILTER INAME(KEY1) PDATA(OP(GE00PER ) PFX(GE0001I )
AOFA0019 FILTER INAME(KEY2) PDATA(OP(OPER5 ) PFX(GE00001I)
AOFA0019 FILTER INAME(KEY2) PDATA(OP(GE00PER ) PFX(GE0001I )
AOFA0019 FILTER INAME(KEY2) PDATA(OP(TIL ) PFX(AOFA0900)
AOFA0019 FILTER INAME(KEYA) PDATA(OP(OPER5 ) PFX(GE00001I)
AOFA0019 FILTER INAME(KEYA) PDATA(OP(+ISQCMON) PFX(ISQ900I )
AOFA0019 FILTER INAME(KEYB) PDATA(OP(OPER5 ) PFX(GE00001I)
AOFA0019 FILTER INAME(KEYB) PDATA(OP(+ISQCMON) PFX(ISQ900I )
AOFA0019 FILTER INAME(KEYC) PDATA(OP(+ISQCMON) PFX(ISQ900I )
AOFA0019 FILTER INAME(OLI1) PDATA(OP(+ISQOPER) PFX(ISQ900I )
AOFA0019 FILTER INAME(OLI1) PDATA(OP(+ISQCMON) PFX(ISQ900I )
AOFA0019 FILTER REPORT COMPLETE
```

If a prefix field PFX was specified with a filter SET command, its text is placed in front of every event message. If no prefix is given with a FILTER SET command, the default prefix AOFA0900 is used.

---

## AOFA0099

**Explanation:** This message is returned as response to a connection status request command.

**Example:** The CPC SERVER1 is connected to this NetView using task AUTHW007. The connection is made either through INTERNAL or SNMP transport. The BCP Internal Interface uses the internal transport and always has the Support Element (SE) as target. For the SNMP transport, either SE or HMC can be the target. The empty EVENTS list indicates that the task is not registered to receive any asynchronous events from the hardware.

```
INGHWCMD SERVER1 STATCOM
```

```
AOFA0099 STATCOM SERVER1 STATUS(CONNECTED)
TASK(AUTHW007)
TRANSPORT(INTERNAL)
TARGET(SE)
EVENTS()
CPCSNAME(IBM390PS.P1234567)
TSTIME(030104091131)
```

---

## Asynchronous Response Messages (AOFA0100-AOFA0900)

Events from CPCs or CPC images arrive as asynchronous messages in NetView. The following event types are supported by INGHWCMD interface:

- Messages from the Operating System (BCP messages)
- Status Changes of CPC or CPC image objects
- Hardware Messages from the CPC and its associated CPC images
- SNA Alert data from the CPC and its associated CPC images



---

**AOFA0100** **NEWSTATUS**(*obj\_status\_number*) **OLDSTATUS**(*obj\_status\_number*)

**Explanation:** This message appears in the msgtext section of a filter message from the CPC.LPAR that you have specified in a FILTER SET command. It indicates the status change of a CPC or CPC image.

Before you can receive this type of message, you must have initialized a session with an SE/HMC for Event Notifications of type status change (ST). In the FILTER SET command, you must also have specified a NetView operator—or group name—as the receiver for these event messages. For each CPC or CPC image, a FILTER SET command must be issued.

**Example:** Partition KEY4 of FREEWAY was successfully CP stopped. The status changed from OPERATING (0001) to NOT\_OPERATING (0002).

```
INGHWCMD FREEWAY INITCOM EN(ST)
INGHWCMD FREEWAY FILTER SET(KEY4) OP(TIL)
INGHWCMD FREEWAY.KEY4 STOP

AOFA0001 STOP FREEWAY.KEY4 STATUS(SUCCESS) CPCINAME(KEY4)
                                         CPCSNAME(DEIBMD1.X7F1E30A)
                                         TSTIME(030208143117)

AOFA0900 FREEWAY.KEY4 SC AOFA0100 NEWSTATUS(0002)
                                         OLDSTATUS(0001)

INGHWCMD FREEWAY.KEY4 START

AOFA0001 START FREEWAY.KEY4 STATUS(SUCCESS) CPCINAME(KEY4)
                                         CPCSNAME(DEIBMD1.X7F1E30A)
                                         TSTIME(030208143305)

AOFA0900 FREEWAY.KEY4 SC AOFA0100 NEWSTATUS(0001)
                                         OLDSTATUS(0002)
```

After the LPAR was CP started again, its status went back to OPERATING. Note, that prefix message AOFA0900 is shown since the FILTER SET was made without a PFX specification. Only status changes are shown, because no other event notifications were specified in the INITCOM request.

---

**AOFA0900** *CpcName.ImageName ConID Event\_message\_string*

**Explanation:** This response message uses the following variables:

**CpcName.ImageName**

Specifies the name of the processor as defined in the SA policy and the image or LPAR name that has caused this event.

**ConID**

For BCP message events, this is OC, indicating a message from the oper- console. For all other event messages, it is SC, indicating a message from the system console.

**Event\_message\_string**

Specifies the message text from the operating system as shown on the SE or HMC, or the message string specific to the other event types.

---

## Condition Codes

This section gives further information about the condition codes for errors associated with the following:

- Hardware Communication Task "00B00xxx"
- SNMP Data Exchange Services "0B100xxx"
- SNMP Command Services "0B200xxx"
- BCP Internal Interface Transport Services "0Bx00xxx"

## Hardware Communication Task Condition Codes "00B00xxx"

Table 3 lists the condition codes for Hardware Communication Task "00B00xxx".

