z/OS

IBM

Hardware Configuration Definition User's Guide

Version 1 Release 10

SC33-7988-07

z/OS

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Version 1 Release 10

SC33-7988-07

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 525.

This edition applies to Version 1 Release 10 of z/OS (5694-A01) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this document

This document explains how to use Hardware Configuration Definition (HCD) to accomplish the following:
- Define new hardware configurations
- Modify existing hardware configurations
- View existing hardware configurations
- Activate configurations
- Query supported hardware
- Maintain IODFs
- Compare two IODFs
- Compare an IODF with an actual configuration
- Print reports of configurations
- Create graphical reports of a configuration
- Migrate existing configuration data

Note

Unless otherwise noted, the term ″MVS″ as used in this document refers collectively to the older MVS operating system as well as to its successors OS/390 and z/OS, in which MVS is one of the basic components. For purposes of this document, ″MVS″ used alone and without reference to a specific release is to be understood as the generic operating system type supported by HCD.

Who this document is for

This document is for the person who is responsible for defining the hardware configuration for a z/OS system. It is assumed that:
- The person has a basic knowledge of z/OS, and hardware configuration.
- Configuration planning has been completed *before* HCD is used to enter definition data. For information on configuration planning, refer to *z/OS HCD Planning*.

For the person responsible for problem determination, this document also explains what to do if a problem arises with HCD.

This information is for system programmers and system operators.

How to use this document

Before you start to use HCD, you should read
- Chapter 1, "Hardware configuration definition - What is it?," on page 1 and
- Chapter 5, "How to use the dialog," on page 59.

These topics provide information about the general concepts and facilities of HCD.

When you want to use HCD to define a new configuration, you should read
- Chapter 5, "How to use the dialog," on page 59,
- Chapter 6, "How to define, modify, or view a configuration," on page 77, and
- Chapter 7, "How to work with switches," on page 169.

Chapter 5 explains how to use the HCD panels, get online help information, enter data and select items such as tasks, objects and actions. Chapter 6 and Chapter 7 explain how to define operating system (OS) configurations, processors, control units, I/O devices, and switches.

How this document is organized

Chapter 1, "Hardware configuration definition - What is it?," on page 1 explains how HCD fits into the context of hardware configurations and systems management. It also explains the environment in which HCD is used.

Chapter 2, "Migration," on page 13 discusses how to move from a previous HCD release to HCD under z/OS. It also refers to other sections in this document dealing with migration and conversion tasks.

Chapter 3, "How to setup, customize and start HCD," on page 21 provides information on how to install, customize, and start HCD, and how to set up an HCD installation for the first time in z/OS.

Chapter 4, "How to work with I/O definition files (IODF)," on page 35 explains how to work with I/O definition files (IODFs), for example, creating, changing, viewing, and deleting them. It also explains how to use configuration packages to create subset IODFs for distribution.

Chapter 5, "How to use the dialog," on page 59 explains the general facilities of the HCD dialog, that is panels, online help, navigation, making selections, and entering data.

Chapter 6, "How to define, modify, or view a configuration," on page 77 explains the navigation through the HCD dialog and how to define, change, copy, delete, and view operating system configurations, processors, control units, and devices. It also explains how to prime processor, control unit, and device data.

Chapter 7, "How to work with switches," on page 169 includes basic information about switches and explains how to define, change, prime, and delete switches, how to define and prime switch connections (ports), and how to work with switch configurations. It also describes how to migrate, activate, and save switch configuration data.

Chapter 8, "How to activate or process configuration data," on page 195 explains how to make a configuration available for use by the system. It further explains how to compare a configuration defined in an IODF with the configuration sensed on the system. It includes information on activating a configuration dynamically, activating a configuration sysplex-wide, and on remote IOCDS management functions.

Chapter 9, "How to print and compare configuration data," on page 235 explains how to build textual and graphical reports about channel subsystem, switch, and operating system configuration, I/O paths, and CTC definitions and how to compare IODFs. It also explains how to print the data that is currently displayed on a list panel.

Chapter 10, "How to query supported hardware and installed UIMs," on page 253 explains how to use HCD to view system data.

Chapter 11, “How to migrate existing input data sets,” on page 261 contains information for migrating existing IOCP/MVSCP/HCPRIO definitions and explains the steps in the migration process.

Chapter 12, “How to invoke HCD batch utility functions,” on page 307 describes the HCD programming interface.

Chapter 13, “Security and other considerations,” on page 339 provides information on various HCD related topics.

Chapter 14, “How to provide LDAP support for HCD,” on page 347 explains the provision for retrieving and updating IODF data via LDAP protocol.

“Appendix A. How to navigate through the dialog” on page 371 illustrates the flow from the HCD main panel options and the various actions that can be taken from each option.

“Appendix B. Configuration reports” on page 377 contains examples of the various reports that can be printed by using HCD.

“Appendix C. Problem determination for HCD” on page 447 explains what to do if problems occur with HCD.

“Appendix D. HCD object management services” on page 475 explains how to use the HCD application programming interface to retrieve configuration data, such as switch data, device type, or control unit type, from the IODF.

“Appendix E. Scenarios” on page 483 contains scenarios which cover the main definition tasks required to produce the IODF illustrated in the diagram at the beginning of the appendix.

“Appendix F. IODF data model” on page 505 describes the IODF data model in terms of object classes and attribute definitions as used by the HCD LDAP Backend.

Related information

Please see the *z/OS Information Roadmap*, SA22-7500 for an overview of the documentation associated with z/OS.

How to read syntax diagrams

This section describes how to read syntax diagrams. It defines syntax diagram symbols, items that may be contained within the diagrams (keywords, variables, delimiters, operators, fragment references, operands) and provides syntax examples that contain these items.

Syntax diagrams pictorially display the order and parts (options and arguments) that comprise a command statement. They are read from left to right and from top to bottom, following the main path of the horizontal line.

Symbols

The following symbols may be displayed in syntax diagrams:

Symbol **Definition**

►►───	Indicates the beginning of the syntax diagram.
───►	Indicates that the syntax diagram is continued to the next line.
►───	Indicates that the syntax is continued from the previous line.
───►◄	Indicates the end of the syntax diagram.

Syntax items

Syntax diagrams contain many different items. Syntax items include:

- Keywords - a command name or any other literal information.
- Variables - variables are italicized, appear in lowercase, and represent the name of values you can supply.
- Delimiters - delimiters indicate the start or end of keywords, variables, or operators. For example, a left parenthesis is a delimiter.
- Operators - operators include add (+), subtract (-), multiply (*), divide (/), equal (=), and other mathematical operations that may need to be performed.
- Fragment references - a part of a syntax diagram, separated from the diagram to show greater detail.
- Separators - a separator separates keywords, variables or operators. For example, a comma (,) is a separator.

Note: If a syntax diagram shows a character that is not alphanumeric (for example, parentheses, periods, commas, equal signs, a blank space), enter the character as part of the syntax.

Keywords, variables, and operators may be displayed as required, optional, or default. Fragments, separators, and delimiters may be displayed as required or optional.

Item type	**Definition**
Required	Required items are displayed on the main path of the horizontal line.
Optional	Optional items are displayed below the main path of the horizontal line.
Default	Default items are displayed above the main path of the horizontal line.

Syntax examples

The following table provides syntax examples.

Table 1. Syntax examples

Item	Syntax example
Required item. Required items appear on the main path of the horizontal line. You must specify these items.	`►►──KEYWORD──required_item──────────────────►◄`
Required choice. A required choice (two or more items) appears in a vertical stack on the main path of the horizontal line. You must choose one of the items in the stack.	`►►──KEYWORD──┬─required_choice1─┬──────────►◄` `             └─required_choice2─┘`

Table 1. Syntax examples (continued)

<table>
<tr><th>Item</th><th>Syntax example</th></tr>
<tr><td>Optional item.

Optional items appear below the main path of the horizontal line.</td><td><pre>
►►──KEYWORD──┬───────────────┬──────────────────────────►◄
             └─optional_item─┘
</pre></td></tr>
<tr><td>Optional choice.

An optional choice (two or more items) appears in a vertical stack below the main path of the horizontal line. You may choose one of the items in the stack.</td><td><pre>
►►──KEYWORD──┬──────────────────┬───────────────────────►◄
             ├─optional_choice1─┤
             └─optional_choice2─┘
</pre></td></tr>
<tr><td>Default.

Default items appear above the main path of the horizontal line. The remaining items (required or optional) appear on (required) or below (optional) the main path of the horizontal line. The following example displays a default with optional items.</td><td><pre>
             ┌─default_choice1──┐
►►──KEYWORD──┼──────────────────┼───────────────────────►◄
             ├─optional_choice2─┤
             └─optional_choice3─┘
</pre></td></tr>
<tr><td>Variable.

Variables appear in lowercase italics. They represent names or values.</td><td><pre>
►►──KEYWORD──variable──────────────────────────────────────►◄
</pre></td></tr>
<tr><td>Repeatable item.

An arrow returning to the left above the main path of the horizontal line indicates an item that can be repeated.

A character within the arrow means you must separate repeated items with that character.

An arrow returning to the left above a group of repeatable items indicates that one of the items can be selected, or a single item can be repeated.</td><td><pre>
             ┌────────────────┐
             ▼   │
►►──KEYWORD────repeatable_item┴─────────────────────────►◄

             ┌─,──────────────┐
             ▼   │
►►──KEYWORD────repeatable_item┴─────────────────────────►◄
</pre></td></tr>
<tr><td>Fragment.

The fragment symbol indicates that a labelled group is described below the main syntax diagram. Syntax is occasionally broken into fragments if the inclusion of the fragment would overly complicate the main syntax diagram.</td><td><pre>
►►──KEYWORD──┤ fragment ├───────────────────────────────►◄
</pre>
fragment:
<pre>
├──┬─,required_choice1───────────────────┬──────────────┤
   │   ┌─,default_choice──┐│
   └─,required_choice2─┼─────────────────┼┘
                      └─,optional_choice─┘
</pre></td></tr>
</table>

Summary of changes

This document contains terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

What is new in HCD for z/OS V1R10

Summary of changes for SC33–7988–07 issued September 2008

Here is a summary of updates that have been introduced to HCD for z/OS® V1R10.

Note: To see a description of new functionality of the current release, select option **9. What's new in this release** from the ***HCD Primary Task Selection Panel***. Here you may find information about SPEs that are delivered after the completion of this document.

Multi-user access

When creating an IODF, you can specify a multi-user access option, so that multiple users can simultaneously update this IODF. The IODF is kept in exclusive update mode only for the duration of a single transaction. If the updates of the transaction are committed, another user may update the IODF without requiring the first user to release it.

Users can switch between single-user and multi-user access using a new option in the ***Change I/O Definition File Attributes*** dialog.

Changed HCD LDAP support

The HCD LDAP Backend now works as a plug-in to the IBM Tivoli Directory Server for z/OS. Support of the *z/OS Integrated Security Services LDAP Server* has been discontinued.

CUADD value is shown on the Control Unit List

A new column **CUADD** is introduced on the ***Control Unit List*** to display the defined logical address for a control unit, where available.

Changes to the 'Switch IOCDS' request

Whenever an HCD Switch IOCDS request is performed, an informational message (CBDG323I) will be written from the HCD session to the console.

Enhanced spanning of channel paths

Up to z/OS V1R9 HCD, connected control units and devices were not defined for the new CSS when spanning a channel path to a new CSS. Users had to do this explicitly by invoking an action from the ***Control Unit List***.

Starting with this release, when spanning a channel path with connected control unit(s) (and devices) to a new CSS, HCD invokes a dialog asking whether the control units should also be reachable from the new CSS.

New profile option

There is one new keyword that you can specify in the HCD profile for the following purpose:

- ***Delay device regrouping:*** You can specify that HCD should perform any necessary device regrouping after a device group split only when the IODF is closed. This gives a better response time in the HCD dialog for large IODFs, because HCD per default performs a necessary device regrouping each time when exiting the I/O Device List.

Functions available as SPE since z/OS V1R9

The following functions have been available as SPEs since z/OS V1R9, but are now described in detail in this edition for the first time.

Hardware support

HCD supports the IBM z10™ EC processor family (processor types 2097-E12, -E26, -E40, -E56, -E64).

Selecting a 2097-type processor creates a maximum logical processor configuration. That is, HCD generates a processor configuration with four channel subsystems and 15 reserved partitions in each channel subsystem. Also, HCD generates two subchannel sets in each of the four channel subsystems and provides for the maximum number of devices in each subchannel set.

New channel path type for coupling over InfiniBand

The use of InfiniBand technology is supported by a new channel path type CIB to emulate coupling connections on the Host Communication Adapter (HCA). Support is provided on type 2094, 2096 and 2097 processors to define coupling links and STP links between CPCs.

History of changes

What is new in HCD for z/OS V1R9

Summary of changes for SC33–7988–06 issued September 2007

Here is a summary of updates that have been introduced to HCD for z/OS V1R9.

New and enhanced profile options

There are several new keywords that you can specify in the HCD profile for the following purposes:

- ***Allow or prohibit mixed esoterics:*** In previous releases, HCD allowed a mix of DASD and TAPE devices under the same esoteric name. Though HCD continued to build the production IODF, it issued warning message CBDA332I. Starting with this release, using the new profile keyword `MIXED_ESOTERIC`, users can decide whether HCD should prohibit mixed esoterics by issuing CBDA332I as error message rather than a warning and thus stop building the production IODF.
- ***Select a HLQ for exporting IODFs:*** When exporting an IODF, the generated data set is normally written with the high-level qualifier of the user ID that issued the Export IODF function. To allow the specification of a different HLQ, you can use the keyword EXPORTED_HLQ in the HCD profile. The HLQ (up to 8 characters) specified with this keyword is used for the exported IODF data set name rather than the user ID.

This function is available as SPE and needs to be installed as APAR OA18724 starting with z/OS 1.4.

- ***Import IODF in data space:*** The setting of keyword IODF_DATA_SPACE is now also applied to the ***Import I/O definition file*** function. To avoid size restrictions imposed on large imported IODFs by address space limitations, the specification of IODF_DATA_SPACE=YES (which is the default) causes HCD to import the IODFs into a data space instead of importing them into an address space.

  This function is available as SPE and needs to be installed as APAR OA16701 starting with z/OS 1.4.

- ***Extend MCF data set to provide space for updates:*** The setting of keyword MCF_EXTENSION allows users to specify the percentage of additional space that is to be allocated when defining an MCF data set. Per default an MCF data set is allocated with 30 percent additional space than actually needed to hold the MCF data, thereby providing relief for updates that consume data space.
- ***Select a volume for the HCM master configuration file:*** Keyword `MCF_VOL` lets you specify a volume serial number where to store the HCM master configuration file (MCF) if you want to exploit HCM's MCF concept.

  For information on the MCF concept, refer to the *z/OS and z/VM HCM User's Guide* .

- ***Overwriting the default allocation for data sets allocated due to HCM requests:*** The new HCD profile option `ALLOC_SPACE` allows users to overwrite the default allocation for host data sets that are temporarily allocated due to HCM requests, for example, HCDASMP, HCDRPT, HCDIN.

  This function is available as SPE and needs to be installed as APAR OA19771 for z/OS 1.7 and 1.8.

Checking for multiple extents of production IODFs

A z/OS IPL using a production IODF with multiple extents results in a wait state. Starting with this release, HCD issues warning message CBDA009I, if dynamic activation encounters an IODF with multiple extents.

This function is available as SPE and needs to be installed as APAR OA17546 starting with z/OS 1.4.

Filter for occupied ports

On the **Port List** for switches, you can now filter for occupied ports.

Show/Hide setting in the I/O Device List

The Show/Hide setting of parameters or features in an **I/O Device List** is now saved across HCD sessions.

Enhancements for transmitting configuration packages

When defining a configuration package, the target user ID and node ID as well as the status of the receiving operating system (attended or unattended) are remembered in the IODF as part of the package definition. In earlier releases, you could not change the target during package submission.

Starting with this release, the ***Transmit Configuration Package*** dialog allows you to overwrite the target user ID, target node ID and transmission mode (attended or unattended).

Removed support

Support for processor types 9021 and 9121 has been removed.

If you access processor support modules for these processor types, you get message CBDA046I during HCD initialization.

Functions available as SPE since z/OS V1R7

The following functions have been available as SPEs for z/OS 1.7, but are now described in detail in this edition for the first time.

Hardware support: HCD supports new IBM System z9® Business Class, type 2096-R07 and 2096-S07 processors.

Server Time Protocol (STP) link support: HCD supports Server Time Protocol (STP) links between two zSeries (z890, z990, or higher) processors. In the ***Connect to CF Channel Path*** dialog, users can select two CHPIDs capable for coupling facilities, and then specify the ***Timing-only link*** option to create an STP link.

Automatic activity log generation: You can enable automatic logging of change activities on IODFs. For this purpose, use the new HCD profile entry `CHANGE_LOG = YES`, and request activity logging when creating the IODF. You can edit the generated log entries before you exit the IODF.

With the new profile options `CHLOG_VOL` and `ACTLOG_VOL`, in non SMS-managed environments, you can specify the volume serial numbers where to allocate a new change log or activity log.

Enhancements of HCD configuration reports: The following configuration reports have been enhanced:

- The ***Processor Summary Report*** displays the support level of the listed processors.
- The ***IOCDS Report*** includes more information, which previously was only available from the ***IOCDS List*** in the HCD dialog. New columns indicate whether the IOCDS token matches the current HSA token as well as the processor token in the IODF, whether it is write-protected and what is its status.
- The ***CF Channel Path Connectivity Report*** now includes a new column showing the type of the connecting control unit.

What is new in HCD for z/OS V1R7

This section summarizes the updates that have been introduced to HCD for z/OS V1R7.

Hardware support

HCD supports @server zSeries IBM System z9 Enterprise Class (z9® EC) processors (type 2094) with multiple subchannel sets.

Support of multiple subchannel sets

Starting with z9 EC processors, users can define an additional subchannel set with ID 1 (SS 1) on top of the existing subchannel set (SS 0) in a channel subsystem. With this additional subchannel set, you can configure more than 2*63K devices for a channel subsystem. With z/OS V1R7, you can define Parallel Access Volume (PAV) alias devices (device types 3380A, 3390A) of the 2105, 2107 and 1750 DASD control units to SS 1.