Table 3. Hardware Communication Task Condition Codes

| Reason Code | Error String            | Error Description  |
|-------------|-------------------------|--|
| 001         | ING_invalid_HLL_buffer  | INGHWCOM was invoked, but the NetView HLL buffer found for C/C++ is not valid.   |
| 002         | ING_origuser_invalid    | The userid and output correlator passed to INGHWCOR is not valid.  |
| 003         | ING_interface_invalid   | The hardware interface name passed to INGHWCOR is not valid. Allowed interface names are BCP internal interface, SNMP, or SNA.   |
| 004         | ING_interface_missing   | No hardware interface name is passed to INGHWCOR.  |
| 005         | ING_tgt_length-error    | Parsing Error: The target object name (processor or image name) has an invalid length. It must be 1 to 8 characters.   |
| 006         | ING_tgt_missing         | Parsing Error: The target object name (processor or image name) is not specified.  |
| 007         | ING_cpc_length_error    | Parsing Error: The CPC address specification netid.nau has an invalid length. It must not exceed 17 characters.  |
| 008         | ING_cpc_missing         | Parsing Error: The CPC address specification that is a required parameter for the request is missing.  |
| 009         | ING_imgname_length_err. | Parsing Error: The image name (Lpar name) parameter has an invalid length.   |
| 00A         | ING_imgname_missing     | Parsing Error: The image name (Lpar name) is a required parameter for the request, but has not been specified.   |
| 00B         | ING_force_invalid       | Parsing Error: The FORCE option is specified in the request but is not supported for the HW function. The following HW functions allow the FORCE option:<br>• ACTIVATE, DEACTIVATE, SYSRESET, LOAD |
| 00C         | ING_force_missing       | Parsing Error: The FORCE option is required for the request, but has not been specified.   |
| 00D         | ING_auth_missing        | Parsing Error: The AUTHENTICATION specification that is required for each request is missing.  |
| 00E         | ING_timeout_missing     | Parsing Error: The required TIMEOUT parameter is missing in the request.   |
| 00F         | ING_OCFCMD_truncated    | Parsing Error: The HW function (OCFCMD) exceeds the maximum allowed length, which is 40 characters.  |
| 010         | ING_OCFCMD_missing      | Parsing Error: No HW function (OCFCMD) was specified in the request.   |
| 020         | ING_SNMP_noIP_address   | Parameter Resolution Error: The SNMP interface was specified for the HW request, but no IP address information is available.   |
| 021         | ING_OCF_resolve_failed  | Parameter Resolution Error: No HW function name to resolve, same as error 010.   |
| 022         | ING_OCF_not_resolved    | Parameter Resolution Error: An invalid HW function name was detected.  |
| 030         | ING_nt_alloc_error      | Storage Allocation Error: The Netid base table could not be allocated using CNMNAMS services.  |
| 031         | ING_img_alloc_error     | Storage Allocation Error: The storage for a system image could not be allocated using CNMNAMS services.  |
| 032         | ING_img_locate_error    | Storage Allocation Error: The previously allocated storage for a system image could not be located using CNMNAMS services.   |

Table 3. Hardware Communication Task Condition Codes (continued)

| Reason Code | Error String             | Error Description  |
|-------------|--------------------------|--|
| 033         | ING_notinit_error        | Storage Allocation Error: An HW function request was issued for a processor/system image without having allocated storage for that processor/system image. This happens if no INITCOM request was made prior the first a HW function request.  |
| 050         | ING_notinitialized_error | HW Function Error: An HW function request was issued for a processor/system image without having done an INITCOM. Same as error 033.   |
| 051         | ING_imgnotfound_error    | HW Function Error: An HW function request was issued for a system image which could not be located as an image belonging to the addressed CPC.   |
| 052         | ING_funcunknown_error    | HW Function Error: An unknown HW function name was requested. Same as error 022.   |
| 053         | ING_nocpcobject_error    | HW Function Error: GETCLUSTER failed. Cluster list attribute not resolved by the processor support element.  |
| 054         | ING_nocluster_error      | HW Function Error: GETCLUSTER failed. The cluster list returned by the processor support element was empty.  |
| 055         | ING_nohwstatus_error     | HW Function Error: An HW function which requires to determine the status of the object prior execution cannot be processed because the object status cannot be determined. This error is valid only for processors where the FORCE option has to be emulated by INGHWCOM.  |
| 056         | ING_disruptive_cmd       | HW Function Error: A disruptive HW function was requested without the FORCE option and the processor/image object is in an operational state. INGHWCOM uses FORCE(NO) (allow no disruptive commands) as default. If you want to allow disruptive commands you must specify the FORCE option in the INGHWCMD request.   |
| 057         | ING_noistatus_error      | HW Function Error: CBU failed. A CBU function was requested but the current CBU status cannot be determined.   |
| 058         | ING_noiobject_error      | HW Function Error: CBU failed. The processor hardware does not support the CBU installed object attribute.   |
| 059         | ING_cbustatus_error      | HW Function Error: CBU failed. A CBU status was returned that does not allow the request.  |
| 060         | ING_filter_error         | HW Function Error: A filter SET/UNSET command failed. Either a filter table is full and no new filters can be set, or a specific image name does not exist on the CPC. A maximum of 10 filter entries can be set per image.  |
| 070         | ING_hmccpc_tbl_error     | Initialization Error: Internal HMC/CPC/IMG table error occurred during INITCOM processing. Enable TRACE or AOCTRACE and rerun INITCOM to get additional information about the problem.   |
| 071         | ING_hmccpc_tbl_error     | Initialization Error: For an image, the dynamic storage allocation request failed during INITCOM processing. Enable TRACE or AOCTRACE and rerun INITCOM to get additional information about the problem.   |
| 0A0         | ING_invalid_task         | HW Task Error: The HW communication interface is running on a NetView task that is not the configured task. Module INGHWCOM terminates. Verify that INGRCUST contains a valid autotask name for the HWOPER02 and HWOPER01 keywords (msys for Operations only). For SA OS/390, make sure you have defined autotask names for the keywords HWOPER01 and HWOPER02 in your active automation policy. Use the SA Dialog to verify this. |

Table 3. Hardware Communication Task Condition Codes (continued)

| Reason Code | Error String     | Error Description  |
|-------------|------------------|--|
| 0A2         | ING_config_error | HW Task Error: The configuration information about the NetView autotask names to be used for the HW communication interface cannot be retrieved. This happens if the interface is called but msys for Operations or SA OS/390 initialization is not complete. This error also happens if the autotasks are not defined. See error code 0A0 for additional information. |

## SNMP Data Exchange Services "0B100xxx"

Note that this set of condition codes applies to SNMP connections *only*.

Table 4 lists the condition codes that are returned if there is an error with the following INGHWCMD functions:

- INITCOM
- TERMCMD
- ACTIVATE
- DEACTIVATE
- SYSRESET
- START
- STOP
- RESTART
- LOAD
- CBU
- EXTERNAL
- GETSSTAT
- GETISTAT

The condition code data "xxx" prefixed by 0B100 is returned as part of the following response messages, with a status value of REJECTED or FAILED:

- AOFA0001
- AOFA0002
- AOFA0004
- AOFA0017
- AOFA0018

The table data is taken from *zSeries 900 Application Programming Interface* hardware documentation.