Support of OSA NCP channel path type

A new channel path type OSN (OSA NCP) is introduced which provides support for OS logical partitions that need to communicate with an external network using SNA protocols. This functionality was earlier provided by the 374x control units, which have been withdrawn from market. The NCP function is now being emulated in Linux via the Communication Controller for Linux (CCL) on zSeries.

Supporting more than 160 TCP/IP stacks for OSD channels

You can now decide to have more than 160 TCP/IP stacks supported with OSD channels. This is done by disabling priority queuing for these channels. If priority queuing is disabled, the channel can support four times as many queues (4 * 480 = 1920 subchannels) corresponding to four times as many TCP/IP stacks (4 * 160 = 640) as with enabled queue prioritization.

When defining or changing channel paths of type OSD for XMP processors, HCD prompts you with a dialog where you can decide whether you require more than 160 TCP/IP stacks for the channel in question.

Also, you can now connect more than one control unit to an OSD channel.

IODF size reduction

Due to the fact of increasing device definitions in the IODF, the IODF size limit of 2 GB is about to be approached. In addition, large IODFs involve a series of disadvantages. Therefore, z/OS V1.7 HCD starts using the new V5 IODF format, representing devices in device groups rather than containing individual device definitions. This significantly reduces the size of IODFs and improves the processing performance of large configurations.

How HCD maintains device groups within an IODF when you apply changes to single devices of a group is described in “How HCD arranges devices into groups in an IODF” on page 41.

Working with device groups

The HCD dialog reflects the new IODF structure in the I/O Device List (see “Defining device data” on page 138). The initial I/O Device List shows the device groups and lets you perform actions on the device groups as well as navigate to the single devices.

Enhanced CHPID aggregate function

The CHPID aggregate function now allows you to aggregate just a subset of control units from a source to a target CHPID. Also, the target CHPID may be connected to a different dynamic switch than the source CHPID.

Miscellaneous enhancements

Local download of an IOCDS: An IOCDS download can now be performed locally even if a SNA address has been defined to the processor.

Definition of FICON loopback port configuration: For a FICON switch matrix, HCD now allows you to define a dynamic port connection from a FICON port to itself (loopback connection).

Enhanced CTC Connection List and Report: The **CTC Connection List/Report** now also displays point-to-point CTC connections.

Enhanced View IODF panel: Besides the IODF version, the **View IODF** panel now shows the percentage of the used space that is actually utilized.

Enhanced Available IODFs panel: The **Available IODFs** panel, invoked by prompting for IODFs on the HCD Primary Task Selection Panel, provides sort keys which you can use to sort the IODF list by IODF name, allocated size or creation date.

Improved PFSHOW handling: The PFSHOW command setting within HCD is retained across HCD sessions. In addition, the PFSHOW setting that is active before the invocation of HCD is saved and reset upon exit of HCD.

Automatic IODF check: There is a new profile option, CHECK_IODF, which you can specify to perform an automatic check for consistent IODF data when the currently allocated IODF is switched or the HCD dialog is terminated.

Counting rows of filtered lists: On panels that provide the ***Filter*** action bar choice, you can now use a new pull down choice ***Count rows on (filtered) lists*** to receive a message that displays the number of rows matching the current filter criteria.

Prompt for unused device numbers: On the **Add Device** panel, you can use a prompt (PF4) to retrieve unused device numbers and ranges in the current IODF. You can select a free device number and range from the displayed list for the definition of new devices.

CSS / OS Device Compare Report enhancement: The CSS / OS Device Compare report now provides an indication for devices that relate to the limiting LPAR via CHPIDs, but which are excluded from this LPAR with an explicit device candidate list and which therefore are not accessible from the current CSS.

What is new in HCD for z/OS V1R5

This section summarizes the updates that have been introduced to HCD for z/OS V1R5. To obtain this new functionality, you need to install PTF UA90070 for HCD if not mentioned otherwise.

You must also upgrade the support level of existing 2084 processor definitions.

Hardware support

HCD supports IBM @server zSeries 990 processors (type 2084 with the appropriate support level) or zSeries 890 processors (type 2086) in the following way:

- a maximum of 30 logical partitions per CPC
- a maximum of 4 channel subsystems (2084 processors only)
- a maximum of 2 channel subsystems (2086 processors only)
- spanned physical channel paths
- dynamic partitions

Note: On the **Available Support Levels** panel you can retrieve an explanation of the processor support level for zSeries processors: Position the cursor on the processor support level description and press PF1 to get an enumeration of functions provided by this support level.

Support of OSA Integrated Console Controller

A new channel path type OSC (OSA Integrated Console Controller) is introduced which provides 2074 control unit functions in an OSA Express2 channel.

Support of dynamic partitions

For IBM @server zSeries 990 and zSeries 890 processors with the appropriate hardware and software support levels, HCD provides the capability to add or remove LPARs via dynamic I/O configuration after a POR. You can define partitions with a placeholder ('*') in the IODF and change the '*' to a partition name later or vice versa. The '*' indicates that you plan to add a partition or to remove an existing partition dynamically by activating the configuration at a later point in time.

Support of spanned physical channels

On XMP processors, besides the internal channels ICP and IQD, the following physical channels may be spanned:

- CF peer and sender channels:
  - CBP, CFP, CBS, CFS
- OSA channels:
  - OSC, OSD, OSE
- FICON channels:
  - FC, FCP

Spanned channels have the same CHPID and PCHID values defined in all channel subsystems.

Support for multiple control units on OSD channels

Up to 16 control units may be defined on an OSD channel path, provided that each has a unique CU logical address (CUADD value). This will allow a single partition to use all 480 supported valid subchannels.

Support of null device candidate lists for XMP processors

If devices are connected to a control unit which is shared between multiple channel subsystems, some (not all) of these devices may specify a null device candidate list for one or more CSSs.

Over-defining channel paths on an XMP processor

For an XMP processor, you can define a channel path that is not physically installed on the machine. This may be useful if you want to migrate from a machine which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards. Such over-defined channel paths are excluded from the IOCDS and from dynamic activations. For more information, refer to "Over-defining channel paths on an XMP processor" on page 118.

Automatic change of CTC connections during Copy action

When copying channel subsystems or partitions within the same IODF, valid CTC connections in the source are not automatically copied and changed in the target configuration. To facilitate these changes, you get a list of affected CTC connections from which you can select those that should be updated. For the selected CTC connections, HCD performs the corresponding updates and copies them to the target configuration. For more information, refer to "Copying/repeating channel subsystems with CTC connections" on page 103.

What is new in HCD for z/OS V1R4

This section summarizes the updates that have been introduced to HCD in z/OS V1R4.

- "Support of physical channel identifiers"
- "Miscellaneous enhancements"
- "Hardware support" on page xxvii

Support of multiple logical channel subsystems (LCSS)

A note on terminolog:

Throughout this document, the following terms are used:

XMP processor and SMP processor
The term **XMP processor** designates processors that support multiple logical channel subsystems. It is used in contrast to the term **SMP processor**, which designates processors of previous generations that support only one channel subsystem.

More than 256 channel paths are supported on an XMP machine. This is achieved by allowing the definition of multiple logical channel subsystems (LCSS).

The HCD dialog is enhanced in a way that for XMP processors the definition of multiple logical channel subsystems is supported. A new object called ***channel subsystem*** is introduced into the object hierarchy below the ***processor*** object. For such processors, partitions and channel paths now pertain to a channel subsystem. For previous processor generations (SMP processors), the object hierarchy remains unchanged.

With XMP processors, supporting multiple logical channel subsystems, some types of channel paths can be shared across partitions belonging to different channel subsystems. Such a channel path is called a ***spanned*** channel path. For more information, refer to "Working with channel paths" on page 111.

Support of physical channel identifiers

Real I/O hardware is attached to a processor via physical channels. For XMP processors, the physical channels need a physical channel identifier (PCHID) which determines the physical location of a channel in the processor. For these processors, you have to specify the physical channel identifier (PCHID) related to the channel path identifier (CHPID).

The task of adding the physical channel path information to an IODF is eased in a way that HCD can cooperate with the CHPID Mapping Tool (CMT). Input to the CMT is the hardware configuration file of your machine (CFReport, see also in the "Glossary" on page 529) and a valid IOCP input file. Output from the CMT is again an IOCP input file that has the PCHID values filled in. This IOCP input file can be reimported into the IODF. For more information see "How to interact with the CHPID Mapping Tool" on page 213.

Miscellaneous enhancements

Enhanced IODF prompt: Besides IODF name and the volume serial number, the IODF prompt now shows the following attributes:

- the VSAM allocated blocks for the data object
- the creation date of the VSAM cluster

HCD profile changes: The default of the following keywords in the HCD profile have changed from NO to YES:

- IODF_DATA_SPACE
- SHOW_IO_CHANGES
- BATCH_IODF_NAME_CHECK

Redesigned Switch Configuration Detail Report: The Switch Configuration Detail Report was previously too extensive and not clearly arranged. Its format is now redesigned such that via grouping the information contained in that report will be highly condensed.

Limitation of CSS Report: When limiting a Channel Subsystem Report to a single partition, the report will show channel paths, control units and devices attached by the access list as well as those attached by the candidate list.