Table 4. SNMP Data Exchange Services Condition Codes

| Condition Code | Error String                 |
|----------------|------------------------------|
| 001            | HWMCA_DE_NO_SUCH_OBJECT      |
| 002            | HWMCA_DE_INVALID_DATA_TYPE   |
| 003            | HWMCA_DE_INVALID_DATA_LENGTH |
| 004            | HWMCA_DE_INVALID_DATA_PTR    |
| 005            | HWMCA_DE_INVALID_DATA_VALUE  |
| 006            | HWMCA_DE_INVALID_INIT_PTR    |

Table 4. SNMP Data Exchange Services Condition Codes (continued)

| Condition Code | Error String   |
|----------------|--|
| 007            | HWMCA_DE_INVALID_ID_PTR  |
| 008            | HWMCA_DE_INVALID_BUF_PTR   |
| 009            | HWMCA_DE_INVALID_BUF_SIZE  |
| 010            | HWMCA_DE_INVALID_DATATYPE_PTR  |
| 011            | HWMCA_DE_INVALID_TARGET  |
| 012            | HWMCA_DE_INVALID_EVENT_MASK  |
| 013            | HWMCA_DE_INVALID_PARAMETER   |
| 014            | HWMCA_DE_READ_ONLY_OBJECT  |
| 015            | HWMCA_DE_SNMP_INIT_ERROR<br><br>This is a retryable condition code.    |
| 016            | HWMCA_DE_INVALID_OBJECT_ID   |
| 017            | HWMCA_DE_REQUEST_ALLOC_ERROR   |
| 018            | HWMCA_DE_REQUEST_SEND_ERROR  |
| 019            | HWMCA_DE_TIMEOUT   |
| 020            | HWMCA_DE_REQUEST_RECV_ERROR  |
| 021            | HWMCA_DE_SNMP_ERROR<br><br>Check if the SNMP API is enabled on the SE. |
| 022            | HWMCA_DE_INVALID_TIMEOUT   |
| 028            | HWMCA_DE_INVALID_HOST  |
| 029            | HWMCA_DE_INVALID_COMMUNITY   |
| 099            | HWMCA_DE_TRANSPORT_ERROR   |

## SNMP Command Services "0B200xxx"

Note that this set of condition codes applies to SNMP connections *only*.

Table 5 on page 148 lists the condition codes that are returned if there is an error with the following hardware functions:

- ACTIVATE
- DEACTIVATE
- SYSRESET
- START
- STOP
- RESTART
- LOAD
- CBU
- EXTERNAL

The condition code data "xxx" prefixed by 0B200 is returned as part of the AOFA0001 response message with a status value of REJECTED or FAILED.

The table data is taken from *zSeries 900 Application Programming Interface* hardware documentation.

Table 5. SNMP Command Services Condition Codes

| Condition Code | Error String                   |
|----------------|--------------------------------|
| 001            | HWMCA_CMD_NO_SUCH_OBJECT       |
| 002            | HWMCA_CMD_INVALID_DATA_TYPE    |
| 003            | HWMCA_CMD_INVALID_DATA_LENGTH  |
| 004            | HWMCA_CMD_INVALID_DATA_PTR     |
| 005            | HWMCA_CMD_INVALID_DATA_VALUE   |
| 006            | HWMCA_CMD_INVALID_INIT_PTR     |
| 007            | HWMCA_CMD_INVALID_ID_PTR       |
| 010            | HWMCA_CMD_INVALID_DATATYPE_PTR |
| 013            | HWMCA_CMD_INVALID_PARAMETER    |
| 017            | HWMCA_CMD_REQUEST_ALLOC_ERROR  |
| 018            | HWMCA_CMD_REQUEST_SEND_ERROR   |
| 019            | HWMCA_CMD_TIMEOUT              |
| 020            | HWMCA_CMD_REQUEST_RECV_ERROR   |
| 021            | HWMCA_CMD_SNMP_ERROR           |
| 022            | HWMCA_CMD_INVALID_TIMEOUT      |
| 023            | HWMCA_CMD_INVALID_CMD          |
| 024            | HWMCA_CMD_OBJECT_BUSY          |
| 025            | HWMCA_CMD_INVALID_OBJECT       |
| 026            | HWMCA_CMD_COMMAND_FAILED       |
| 027            | HWMCA_CMD_INITTERM_OK          |
| 028            | HWMCA_CMD_CBU_DISRUPTIVE_OK    |
| 029            | HWMCA_CMD_CBU_PARTIAL_HW       |
| 030            | HWMCA_CMD_CBU_NO_SPARES        |
| 031            | HWMCA_CMD_CBU_TEMPORARY        |
| 032            | HWMCA_CMD_CBU_NOT_ENABLED      |
| 033            | HWMCA_CMD_CBU_NOT_AUTHORIZED   |
| 034            | HWMCA_CMD_CBU_FAILED           |
| 035            | HWMCA_CMD_CBU_ALREADY_ACTIVE   |

## BCP Internal Interface Transport Services "0Bx00xxx"

Note that this set of condition codes applies to BCP internal interface connections *only*.

Table 6 on page 149 lists the condition codes that are returned if there is an error with the following INGHWCMD functions:

- INITCOM
- TERMCOM
- ACTIVATE
- DEACTIVATE
- SYSRESET
- START

- STOP
- RESTART
- LOAD
- CBU
- EXTERNAL
- GETSSTAT
- GETISTAT

The condition code data "xxx" prefixed by 0B100 or 0B200 is returned as part of the following response messages, with a status value of REJECTED or FAILED:

- AOFA0001
- AOFA0002
- AOFA0004
- AOFA0017
- AOFA0018

Table 6. BCP Internal Interface Transport Services Condition Codes

| Reason Code | Error Description  |
|-------------|--|
| 100         | A problem was encountered prior to sending the request to the HSAET32 API for processing. This is likely due to a failure to an environmental error. Check if the Support Element is fully operational. A running reboot of the SE may have caused this problem. |
| 101         | A problem was encountered prior to sending the request to the HSAET32 API for processing. This is likely due to a failure to properly enable the API, however it may be due to parameter and/or environmental errors.  |
| 102         | A report list overflow occurred. This return code should not currently be issued for SNMP requests, however is included for OCF query (Query-Read-Cluster) compatibility.  |
| 110         | The issuer of the request is not (RACF) authorized to the requested function. Note that (like HCD) the HSAET32 services require that RACF or a compatible SAF product be installed and operational.  |
| 111         | The control block ID or version of the HSDB passed to HSAET32 services is invalid. For hwmcaapi requests, this indicates that HSAPHCPI is incompatible with the supporting HSAPHARI module.  |
| 112         | The requested function is invalid or not supported by the current level of HSAET32 services. For hwmcaapi requests, this indicates an incompatibility between HSAPHCPI and the supporting HSAPHARI module.   |
| 113         | The control block ID of the request list passed to HSAET32 services is invalid or inappropriate for the requested function. For hwmcaapi requests, this indicates a problem in module HSAPHCPI.  |
| 114         | The request list entry count passed to HSAET32 services is invalid or inappropriate for the requested function. For hwmcaapi requests, this indicates a problem in module HSAPHCPI.  |
| 115         | The request list entry pointer passed to HSAET32 services is null and therefore invalid. For hwmcaapi requests, this indicates a problem in module HSAPHCPI.   |

Table 6. BCP Internal Interface Transport Services Condition Codes (continued)

| Reason Code | Error Description   |
|-------------|---|
| 116         | Some of the input areas passed to HSAET32 services exist in a storage area that the caller does not have authority to fetch/update.   |
| 117         | The input parameter list generated by the HSAXHARI (or CBDIHSD) macro does not have the correct version ID or type, or does not point to an HSDB.   |
| 118         | The control block ID of the Output Report request list passed to HSAET32 services is invalid or inappropriate for the requested function. For hwmcaapi requests, this indicates a problem in module HSAPHCPI. |
| 119         | The session token is invalid. This is probably due to a previous failure of the hwmcatерminate request being issued for the session, or improper modification of the HWMCA_SCLP_TARGET_INFO structure.        |
| 120         | The host environment does not support HSAET32 services. HSAET32 services are not currently on VM hosts.   |
| 121         | An address space resource manager could not be established.   |
| 122         | A task resource manager could not be established.   |
| 123         | The HSAET32 associated recovery routine (HSAPHARR) was entered due to an unexpected error processing the request.   |
| 124         | The CBDMHWA CSECT could not be found in the nucleus.  |
| 125         | The HSAET32 monitor exit (HSAPHMON) could not be established as the secondary ET32 listener exit for the application.   |
| 126         | The system date and time could not be obtained to correlate HRE and associated MDS-MU's.  |
| 127         | A failure attempting occurred attempting to access the HWAX.  |
| 129         | An attempt to send the MDS_MU requests across the BCP internal interface interface failed.  |
| 130         | Either the EP_OPERATIONS_MGMT vector (9F22) from the event type 30 data was not available or its length was invalid.  |
| 131         | Either the application name-group for the EP_OPERATIONS_MGMT application (event type 30 data) was not returned in the 9F22 vector or its length was invalid.  |
| 132         | Either the NetID of the local support element was not returned in the application name-group for the EP_OPERATIONS_MGMT application (event type 30 data) or its length was invalid.                           |
| 133         | Either the NAU of the local support element was not returned in the application name-group for the EP_OPERATIONS_MGMT application (event type 30 data) or its length was invalid.                             |
| 134         | Either the CPC image name vector (9F70) from the event type 30 data was not available or its length was invalid.  |
| 136         | Either the primary OCF name vector (9F81) from the event type 30 data was not available or its length was invalid.  |
| 150         | HSAPHSPI was unable to establish an ESTAEX recovery environment.  |
| 151         | HSAPHSPI identified a parameter that is not contextually valid.   |
| 152         | HSAPHSPI identified a missing parameter that is contextually required.  |



Table 6. BCP Internal Interface Transport Services Condition Codes (continued)

| Reason Code | Error Description   |
|-------------|---|
| 153         | HSAPHSPI identified a parameter value that is syntactically incorrect.  |
| 204         | The request was accepted by the local support element and will be processed asynchronously. No further reason code is provided. (This function is not currently used by the hwmcaapi implementation).   |
| 208         | Execution of request was failed by the target support element. This indication is normally accompanied by a condition report which is returned as the error reason, and may also be accompanied by sense data further identifying the cause of the failure. |
| 212         | The request was rejected by the local support element. This indication is normally accompanied by a condition report which is returned as the error reason.   |
| 216         | An MDS-MU error message was received from the target support element. The condition report code is returned as the error reason.  |
| 220         | HSAPHMON detected an structural error while processing the incoming report from the target support element. An internal reason code is generated to further describe the request.   |
| 224         | No response was received from the target support element within the time interval designated for the request. No further reason code provided.  |
| 228         | An error was detected in a request list entry. An internal reason code is generated to identify the field in error. (This code is not used for hwmcaapi requests).  |
| 232         | A routing error has occurred while forwarding the requests for processing. This indication is normally accompanied by a condition report which is returned as the error reason.   |



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## Appendix C. Sense Codes, Hardware Object Status Summary

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### Sense Codes

Note that for BCP Internal Interface connections the sense codes are copied from the request response report information into the AOFAxxxx messages. For SNMP connections, the sense data is taken from the HWMCA\_EVENT\_COMMAND\_RESPONSE return codes, which is currently not supported. For SNA connections this information is provided in the CSAxxxx messages, which can be found in the netlog.

The following table lists the sense codes returned in an error case of the following hardware functions: ACTIVATE, DEACTIVATE, SYSRESET, START, STOP, RESTART, LOAD, CBU, EXTERNAL.

The table data is copied from "Managing Your Processors" hardware documentation. Note that the data listed here as sense codes correspond to the Operations Management Condition Code Reference in the above named documentation. For BCP internal interface and SNMP connections only a subset of this SNA set applies.

Sense codes are returned in the SENSE field of the AOFAxxxx messages.

The online description of the sense codes is also available in NetView. Enter *SENSE code* on the NCCF screen to view the explanation of the sense code.

---

**0806000A    RESOURCE UNKNOWN**

**Explanation:** The profile name (CNAME) specified in a operations command is not recognized by the receiving node.

**System Programmer Response:** Correct the configuration identifier and resend the request.

---

**08090000    Mode inconsistency: The requested function cannot be performed in the present state of the receiver.**

**Explanation:** This command is prohibited because the target is in an incompatible mode. For example, an ITIMER request is not accepted when the system is power-on reset in LPAR mode.