Default SIZE parameter of INITIODF utility: For the SIZE parameter of the Initialize IODF (INITIODF) utility, you can now specify zero (0) to get the default. HCD then tries to get the number of allocated blocks of the VSAM data set from the catalog and uses that value as the default. If you specify a size value greater than zero, HCD checks whether this value does not exceed the allocated size of the VSAM data set.

Enhanced checking: The following new checks are introduced:

- When copying/merging channel paths, HCD checks whether an existing target channel path is connected to a different switch port than the source channel path. HCD also checks whether an existing dedicated channel path in the target is reconnected to a different partition during copying/merging, because the CHPID already existed in the target. Appropriate warning messages are issued if necessary.
- For esoteric groups, HCD issues a warning message if:
  - you do not specify a token for esoterics in an EDT
  - you mix DASDs and TAPEs into a single esoteric group.
- A warning message is issued while building the production IODF in case more than one channel path is connected to the same switch port. Also a port that is already connected to a channel path will no longer be presented in the prompt when connecting a channel path with the same ID to the switch.

Hardware support

HCD supports IBM @server zSeries 990 (Type 2084) processors. These processors support:

- more than one channel subsystem within the processor complex
- more than 15 partitions throughout all defined channel subsystems
- more than 256 channel paths throughout all defined channel subsystems
- spanning for specific channel types

Each single channel subsystem has the following limitations:

- 256 channel paths
- 15 logical partitions
- 64K devices

What is new in HCD for z/OS V1R3

This section summarizes the updates that have been introduced to HCD in z/OS Version 1 Release 3 (z/OS V1R3).

- “Coupling facility duplexing” on page xxviii

- “iQDIO and FCP channel support”
- “FCTC support”
- “Support for FICON cascade switching”

Note:
This release of z/OS does not include a new release of HCD. For this reason, HCD is presented with its FMIDs of OS/390 Release 9.

An appendix with z/OS product accessibility information has been added.

Coupling facility duplexing

With coupling facility duplexing, a CF logical partition can use the CF sender to communicate with another CF logical partition. That means, you can define sender channel paths (CFS, CBS, ICS) besides the receiver channel paths (CFR, CBR, ICR) in a CF partition. CF Duplexing is supported starting with the 9672 Parallel Enterprise Servers G5 and G6 models and the 2064 zSeries models.

iQDIO and FCP channel support

HCD supports two new channel types:

- **IQD:** In zSeries processors, a virtual internal queued direct I/O (iQDIO) transport layer enables memory-to-memory message delivery across logical partitions. So, IQD channels will be used for Fast Message Passing between z/OS logical partitions and the Linux for zSeries partition.
- **FCP:** This channel path type is introduced to allow access to SCSI devices, for example, a DVD device, via the Fibre Channel Protocol from a Linux for zSeries image.

FCTC support

IBM @server zSeries 900 exploits the FICON capability to provide channel-to-channel host communication between processors. FICON CTC (FCTC) provides CTC communication at a higher bandwidth and with greater connectivity than with ESCON CTC.

In order to be usable as an FCTC connection channel, an FC channel path must be defined to an FCTC control unit which is connected to FCTC devices. At least one end of an FCTC connection must be a 2064 zSeries processor, since the FCTC control unit function is only contained in an FC channel of a 2064 zSeries machine at the corresponding EC level and follow-on machines.

Support for FICON cascade switching

HCD supports fabrics containing cascade switching using FICON switches. Such a fabric consists of two or more FICON switches. Within a fabric, the connection from a channel path to a control unit is dynamically established using the link address of the target control unit provided.

For addressing control units in FICON cascade switching environments, HCD supports the use of two-byte link addresses. The first byte specifies the switch address and the second byte specifies the port address of the FC switch to which the control unit is attached.

Hardware support

HCD supports zSeries 900 (Type 2066) processors.

What is new in HCD for z/OS V1R1

This section summarizes the updates that have been introduced to HCD in z/OS V1R1. If you are migrating from OS/390, you should review the information in the detailed section for each item.

Note:
This release of z/OS does not include a new release of HCD. For this reason, HCD is presented with its FMIDs of OS/390 Release 9.

Hardware support

- zSeries 900 (Type 2064) processor
- Support of native FICON (FC) channels and up to 288K HSA subchannels for System/390 Parallel Enterprise Server Generations 5 and 6.

Dynamic Channel Path Management (DCM)

As part of the z/OS Intelligent Resource Director, Dynamic Channel Path Management allows the system to dynamically re-assign channel paths to connected control units based on the current work load and its service goals. HCD allows channel paths to be designated as static (fixed) or managed (re-assignable) when they are defined.

Support for peer coupling channels

For the zSeries 900 processor, a new type of coupling channel, a *peer coupling channel*, has been introduced. HCD supports peer coupling channels via 3 new channel path types:

- CFP - Peer mode ISC-3, defined on ISC-3 links
- CBP - Peer mode ICB-3, defined on 1 GB STI link
- ICP - Peer mode IC-3, defined on uninstalled channel path numbers

Migration support from ESCON to native FICON

HCD allows intermixing both ESCON and native FICON channels on the same control unit. Thus, it is possible to switch from ESCON to native FICON channel channels on the control unit via two subsequent dynamic activates without the need to vary the devices off-line.

Support of a generic fibre channel switch

HCD supports a generic fibre channel switch (FC switch, type FCS), with available port addresses 00 to FF. This switch type does not support a switch control unit port.

What is new in HCD for OS/390 V2R9

The following section describes the new functions that were made available for OS/390 Release 9 HCD. You need to read this section only if you have worked with HCD for previous releases.

Hardware support

HCD supports the following new processors:

- S/390 Parallel Enterprise Server Generation 5 and 6 (9672 R6 and X7 models)
- S/390 Coupling Facility 9674 Model C++
- S/390 Application StarterPak (Type 3000 models)
- Support of Multiprise processor, 2003-202
- Support of S/390 Multiprise 3000 (7060 models)

- Support of 4-port parallel channels

Move ports

This is a new action that you can perform on selected switches. It allows you to move ports or a range of ports on the selected switch to different positions, or to move them from other switches to the selected (target) switch. This is described in "Moving ports" on page 176.

Aggregate channel paths

This is a new action that allows you to aggregate channel paths together. It is described in "Aggregating channel paths" on page 126.

Generate switch matrix

This is a new action that allows you to create the port matrix of a switch configuration dependent on the logical paths defined in the IODF. This is described in "Generating a switch matrix" on page 187.

LDAP support

LDAP (Lightweight Directory Access Protocol) is an Internet protocol designed for fast read access to data. It can be used to manage system data for OS/390 on an enterprise (or at least sysplex) level.

HCD provides IODF search and update capabilities via LDAP using the OS/390 Security Server LDAP Server and the HCD LDAP Backend. For more information on LDAP support see Chapter 14, "How to provide LDAP support for HCD," on page 347.

Other enhancements

In addition to the above, there are a number of additional enhancements listed below:

- You can specify a different maximum number of lines per report page other than the default value of 55 using a new profile option (see "Options for text reports" on page 28).
- You can set a profile option to ensure that all output texts are written in uppercase. This allows you to use printer code pages that do not support lowercase English letters (see also "Options for text reports" on page 28).
- You can extend the attachable device list of a control unit supported with a UIM via a new profile option (see "Extension of the attachable device list of a control unit" on page 31).
- Using a profile option you can bypass the attempt of HCD to update the IOCDS status in the IODF when an IOCDS is written for a processor that has an SNA address defined. HCD retrieves that information from the Support Element directly (see "Bypass IODF information update" on page 29).
- It is possible to write an IOCDS regardless of the processor type. This is particularly useful if you are preparing for a processor upgrade (see "Build an IOCDS" on page 201).
- The previous limit of 8 switch port connections when adding or changing a control unit has been eliminated. The related control unit panels let you specify up to 32 ports (see "Defining the control unit characteristics" on page 129).

What is new in HCD for OS/390 V2R5

The following section describes the new functions that were made available for OS/390 Release 5 HCD. You need to read this section only if you have worked with HCD for previous releases.

Hardware support

HCD supports the following new processors:
- S/390 Parallel Enterprise Server Generation 4 (9672 R5 models)
- S/390 Coupling Facility 9674 Model C++
- S/390 Application StarterPak (Type 3000 models)

Verification of defined I/O configuration

The verify function, which compares the definitions in an IODF with the sensed I/O data, is now available as an action on the HCD activate dialog.

From the HCD activate dialog the verify function is performed as an action for a specified single system or partition. You can choose to compare the sensed system data against the active IODF or against the target IODF of an activate request.

If the verify function is invoked via the dialog, the output is presented on a new panel, the **I/O Path List**. For each channel path defined in the IODF the sensed data and the IODF data are listed. In addition, the list contains the following information:
- Indication of discrepancies,
- Information on whether a sensed path is online or offline, and
- Information on whether a sensed device is online or offline.

A filter facility allows the list to be reduced to the entries of interest. These can then be saved into a data set and subsequently printed.

Building and processing CONFIGxx members

From a production IODF individual CONFIGxx members can be built. Existing CONFIGxx members can be updated or replaced.

For systems which are members of a sysplex, CONFIGxx members can be verified against selected systems. Responses are displayed in a message list.