**System Programmer Response:** This function cannot be performed in the present state of the receiver. Retry the request after the target mode status has changed.

---

**08090001    Mode inconsistency: The requested function cannot be performed in the present state of the receiver.**

**Explanation:** Acceptance of the command is prohibited because the target is in an incompatible mode. For example, an ITIMER request is not accepted when the system is power-on reset in LPAR mode.

**System Programmer Response:** None. This function cannot be performed in the present state of the receiver.

---

**08090027    Mode inconsistency: The requested function cannot be performed in the present state of the receiver.**

**Explanation:** The receiving Hardware Management Console is not in the correct state to automatically dial out using the attached modem.

**System Programmer Response:** Ensure the receiving Hardware Management Console is customized to use the auto-dial and RSF functions.

---

**08090051    Mode inconsistency: The requested function cannot be performed in the present state of the receiver.**

**Explanation:** Operations management control is not enabled.

**System Programmer Response:** Enable the system for automated operations and resend the request. Ensure that the Emergency Power Off switch is on.

---

**080A000A**    **Permission rejected: The receiver has denied an implicit or explicit request of the sender.**

**Explanation:** A STATLEV request was rejected because it was not compatible with the status reporting values set in the receiver.

**System Programmer Response:** Correct the STATLEV value and resend the request.

---

**080A000C**    **Permission rejected: The receiver has denied an implicit or explicit request of the sender.**

**Explanation:** A SETCLOCK request has failed because it required that a clock be set in a configuration where a dominant timing source has priority.

**System Programmer Response:** If the Sysplex Timer is the dominant timing source, then the SOURCE, TIME, UTCO, and OFFSET operands cannot be used in the command string. Remove these operands and resend the request.

---

**080C0005**    **Procedure not supported: A procedure specified is not supported in the receiver.**

**Explanation:** The command is not supported.

**System Programmer Response:** Resend the request using a supported command, if possible.

---

**080C0007**    **Procedure not supported: A procedure specified is not supported in the receiver.**

**Explanation:** A request for a function is supported by the receiver, but the resource identified in the request does not support that function. This function cannot be canceled.

**System Programmer Response:** None.

---

**080F0001**    **End-user not authorized: The requesting end-user does not have access to the requested resource.**

**Explanation:** Authorization checks have not been successfully passed.

**System Programmer Response:** Correct the command authorization-token and resend the request.

---

**08120000**    **Insufficient resource: The receiver cannot act on the request because of a temporary lack of resource.**

**Explanation:** System resources are temporarily busy.

**System Programmer Response:** Resend command if required.

---

---

**08120011**    **Insufficient resource: The receiver cannot act on the request because of a temporary lack of resource.**

**Explanation:** Insufficient storage is available to the target component to satisfy the request.

**System Programmer Response:** Resend command.

---

**08120012**    **Insufficient resource: The receiver cannot act on the request because of a temporary lack of resource.**

**Explanation:** A timed command was rejected because the OCF timed operations queue was full.

**System Programmer Response:** Cancel any unnecessary scheduled requests and resend the command.

---

**08150001**    **Function active: A request to activate an element or procedure was received, but the element or procedure was already active.**

**Explanation:** Unable to perform the command because the target CPC Subset or CPC Image is operational and the force operand has not indicated the override selection.

**System Programmer Response:** Put the system in the appropriate state and resend the command.

---

**081A0000**    **Request sequence error.**

**Explanation:** Unable to perform the command because the target partition is in the deactivated state.

**System Programmer Response:** Activate the logical partition, then resend the original request.

---

**081A0009**    **Request sequence error.**

**Explanation:** Unable to perform command because power is not on.

**System Programmer Response:** Send a POWERON or ACTIVATE command, then resend the original request.

---

**081A000A**    **Request sequence error.**

**Explanation:** Unable to perform command because power-on reset is not complete.

**System Programmer Response:** Send a POWERON or ACTIVATE command, then resend the original request.

---

**081A000B**    **Request sequence error.**

**Explanation:** Unable to perform command because the targeted CP is not in the stopped state.

**System Programmer Response:** Send a STOP command, then resend the original request.

---

---

**081A000E Request sequence error.**

**Explanation:** Unable to perform command because the interval timer is present only when the CPC Image is operating in S/370 mode.

**System Programmer Response:** None. The requested command cannot be performed when the system is power-on reset in either ESA/390 mode or LPAR mode.

---

**081A0010 Request sequence error.**

**Explanation:** The request is rejected or failed because the target resource is already in the state or condition that the request would have provided.

**System Programmer Response:** None. The requested command has already been performed.

---

**081C0005 Request not executable: The requested function cannot be executed because of a permanent error condition in the receiver.**

**Explanation:** A power-on request failed.

**System Programmer Response:** Verify power is available and resend the command.

---

**081C0006 Request not executable: The requested function cannot be executed because of a permanent error condition in the receiver.**

**Explanation:** A POR(YES) or POR(IML) failed. This may be accompanied by a hardware alert.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**081C0007 Request not executable: The requested function cannot be executed because of a permanent error condition in the receiver.**

**Explanation:** An operating system load request (for example, LOAD) failed.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**081C000A Request not executable: A POWEROFF request cannot be performed because of a permanent error condition in the receiver.**

**Explanation:** A power off request failed due to an unexpected power status.

**System Programmer Response:** Reset any abnormal power conditions at the receiver, such as tripped circuit

breakers, and retry the power off command. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**081C00BA Request not executable: The requested function cannot be executed because of a permanent error condition in the receiver.**

**Explanation:** The receiver has an error resulting from a licensed internal code problem that prevents execution of the request.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**081F0000 Request was canceled by an operator.**

**Explanation:** The operator has canceled the requested function.

**System Programmer Response:** Resend the command if required.

---

**082D0001 Busy.**

**Explanation:** Resources needed to process the request are being used.

**System Programmer Response:** Wait for the resources to be released, then resend the request.

---

**08380000 Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.**

**Explanation:** Unable to perform the command because the system is in an invalid state.

**System Programmer Response:** Put the system in a state that is compatible with the requested command and resend the request.