Support of large IODFs

Within large enterprises IODFs describing the entire I/O configuration may become too big for an effective management. To remedy this problem, while preserving the benefits of keeping a single repository for all I/O definitions, HCD can now build subset IODFs based on configuration packages from a centrally administered master IODF. Configuration packages define subsets of the master IODF, which allows selective distribution of I/O data to target systems, while keeping the processor token in sync. Configuration packages also allow configuration changes made at a remote system to be merged back into the master IODF.

It is now possible to opt for IODFs to be stored in a data space, relieving constraints to the IODF space imposed by user address space limitations.

Panel enhancements

For all attributes that can be primed prompts have been provided on the object definition panels, e. g. for the serial number and port names on the control unit or switch definition panels.

The channel path list has been improved in design by showing the partitions according to their image numbers. Up to 15 partitions can now be shown on the panel.

The device list has been extended by an extra two columns where the number of operating systems and processors accessing the device are stated. If called from the processor list, it is stated how many partitions of the selected processor are accessing the device.

Occupied indication for ports and coupling facility channel paths

Ports and coupling facility CHPIDs already connected in another IODF can now be shown as occupied. The HCD dialog does not permit occupied ports to be connected, thus avoiding inadvertent conflicting connections. The user can add or remove the occupied indicator using the dialog.

Removed restrictions

HCD profile options no longer need to be located in a cataloged data set. For batch jobs, profile options can now also be defined inline.

When processors are repeated, HCD now also copies related coupling facility connections, as well as switches not present in the target IODF. Device preference values for user defined generics are now copied when repeating operating systems.

HCD can now be used to create OS and switch configuration control statements. HCD extended migration allows these to be migrated back into the IODF.

JES3 initialization stream checker data can now be created using a batch utility. A batch utility function is provided which allows creating a work IODF from a production IODF.

What is new in HCD for OS/390 R3

The following sections describe the functions that were made available for OS/390 Release 3 HCD.

Hardware support

Support for new channel: HCD 5.1, HCD 5.2, and OS/390 Release 3 HCD support the definition of the Internal System Device (ISD) channel.

New processor support: HCD continues to support new processors. These are:
- S/390 Multiprise 2000 models,
- S/390 Parallel Enterprise Server Generation 3 (9672 R4 models),
- S/390 Coupling Facility 9674 Model C04.

Ease of upgrading a processor type or model:
- The Update Channel Path Identifiers panel is issued with every ***Change Processor*** action. It permits rearrangement of the channel path IDs.
- New channel path IDs are already preset to support the upgrade from a 9672 R2 to a 9672 R4 model.

I/O Definition Reference: A new report is provided that generates IOGEN configuration documentation from the installed UIMs.

This report is called the I/O Definition Reference, and contains a description of the parameters to define the devices to the Channel Subsystem, as well as a description of the parameters and features to define the devices to the OS/390 operating system.

Verification of defined I/O configuration

This function compares an active I/O configuration against a defined I/O configuration in an IODF. The function is provided as an I/O Path report. It shows the sensed I/O paths of an active system and compares this data with the definitions in the IODF.

Priming the IODF with actual configuration data

This function allows you to prime the IODF with device self-description data (for example, the serial number), and configuration related data that are known by the ESCON Manager (for example, the port names, and port connections).

Report enhancements

Device Detail Report: Contains device groups rather than the individual device numbers, and includes a matrix of the partitions that have access via the channel path access or candidate list rather than listing the partition names.

Channel Path Detail Report: Shows the switch connections that can be determined without requiring a switch configuration to be defined.

Channel Path Summary Report: Includes a matrix of the partitions that have access via the channel path access list or candidate list.

Selection of individual compare reports: You can select individual compare reports for specific object classes (for example, control units) rather than always getting all Channel Subsystem compare reports.

Limit IODF Compare Report: The IODF compare function allows limiting the processor related compare reports to a single partition. As a result, reports of

- Channel path compare only contain channel paths which have the limiting partition in their access list or candidate list.
- Control unit compare only include the control units related to channel paths which have the limiting partition in their access or candidate list.
- Device compare only include the devices related to channel paths which have the limiting partition in their access or candidate list.

Year 2000 support

The support for dates beyond year 2000 is provided. The data areas of HCD are extended to hold the 4 character year format.

The reports and generated data sets show the year as 4 characters. HCD panels that contain a date in the format yy-mm-dd are left unchanged.

Ease-of-Use changes

Reduced number of messages during Build Production IODF: The number of information and warning messages that are generated when building a production IODF is reduced.

These messages are now collected for each object class, and the number of messages is no longer dependent on the number of defined objects. The generated message lists are shorter and provide a better overview of the messages than before.

Replace production IODF in dialog: When building a production IODF in the dialog, you can replace an existing IODF.

Function key consolidation: Function key F3=Exit is offered on all HCD panels. It exits the current unit of work, except for add, change and similar actions, where, when exiting with F3, data is saved before stepping back.

Removed restrictions

Specification of VOLIDs for generated output files: You can direct the HCD generated output data sets to a specific volume, for the
- JES3 INISH data set,
- IOCP input data set, and
- HCPRIO input data set.

Support of multiple switch CUs: This function allows you to attach multiple switch control units to switch port FE.

By this, it is possible to define alternate paths to the ESCON director from any of the LPARs.

IODF checker function

The IODF checker function is provided with the TRACE ID=IODF command and its REPAIR option. It
- Supports the analysis of the inconsistencies within an IODF, and
- Corrects certain inconsistencies.

What is new in HCD for MVS/ESA SP 5.2.2

The following sections describe the functions that were made available for MVS/ESA SP 5.2.2.

Sysplex-wide Activate

HCD offers you a single point of control for systems in a sysplex. You can dynamically activate the hardware and software configuration changes for systems defined in a sysplex.

CTC Report

To allow an easier definition of CTC connections, HCD offers a facility to display and print a CTC connection report for those CTC connections that use a dynamic switch. In case of incorrect definitions you get a message list with diagnostic information.

Migration enhancements

The extended migration function allows you to specify additional parameters in your MVSCP and IOCP input data set to define, for example, coupling facility connections or switch related data.

IOCP changes

Restrictions are removed when building IOCP input data sets:

- The generated IOCP data set now contains control unit and device types of 8 characters and a device model of up to 4 characters. Such an IOCP input data set can be processed by IOCP (with APAR OW13343) and re-migrated to HCD without the need to correct the control unit and device types that exceed the 5 character UNIT and 2 character MODEL value limitation.
- The generated IOCP data set now contains an all-character readable token which allows the user to preserve the dynamic capability when performing a stand-alone IOCP run on a S/390 microprocessor cluster CPC and having the IOCP input data set loaded to the support element using a diskette.

Save command

A new command has been added that allows you to save the current data displayed on an HCD list panel into a data set for printing.

Checking of channel packaging rules

HCD includes checking of channel packaging rules for the new processor types when building a production IODF. Note that there must be access to IZPIOCP while building the production IODF.

Processor upgrade

HCD now contains channel path conversion tables which facilitates processor upgrades from 9672-Rx1 to 9672-Rx2 or 9672-Rx3 models.

Old action codes valid again

For HCD 5.2, several action codes (marked as white type on a black background) were changed from **v** (view), or **c** (change) to **s** (select/work with) due to consistency reasons. For easier usage, the old action codes are also accepted on the following panels:

- Define Device to Operating System Configuration
- View Device / OS Configuration Definitions
- Select Processor / Control Unit
- Device / Processor Definition
- Change Device Group / Operating System Configuration

What is new in HCD 5.2

You need to read this section only if you have worked with HCD in the past. It summarizes the changes that were made for HCD 5.2.

Improved navigation

Context menu: The ***Add***, ***Modify***, ***View***, and ***Build*** actions have been removed from the action bar. Instead, you will now see a context menu when you select an object on an action list panel and press the Enter key. The context menu shows all options available for the selected object. If there is only one action possible, the action is performed without showing the context menu.

View objects and work with objects: HCD 5.2 makes a clear distinction between viewing objects and working with objects to change them. Whenever you used ***View*** in the past to navigate to a list panel and perform some changes, you now have to select ***Work with ...*** from the context menu.

Selecting ***View ...***, on the other hand, displays a list panel on which you can view information but cannot change it.

Consistent usage of action code V: For consistency reasons, the action code **v** is now used exclusively to view objects. Therefore, the action code to request an **Esoteric List** panel from an **EDT List** panel has been changed from **v** to **s**.

Consistent usage of action code S: The action to select an object has been made consistent. On the **Define Device to Operating System Configuration** panel, and on the **Select Processor / Control Unit** panel, you now have to select an operating system or a processor by using action code **s** instead of **c**.

GOTO enhancements: *Goto* is now made available as an action bar choice and displays all possible targets in the pull-down menu. This means that you need not worry about the GOTO command syntax but simply select the target object you want to work with.

The GOTO command has been further enhanced and you can now go directly to the switch configuration and port matrix panels.

Extended filtering: Additional filter criteria give you more flexibility in limiting the number of objects displayed. For instance, you can now get an overview of objects that are not attached to another object (such as CUs not attached to a processor or devices not attached to a CU) or you can get an overview of CHPIDs and ports that are free for establishing connections.

Confirm leaving HCD: To prevent you from unintentionally leaving HCD when pressing the F3=Exit key or F12=Cancel key when on the primary panel, you are now asked to confirm that you want to leave HCD.

Streamlined dialog

EDT/Esoteric dialog: Some EDT/Esoteric panels have been combined to reduce the number of panels you have to go through when assigning devices to esoterics.

Channel Path/Partition assignment matrix: The Channel Path List panel has been extended and includes now the partition's access and candidate list assignments. You can view the assignments by scrolling the panel to the right. You can easily update the information by typing over the new assignments.

Removed restrictions

Virtual Storage constraint relief: When defining devices, the UCBs for the devices are appended to the SQA located below the 16 MB line. You could run out of storage below the 16 MB line when defining a large number of devices. To overcome this problem, you are now allowed to specify that the UCBs are located above the 16 MB line. The UCBs will then be located in the Extended SQA, which is above the 16 MB line in 31-bit storage. Use the LOCANY parameter in HCD to define where you want the UCBs for your devices to be located.

Exporting between different HCD versions: You can now export an IODF from a higher HCD version to a lower HCD version. The version of the IODF remains the same. For example, if you export an IODF from HCD 5.2 to HCD 4.3, the IODF remains a 5.2 IODF. When using this IODF you have to consider the restrictions as described in Table 5 on page 57.

New and improved reports

Coupling Facility Report: You can now create or view a graphical report showing the connections that exist between a coupling facility and the other processors defined in the IODF.

Improved readability of reports: The readability of a number of reports has been increased by grouping devices with the same characteristics. The grouping is done by showing the starting device number and the range (Example: 110,8) rather than listing each device on a separate line. The device grouping is done for the following reports:
- Device summary report
- MVS Device report

- VM Device report
- EDT Device report

Reports showing supported hardware: You can use the HCD batch utility ″Print a Configuration or Supported Hardware Report″ to print the actual status of the hardware supported in your installation. This is particularly useful for installation planning. The report shows the following supported hardware:
- Processors
- Control units
- Devices (including device characteristics and attachments)
- MVS devices (including device capabilities and parameters/features)
- VM devices (including device capabilities and parameters/features)

What is new in HCD 5.1

You need to read this section only if you have worked with an HCD version lower than 5.1 so far. It summarizes the functional and ease-of-use improvements included in HCD 5.1.

Hardware support

- Support for New Channels

  HCD 5.1 supports the definition of OpenSystem Adapter (OSA) and ESCON converter byte (CBY) channels.
- S/390 Microprocessor Cluster Support

  An S/390 microprocessor cluster is a group of new CPCs whose support elements are attached to the same local area network as the hardware management console, on which the CPCs are configured and operated. HCD running on one of the CPCs provides a single point of control to perform group actions.
- Coupling Facility (CF) Support

  This support enables high-performance data sharing among processors. CF-capable processors allow the use of a PR/SM partition as a communication partition and high-speed channels to connect the partition with other processors.

Startup profile

HCD 5.1 provides a profile data set for setting processing options. For example:
- You can map the control unit types in IOCP input data sets to valid control unit types supported by HCD. This means that you need not change the data sets before migrating them.
- You can select trace options with the HCD dialog or with an HCD batch job.
- You can specify defaults for colors and for the layout of the graphical configuration report.

Graphical configuration reports

HCD 5.1 allows you to create or view various types of graphical configuration reports of logical configurations in an IODF. To print the reports created, use either DCF, BookMaster, or GDDM. To display a report, you need GDDM.
- Print

  The printed output can be used for documentation purposes and serve as a base for further configuration planning. You can limit the report by means of filtering.
- Display

  The display function allows you to get a quick overview of your logical hardware configuration. You can use the LOCATE command to find a specific object, and you can jump from an object to the related object list. You can use the SAVE command to store a graphical configuration displayed on your screen in a partitioned data set for printing via GDDM later on.

IODF enhancements

- Copy/Merge IODF Data

  The existing ***Repeat*** pull-down choice of the ***Add*** action has been extended to enable you to copy a selected object together with its dependent objects and I/O attachments not only within the same IODF but also to another IODF. This is useful if you want to consolidate configuration data from several IODFs into a single IODF or to repeat configuration data that is used several times in an IODF.

  The target objects may or may not exist in the target IODF. If the objects do not exist in the target IODF, new ones are created by copying the values and definitions of the objects in the source IODF. If some of the objects already exist, a merge action takes place, that is, the definitions of the objects in the source IODF are combined with those of the objects in the target IODF.
- View Active IODF

  View information about the currently active IODF and, if available, the configuration token which is currently active in the HSA (hardware system area). You can also see the current activation scope (software changes, hardware changes, or recovery required) and examine the reasons for any limitations to the scope.
- IODF Default Size

  The default size of the IODF has been increased to 1024 blocks of 4KB.

Switch enhancements

- Save/Migrate ESCON Director File Configuration

  So far you could migrate switch configurations from an active ESCON Director or an ISPF table only with HCD. If you have ESCON Manager V.1.2 installed with its capability to read and update ESCON Director files, HCD 5.1 allows you to:
  - Save a switch configuration, which you do not want to activate immediately, in an ESCON Director file.
  - Migrate the saved switch configuration from the ESCON Director file for further processing and manipulating by HCD.
- Connect New Switch

  When defining a new switch, you can now connect this switch to a switch control unit and switch device that you added to the IODF when migrating your IOCP or MVSCP input data set.
- Port Range

  Up to now HCD set the minimum port range to 'Installed' when you added a switch. You can now set a port range larger than the minimum range to 'Installed' when defining a switch.

Improved navigation

- Primary Task Selection Panel

  This panel has been restructured (see Figure 27 on page 62). All options for defining a configuration have been moved to a separate panel showing the hierarchy of the objects you work with.

  The HCD release level and a command line have been added to the primary task selection switch.
- GOTO Command

The GOTO command has been enhanced and allows you to go directly to the list panels of dependent objects or to a specific object within a list. For example, you can now go directly to a specific partition or channel path list of a processor from any other action list panel.

Ease-of-Use changes

- Reduced Keystrokes
  - Type `L` for the LOCATE command.
  - Type `LEFT` or `RIGHT` for the HLEFT or HRIGHT commands.
  - Press the Enter key just once on a scrollable confirm delete panel to delete all selected objects.
- Removed Selection Markers

  List element selections, which were done using the single or group selection markers are no longer in effect after an operation has been completed successfully. They are removed automatically. You no longer have to remove them by pressing the F5=Reset key twice.
- Auto-Assign

  Select `Auto-assign` on the Add Control Unit panel to have some control unit and processor attachment parameters automatically proposed by HCD when defining a control unit which is to be connected to one or more switches.
- Group Changes

  In the past, when you defined or changed the settings of a control unit that was attached to a group of processors, you had to change the attributes for each processor in the group one at a time. HCD 5.1 allows you to select the range of processors to which the attachment parameters will be applied, when you add a new or modify an existing control unit definition.
- Saving of Messages

  In addition to displaying messages, you can now save all messages in the message log file.
- IODF Name in Activity Log

  The IODF name is now shown in the activity log, which allows you to associate the changes with the IODF, for which you made them.
- CSS Reports

  Instead of getting all CSS reports you can now select the types of CSS reports you want to produce and print. The devices in the CHPID and control unit detail reports are grouped to improve readability.

Removed restrictions

- Channel Path Change

  HCD 5.1 allows you to change the channel path type from parallel to serial (or vice versa), and the operation mode from nonshared to shared (or vice versa). However, changing the type or operation mode of one channel path will result in changing all channel paths attached to the logical control units affected.
- SYS1.NUCLEUS

  HCD 5.1 no longer requires that SYS1.NUCLEUS is contained in the TSO STEPLIB concatenation or in the ISPLLIB load library concatenation chain. Instead, HCD allocates the library automatically at initialization time. You may use the HCD profile to specify the name and the volume serial number of the library that contains the UIMs. If you do not specify a name in the profile, SYS1.NUCLEUS is assumed as default name for the UIMs. For IPL, however, the UIMs and UDTs must be in SYS1.NUCLEUS.

Note that the UIMs and UDTs have to be in the same data set, if you specify a library name in the HCD profile statement, or if you accept SYS1.NUCLEUS as the default name.

- Partition Name Change

  You may give a partition a new name by changing the name displayed on the Change Partition Definition panel.
- Control Unit Number Change

  You may give a control unit a new number by changing the number displayed on the Change Control Unit Definition panel.
- Esoteric Order in EDT

  HCD 5.1 introduces a token when specifying esoterics. This allows you to control the order of the esoterics in the EDT. You no longer have to maintain a chronological order and may delete and add esoterics without getting access problems for data sets that are cataloged using esoterics.
- Four-Digit Device Numbers

  HCD 5.1 allows you to specify four digits (numbers higher than ’0FFF’) for device numbers and connect these devices to an MVS operating system. HCD validation will check whether the specified devices can have four-digit numbers. This validation is based on the UIMs installed on your system. The device numbers for MVS/ESA SP 4.3 and prior versions are still restricted to three digits.

Support no longer provided

MVS/ESA SP 4.3 is the last release that supports MVSCP. This means that you have to use an IODF to IPL your MVS/ESA SP Version 5. The migration facilities have been enhanced to ease the transition to HCD. A short summary is given below. For details see Chapter 11, “How to migrate existing input data sets,” on page 261.