---

**08380017 Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.**

**Explanation:** Execution of the request referred to in a cancel command has proceeded too far to cancel.

**System Programmer Response:** None. The request you want to cancel is already being processed.

---

---

**08380018** Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.

**Explanation:** Cancellation of the request referred to in a cancel command cannot be done without disrupting CPC Subset resources.

**System Programmer Response:** None. The request failed during processing and cannot be completet.

---

**08380019** Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.

**Explanation:** The timing-window time specified in a command request has expired. The request will not be honored.

**System Programmer Response:** Resend the commabnd with a valid timing-window.

---

**0838001B** Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.

**Explanation:** Request will not be honored because it was submitted to a node at a time when a local operator or other application reserved control of the node.

**System Programmer Response:** Request the local operator to release control (log off), or retry later.

---

**08380037** Operating system is not receiving. The request is not executable because the operating system is not able to respond because it is in an inactive or quiesced state.

**Explanation:** Request will not be honored because it requires that the resource operating system is in an active state.

**System Programmer Response:**

---

---

**08380038** Request not executable because of resource or component state incompatibility: The request is not executable because it is not compatible with the state of a resource or component in the receiver.

**Explanation:** Request will not be honored because it requires that the resource not exist, but the resource already exists.

**System Programmer Response:** If the resource is a profile name, change the profile name in the command string and resend the request.

---

**084C0001** Permanent insufficient resource: Receiver cannot act on the request because resources required to honor the request are permanently unavailable. The sender should not retry immediately because the situation is not transient.

**Explanation:** Disk space is unavailable to complete the request.

**System Programmer Response:** Follow local procedures for reporting a processor complex problem.

---

**084F0000** Resource not available: A requested resource is not available to service the given request.

**Explanation:** A resource error exits which may indicate a configuration problem or insufficient resource to execute the command.

**System Programmer Response:** Check the accompanying SDATA codes, if any exist, to determine the specific resource error.

---

**085B0000** Unknown resource name: The identified resource, required to complete the requested command, is not known.

**Explanation:** The profile name specified in the AUTOACT operand of the RESET profile is not recognized by the receiving node.

**System Programmer Response:** Correct the profile name and resend the request.

---

**085B0003** Unknown resource name: The identified resource, required to complete the requested commands, is not known.

**Explanation:** The clock identifier specified in a SETCLOCK command is in error. Either the OCF is unknown to the receiver, or the TOD is invalid.

**System Programmer Response:** Correct the CLOCK parameter and resend the request.

---

---

**085B0004**    **Unknown resource name: The identified resource, required to complete the requested command, is not known.**

**Explanation:** The timing source name specified in a SETCLOCK command is unknown to the receiver.

**System Programmer Response:** Correct the SOURCE operand and resend the request.

---

**085B0005**    **Unknown resource name: The identified resource, required to complete the requested command, is not known.**

**Explanation:** The correlator referred to by a cancel command is unknown to the receiver, or represents a command already completed.

**System Programmer Response:** None. There is no pending request to cancel.

---

**085B0006**    **Unknown resource name: The identified resource, required to complete the request command, is not known.**

**Explanation:** The timing source name specified in a SETCLOCK command is the same as the clock name to be set.

**System Programmer Response:** Correct either the CLOCK or the SOURCE operand and resend the request.

---

**085C0000**    **System exception. The node experiences an exception condition within a resident system or subsystem that inhibits further processing by the component.**

**Explanation:** An internal error has occurred with the processing of this request. This may be accompanied by a hardware alert.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**085C0001**    **System exception: The node experiences an exception condition within a resident system or subsystem that inhibits further processing by the component.**

**Explanation:** The exception is identifiable as a system-related problem. This may be accompanied by a hardware alert.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

---

**085C0002**    **System exception: The node experiences an exception condition within a resident system or subsystem that inhibits further processing by the component.**

**Explanation:** If accompanied by an SDATA code, this condition code indicates that a complete activation failed. Activation was completed only through the power-on reset step. See the SDATA code for additional information.

If there is no SDATA code, the exception is identified as a permanent system-related problem. This may be accompanied by a hardware alert.

**System Programmer Response:** If the code is returned for an ACTIVATE request, to complete activation, send another ACTIVATE request to complete the initial program load.

For all other requests, retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**086B0B10**    **Sub-field value invalid.**

**Explanation:** An invalid XATIME operand was specified on the command request.

**System Programmer Response:** Correct the XATIME operand and resend the request.

---

**086B0B20**    **Sub-field value invalid.**

**Explanation:** An invalid XBTIME operand was specified on the command request.

**System Programmer Response:** Correct the XBTIME operand and resend the request.

---

**086B0B30**    **Sub-field value invalid.**

**Explanation:** An invalid INTERVAL operand was specified on the command request.

**System Programmer Response:** Correct the INTERVAL operand and resend the request.

---

**086B0B40**    **Sub-field value invalid.**

**Explanation:** An invalid COUNT operand was specified on the command request.

**System Programmer Response:** Correct the COUNT operand and resend the request.

---

**086B8110**    **Sub-field value invalid.**

**Explanation:** If returned for a CANCEL request, the OCF does not support the canceling of this CANCEL TCORR(hex-value) request.

For all other requests, this code indicates that an

invalid FORCE operand was specified on the command request.

**System Programmer Response:** None, if the code is returned for a CANCEL request; this function cannot be performed. For all other requests, correct the FORCE operand and resend the request.

---

**086B8115 Sub-field value invalid.**

**Explanation:** An invalid CLOCK operand was specified on a SETCLOCK command.

**System Programmer Response:** Correct the operand and resend the request.

---

**086B8120 Sub-field value invalid.**

**Explanation:** If returned on a SETCLOCK command, an invalid SOURCE operand was specified. If returned on an ACTIVATE command, an invalid CHANGE operand was specified.

**System Programmer Response:** Correct the operand and resend the request.

---

**086B8130 Sub-field value invalid.**

**Explanation:** If returned for a CANCEL request, the OCF does not support the canceling of this CANCEL DEFERRED request.

If returned for a SETCLOCK, this code indicates that an invalid TIME operand was specified on the request.

**System Programmer Response:** None, if the code is returned for a CANCEL request; this function cannot be performed. If the code is returned for a SETCLOCK request, correct the TIME operand and resend the request.