Enhanced migration

- Update Parts of a Configuration

  You can update existing processor and operating system configuration definitions in an IODF with IOCP, MVSCP, or HCPRIO statements. In particular, you can:
  - Add or replace control units, devices, channel paths, and partitions.
  - Replace list of consoles.
  - Update EDTs, generics, and esoterics.

  This is described in detail in “Updating parts of a configuration by migrating input data sets” on page 292.
- Retain Entries on Migration Panel

  The last values entered for the input data sets on the migration panel are retained. You need not re-enter the values for a subsequent migration.
- Merge Device Connections

  Devices defined in the IODF and in the IOCP input data sets need not be connected to exactly the same set of control units. If one set is the subset of the other, the definitions are merged. Previously, the definitions were rejected.
- Device Number Conflicts

  In the past, device numbers could be associated with the wrong processor or partition in the IODF when migrating the MVSCP input data sets if they did not specify control unit numbers. To resolve this conflict, you are now able to associate an MVSCP input data set with a processor or a logical partition.
- Duplicate Device Numbers

An improved mapping algorithm for devices results in fewer duplicate device numbers and in fewer migration failures due to control unit configuration mismatches.

- Duplicate Labels

  Labels in the input data sets no longer need to be unique anymore. Duplicate labels are now ignored.

- Map Control Unit Types

  You can use the startup profile to map the control units to valid HCD control units and reduce the need to change the IOCP input data sets before migrating them.

- Assigning Esoteric Tokens when Migrating MVSCP Input Data Sets

  You can use the HCD profile to specify if you want HCD to assign esoteric tokens in ascending order when migrating MVSCP input data sets.

  To assign individual tokens to esoterics during migration, HCD introduced a new keyword for the UNITNAME parameter. This keyword is only valid for migration purposes and cannot be used for processing the data sets with MVSCP.

Chapter 1. Hardware configuration definition - What is it?

Overview

This topic explains:
- What HCD is and how it differs from MVSCP and IOCP
- What HCD offers you
- How HCD works
- The environment in which HCD operates

What HCD is and how it differs from MVSCP and IOCP

The channel subsystem (CSS) and the IBM z/OS operating system need to know what hardware resources are available in the computer system and how these resources are connected. This information is called *hardware configuration*.

Hardware Configuration Definition (HCD) provides an interactive interface that allows you to define the hardware configuration for both a processor's channel subsystems and the operating system running on the processor.

Before HCD was available, you had to use IOCP to define the hardware to the channel subsystem and the MVS Configuration Program (MVSCP) to define the hardware to the MVS operating system. The following sections explain in what way HCD differs from MVSCP and IOCP when defining, validating and reconfiguring configuration data.

Definition of configuration data

This topic informs about the differences between MVSCP and IOCP on the one hand and HCD on the other hand when performing the task of defining configuration data.

How MVSCP and IOCP worked

With MVSCP and IOCP you were limited to defining one processor or operating system per input data set. This meant that you needed more than one data set when you used MVSCP or IOCP.

Figure 1 on page 2 illustrates the definition process using several sources for writing and modifying the hardware configuration using IOCP and MVSCP data sets.

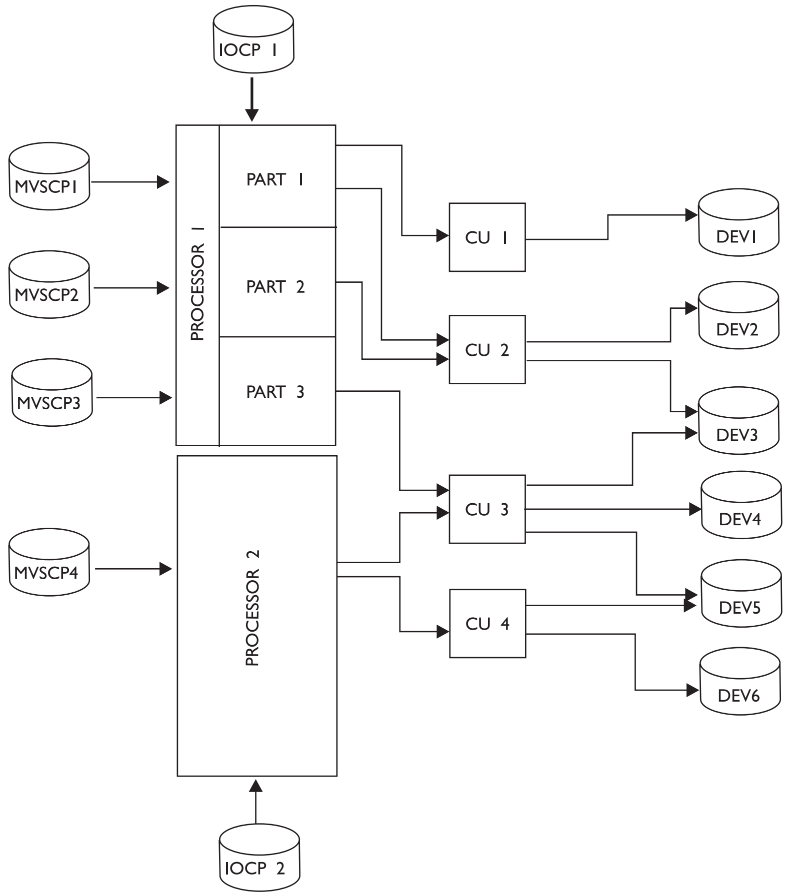


Figure 1. Multiple data set configuration definition without HCD

What HCD does

The configuration you define with HCD may consist of multiple processors with multiple channel subsystems, each containing multiple partitions. HCD stores the entire configuration data in a central repository, the ***input/output definition file (IODF)***. The IODF as single source for all hardware and software definitions for a multi-processor system eliminates the need to maintain several independent MVSCP or IOCP data sets. That means that you enter the information only once using an interactive dialog.

Figure 2 on page 3 illustrates the definition process using one source for writing and modifying configuration data in the IODF:

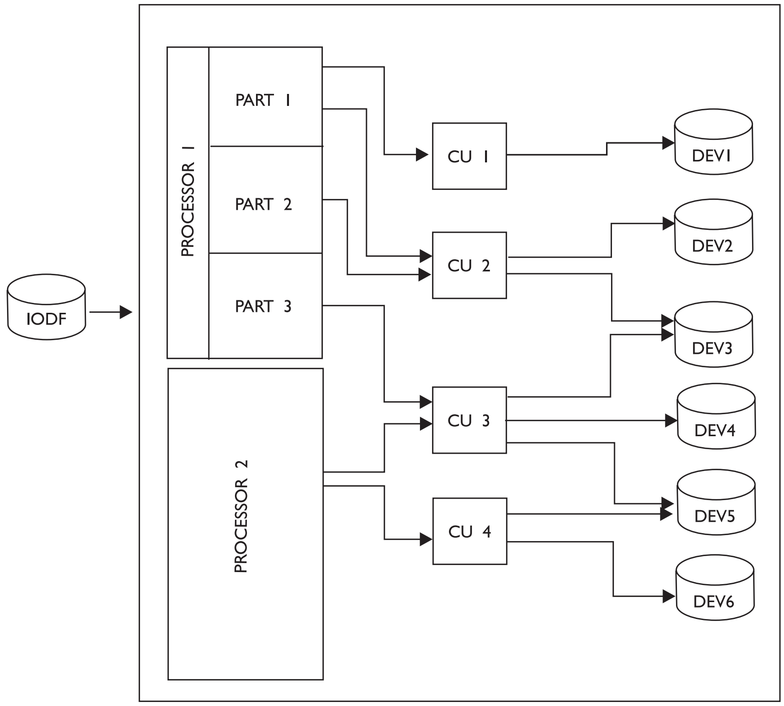


Figure 2. Single data set configuration definition with HCD

Validation of configuration data

How MVSCP and IOCP worked

MVSCP and IOCP were separately running independent programs. Prior to IPL it was not checked whether the MVSCP output matched the configuration in the I/O configuration data set (IOCDS). Even if the definitions of both programs were not identical, it was possible for an IPL to be successful if the devices needed to start the system were included in both programs. Therefore, discrepancies would be detected only after the system had been running for some time. Such a discovery could have happened at a very inconvenient moment.

What HCD does

The data entered with HCD is validated and checked for consistency and completeness. Because the check is performed when the data is defined, rather than when the device is accessed, inconsistencies can be corrected right away, and unplanned system outages resulting from inconsistent definitions can be avoided.

If you include ESCON or FICON Director definitions in the IODF, HCD also validates the switch port usage and connection information for all devices and channels connected to each of the directors in the configuration. In addition, HCD validates the complete path from the processor through the switch to the control unit and device.

Planned I/O paths, as defined in an IODF, can be checked against the active configuration on the system. Discrepancies are indicated and can be evaluated before and after the IODF is activated.

Reconfiguration of configuration data

How MVSCP and IOCP worked

The IOCP updated the input/output configuration data set (IOCDS) that resided in the hardware support processor. This information was loaded into the hardware system area during power-on reset (POR). If the configuration was changed, it was necessary to write a new IOCDS using IOCP and to load it into the hardware system area with a POR.

MVSCP created the control information (such as UCBs, EDTs, and NIPCONs) needed by MVS to describe the hardware configuration and stored this information in the SYS1.NUCLEUS data set. The nucleus information was loaded at IPL time into storage. If a change was made to the I/O configuration, it was necessary to IPL to make the information available to MVS.