---

**086B8140 Sub-field value invalid.**

**Explanation:** An invalid UTCO operand was specified on a SETCLOCK request.

**System Programmer Response:** Correct the operand and resend the request.

---

**086B8150 Sub-field value invalid.**

**Explanation:** An invalid UTCO operand was specified on a SETCLOCK request.

**System Programmer Response:** Correct the operand and resend the request.

---

**086D8115 Required sub-field missing.**

**Explanation:** The CLOCK operand is missing on a SETCLOCK command.

**System Programmer Response:** Correct the operand and resend the request.

---

**08A80001 Multiple-domain support routing exception: the MDS router in the reporting NAU is unable to perform the required routing for an MDS MU.**

**Explanation:** Origin or destination NAU name unknown. For NetView, either the origin or the destination Net ID in the MDS header is invalid.

**System Programmer Response:** Ensure the node is available and correct the configuration definition.

---

**08A80002 Multiple-domain support routing exception: The MDS router in the reporting NAU is unable to perform the required routing for an MDS MU. MS application name not recognized.**

**Explanation:** The NAU directory services are unavailable.

**System Programmer Response:** Retry the operation after the directory service problem has been corrected.

---

**08A80003 Multiple-domain support routing exception: the MDS router in the reporting NAU is unable to perform the required routing for an MDS MU. MS application name not recognized.**

**Explanation:** For applications using the NetView LU 6.2 transport, this sense code indicates that one of the MS applications named in the request is not registered with NetView.

**System Programmer Response:** Ensure the node is available and retry the operation.

---

**08A80009 Multiple Domain Support (MDS) routing exception: The MDS router in the reporting NAU is unable to perform the required routing for a MDS MU.**

**Explanation:** Destination not supported by the reported network node (NN). The NN has received an MDS MU from another node that cannot be routed.

**System Programmer Response:** Ensure the configuration is correct and the node is available, then retry the operation.

---

**08A8000A Multiple-domain support routing exception: The MDS router in the reporting NAU is unable to perform the required routing for an MDS MU. Unrecoverable session failure. Unrecoverable TP failure in remote node.**

**Explanation:** The MDS\_Send TP in the reporting node was unable to send the message because of an allocation error. Retries have been exhausted.



**System Programmer Response:** Resend the operation after the network node becomes available.

---

**08A8000B** Multiple-domain support routing exception: the MDS router in the reporting NAU is unable to perform the required routing for an MDS MU. The network had a failure during an operation request transmission; Unrecoverable TP failure.

**Explanation:** The MDS\_Send TP in the reporting node was unable to send the message because of a TP failure in a remote node. Retries have been exhausted.

**System Programmer Response:** After the network problem has been corrected, retry the operation request.

---

**08A8000F** Multiple-domain support routing exception: the MDS router in the reporting NAU is unable to perform the required routing for an MDS MU; MS application congestion.

**Explanation:** The MDS router in the destination NAU is unable to communicate with the destination MS application because of local congestion (implementation buffer space for queuing additional MDS MU(s) has been exhausted).

**System Programmer Response:** Resend the operation request after the congestion has cleared.

---

**08A80013** Multiple-domain support routing exception: the MDS router in the reporting NAU is unable to perform the required routing for an MDS MU; Session outage involving an MDS LU 6.2 session has occurred. For NetView, further sense data is contained within the supplemental report subfield in the SNA condition report containing this sense code.

**Explanation:** The last session to the indicated destination has been deactivated. For NetView, further sense data is contained within the supplemental report subfield in the SNA condition report containing this sense code.

**System Programmer Response:** Retry the operation after the destination session is reinstated.

---

**08A90001** Multiple-domain support transaction failure: The reporting MDS router or MS application has detected a condition that has impacted an outstanding unit of work (identified by the unit-of-work correlator of the MDS error message) or MDS MU.

**Explanation:** The failure was caused by an outage of a CPSVCMG session.

**System Programmer Response:** Ensure the node is available and retry the operation.

---

**08A90003** Multiple-domain support transaction failure: The reporting MDS router or MS application has detected a condition that has impacted an outstanding unit of work (identified by the unit-of-work correlator of the MDS error message) or MDS MU; Unit of work canceled by reporting MS application program.

**Explanation:** The unit of work has been canceled because of a timeout in the reporting MS application program. For applications using the NetView LU 6.2 transport, the timeout value is determined by the SECONDS parameter on the transport send service, of the RCVREPLY value set by the DEFAULTS command.

**System Programmer Response:** Retry the operation.

---

**08A90004** Multiple-domain support transaction failure: The reporting MDS router or MS application has detected a condition that has impacted an outstanding unit of work (identified by the unit-of-work correlator of the MDS error message) or MDS MU; Unit of work canceled by reporting MDS router.

**Explanation:** The unit of work has been canceled by a garbage-collection time-out in the reporting MDS router. For applications using the NetView LU 6.2 transport, this sense code is returned if the timeout value for a request matches that set by MAXREPLY on the DEFAULTS command.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**08B20000** A timeout occurred trying to issue the command. The data transmission between the application in the processor and the support element was not completed, the command acceptance report was not received before the timeout condition occurred.

**Explanation:** A timeout has occurred while waiting for transmission of data between two applications.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**08B20002 Data transmission failure: The data transmission between an application in the support element and an application in the processor was incomplete causing abnormal termination of the function.**

**Explanation:** A timeout has occurred while waiting for transmission of data between two applications.

**System Programmer Response:** Retry the operation. If the problem persists, follow local procedures for reporting a processor complex problem.

---

**1003000D Function not supported.**

**Explanation:** The function identified in the request is not supported.

**System Programmer Response:** Correct the command string and resend the request.

---

**100B0001 Required structure absent.**

**Explanation:** An operand required by the command was not found in the command string.

**System Programmer Response:** Enter the required operand and resend the request.

---

**100B0002 Precluded structure present.**

**Explanation:** The operand indicated in SDATA is not allowed by the command or by other operands.

**System Programmer Response:** Remove the precluded operand or correct the command and resend the request.

---

**100B0003 Multiple occurrences of a non-repeatable structure.**

**Explanation:** A value that cannot be repeated was detected in the command string.

**System Programmer Response:** Change the duplicate value(s) to unique value(s) and resend the request.

---

**100B0004 Excess occurrences of a repeatable structure.**

**Explanation:** A value that can be repeated has exceeded the maximum number of occurrences permitted in the command string.

**System Programmer Response:** Reduce the number of occurrences of the value in error to an acceptable number and resend the request.

---

**100B0006 Length outside specified range.**

**Explanation:** The length of the operand indicated in SDATA is outside the allowable range.

**System Programmer Response:** Correct the operand data-value and resend the request.

---

**100B0007 Length exception; length arithmetic is out of balance.**

**Explanation:** The length of the operand value for the operand indicated in SDATA is not consistent with the allowable values.

**System Programmer Response:** Correct the operand data-value and resend the request.

---

**100B000A Required combination of structures and data values absent.**

**Explanation:** One command operand or data-value that is present in the command string requires another operand or data-value that is absent.

**System Programmer Response:** Correct the operand or data-value and resend the request.

---

**100B000B Precluded combination of structures and data values present.**

**Explanation:** One command operand or data-value is in conflict with one or more other operands or data-values.

**System Programmer Response:** Remove the precluded operand(s) or correct the command and resend the request. Also check the activation profile(s) used for activation, as the error may be the result of incorrect profile data.

---

**100B000C Unknown or unsupported data-value.**

**Explanation:** The data value in the operand indicated by SDATA is either unknown or unsupported.

**System Programmer Response:** Correct the operand data-value and resend the request.

---

**100B000D Incompatible data-values.**

**Explanation:** The data value in the operand indicated by SDATA is not compatible with this or other values.

**System Programmer Response:** Correct the conflicting operand data-value and resend the request.

---

**100B000E Precluded character present.**

**Explanation:** The data value in the operand indicated by SDATA contains a character that is not allowed for the indicated operand.

**System Programmer Response:** Correct the operand

data-value and resend the request.

---

**100B000F Data-value out of range.**

**Explanation:** The data value in the operand indicated by SDATA is not within the range allowed for the indicated operand.

**System Programmer Response:** Correct the operand data-value and resend the request.

---

**100B0011 Precluded data-value.**

**Explanation:** The data value in the operand indicated by SDATA is not allowed by this or other operands.

**System Programmer Response:** Replace the precluded operand data-value and resend the request.

---

**100B0012 Recognized but unsupported structure.**

**Explanation:** The operand indicated by SDATA is recognized but not supported by the target support element.

**System Programmer Response:** Remove the

unsupported operand and resend the request.

---

**80180002 Resource unknown**

**Explanation:** The secondary OCF specified in the OCFNAME operand is not recognized, or an invalid command was issued to the OCF. For scheduled operations, this may indicate that the logical partition existed when the command was validated and placed on the timed operations queue, but was no longer valid when the timing-window for processing arrived.

**System Programmer Response:** Ensure the system is power-on reset in LPAR mode and the secondary-name in the OCFNAME operand matches a logical partition name in the active IOCDs, or specify the correct OCFNAME in the command.

---

**80180003 Resource unknown.**

**Explanation:** Unrecognized Destination Application Name in the DAN operand of RUNCMD.

**System Programmer Response:** Correct the operand data-value and resend the request.

---

## Hardware Object Status Summary

Table 7 lists the status values for CPC and image objects provided by the z900 API. The status description was taken from the HMC online help because the API documentation does not provide this information. Note that the z900 SNMP API provides only a subset of the object states provided by the HMC.

*Table 7. Status values for CPC and image objects provided by the z900 API*

|               |      |   |
|---------------|------|---|
| OPERATING     | 0001 | <b>Image:</b> All of the image's processors are operating.<br><b>CPC:</b> All of the CPC's processors are operating.  |
| NO POWER      | 0002 | <b>CPC:</b> CPC power is off.   |
| NOT OPERATING | 0004 | <b>Image:</b> None of the image's processors are operating, but the exact status of the processors vary.<br><b>CPC:</b> <u>If a power-on reset has not been performed:</u> The CPC's processors cannot operate until a power-on reset of the CPC is performed. <u>If a power-on reset was performed:</u> None of the CPC's processors are operating, but the exact status of the processors vary. |
| NOT ACTIVATED | 0008 | <b>Image:</b> The image is defined in the CPC's current input/output (I/O) configuration, but is not activated.   |
| EXCEPTIONS    | 0010 | <b>Image:</b> At least one of the image's processors is operating, and at least one processor is not operating, but the exact status of the processors vary.<br><b>CPC:</b> At least one of the CPC's processors is operating, and at least one processor is not operating, but the exact status of the processors vary.  |

Table 7. Status values for CPC and image objects provided by the z900 API (continued)

|                  |      |  |
|------------------|------|--|
| STATUS CHECK     | 0020 | <p><b>Image:</b> The CPC is not communicating with the support element. The status of the image and its CPs cannot be determined.</p> <p><b>CPC:</b> The CPC is not communicating with the support element.</p>  |
| POWERSAVE        | 0040 | <p><b>CPC:</b> Utility power for the CPC failed, and one or more of its active control programs put the CPC in a power save state. The CPC is using only enough power from its alternate, temporary power source to preserve data for the control programs that put it in the power save state.</p> <p><b>Image:</b> The image cannot operate until power for the CPC is restored.</p> |
| LINK NOT ACTIVE  | 0080 | <p><b>CPC:</b> The CPC's support element is not communicating with this HMC. The status of the CPC cannot be determined.</p>   |
| SERVICE          | 0100 | <p><b>CPC:</b> A console operator enabled service status for the CPC (ordinarily done at the request of a service representative to allow providing service for the CPC).</p>  |
| SERIOUSALERT     | 0200 |  |
| ALERT            | 0400 |  |
| ENVALERT         | 0800 |  |
| SERVICE REQUIRED | 1000 | <p>The next disruption will result in the CPC operating in degraded capacity, or it will fail to operate.</p>  |

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# Readers' Comments — We'd Like to Hear from You

System Automation for OS/390  
Enhancements for Parallel Sysplex Automation  
Version 2 Release 1

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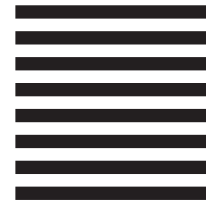
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