What HCD does

Dynamic reconfiguration management is the ability to select a new I/O configuration during normal processing and without the need to perform a power on reset (POR) of the hardware or an initial program load (IPL) of the z/OS operating system.

The ability of HCD to provide equivalent hardware and software I/O definitions and to detect when they are not in sync is essential for dynamic I/O reconfiguration management. HCD compares both the old and the new configuration and informs the hardware and software about the differences. You may add, delete, and modify definitions for channel paths, control units and I/O devices without having to perform a POR or an IPL.

What HCD offers you

This section summarizes what you can do with HCD and how you can work with HCD.

Single Point of Control: With HCD you have a single source, the IODF, for your configuration data. This means that hardware and software definitions as well as ESCON or FICON director definitions can be done from HCD and can be activated with the data stored in the IODF.

Increased System Availability: HCD checks the configuration data when it is entered and therefore reduces the chance of unplanned system outages due to inconsistent definitions.

Changing Hardware Definitions Dynamically: HCD offers dynamic I/O reconfiguration management. This function allows you to change your hardware and software definitions on the fly - you can add devices, or change devices, channel paths, and control units, without performing a POR or an IPL. You may also perform software-only changes, even if the hardware is not installed.

Sysplex Wide Activate: HCD offers you a single point of control for systems in a sysplex. You can dynamically activate the hardware and software configuration changes for systems defined in a sysplex.

Migration Support: HCD offers a migration function that allows you to migrate your current configuration data from IOCP, MVSCP, and HCPRIO data sets into HCD. Migration support also allows you to make bulk changes to the configuration using an editor on the IOCP/MVSCP/HCPRIO macro statements.

Accurate Configuration Documentation: The actual configuration definitions for one or more processors in the IODF are the basis for the reports you can produce with HCD. This means that the reports are accurate and reflect the up-to-date definition of your configuration.

HCD provides a number of textual reports and graphical reports, that can be either printed or displayed. The printed output can be used for documentation purposes providing the base for further configuration planning tasks. The display function allows you to get a quick overview of your logical hardware configuration.

Guidance through Interactive Interface: HCD provides an interactive user interface, based on ISPF, that supports both the hardware and the software configuration definition functions. The primary way of defining the configuration is through the ISPF dialog. HCD consists of a series of panels that guide you through all aspects of the configuration task. The configuration data is presented in lists.

HCD offers extensive online help and prompting facilities. Help includes information about panels, commands, data displayed, available actions, and context-sensitive help for input fields. A fast path for experienced users is also supported.

Batch Utilities: In addition to the interactive interface, HCD also offers a number of batch utilities. You can use these utilities, for instance, to migrate your existing configuration data; to maintain the IODF; or to print configuration reports. For a complete list of batch utility functions, refer to Chapter 12, “How to invoke HCD batch utility functions,” on page 307.

Cross Operating System Support: HCD allows you to define both MVS type (for example OS/390 or z/OS) and VM type configurations from z/OS and to exchange IODFs between z/OS HCD and z/VM HCD.

Support of S/390 Microprocessor Clusters: HCD provides functions for IOCDS and IPL attributes management, which simplify the configuration and operational support for those processors that are configured in an S/390 microprocessor cluster.

LDAP Interface Capability: HCD provides you with search and update capabilities for IODF data via an LDAP interface.

How HCD works

HCD stores the hardware configuration data you defined in the IODF. A single IODF can contain definitions for several processors (or LPARs) and several MVS or VM operating systems. It contains all information used to create IOCDSs and the information necessary to build the UCBs and EDTs. When HCD initiates the function to build the IOCDS, the IODF is used as input. The IOCDS with the channel subsystem definitions of a processor is then used to perform POR. The same IODF is used by MVS to read the configuration information directly from the IODF during IPL. If your environment includes z/OS and z/VM on different processors or as logical partitions on the same processor, the IODF can also be used to document the z/VM configuration.

Figure 3 on page 6 shows an example of a configuration using HCD.

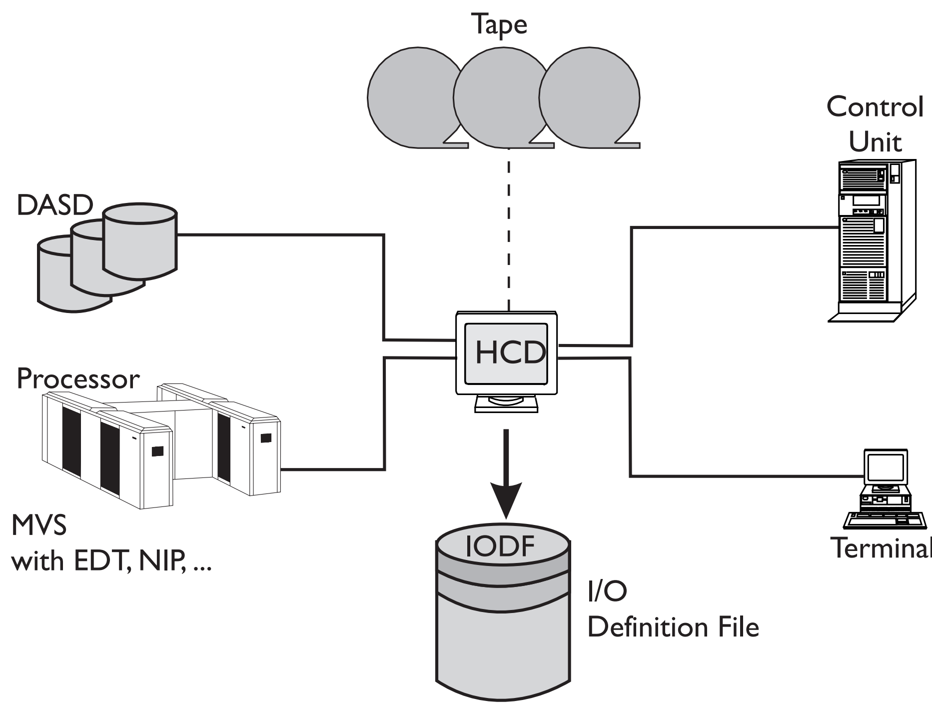


Figure 3. Configuration definition with HCD

Objects managed in the IODF

HCD lets you define the configurations as objects and their connections. The following objects and their connections are managed by HCD:

- IODF
  - Operating System
    - EDT (MVS-type only)
      - Esoteric (MVS-type only)
      - Generic (MVS-type only)
    - Console
  - Switch
    - Switch Configuration
    - Port
  - Processor
    - Channel Subsystem
      - Partition
      - Channel Path
  - Control Unit
  - Device

Figure 4. Objects managed by HCD

For all these objects the HCD dialog provides action lists where you can define the characteristics and the relation between the objects.

IODF used at IPL

After you complete the input of your configuration data, you have to build a production IODF. The production IODF is used by the operating system to build the configuration data (for example, control blocks) at IPL time. This active production IODF is also used for building the IOCDS.

Figure 5 illustrates the build phase of a production IODF and of an IOCDS.

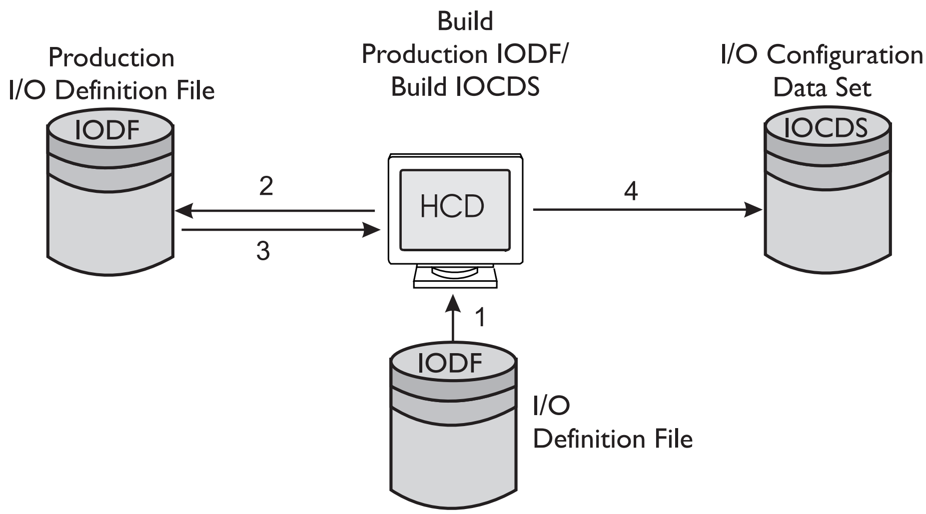


Figure 5. Building a production IODF and an IOCDS

The production IODF cannot be updated (read-only). This ensures that the data in the production IODF used at IPL remains the same during the run time of that system.

Relationship of data sets used by HCD

Figure 6 on page 8 shows the relationship between the data sets used by HCD and how you can work with or change these data sets.

By using the define and modify tasks or by migrating MVSCP, IOCP, and HCPRIO input data sets you create a work IODF. After finishing the definition, you build a production IODF from your work IODF, which you can use to IPL your system or to activate your configuration dynamically. The data sets shown at the bottom of the figure are created by the appropriate tasks like Build IOCDS, Build IOCP input data set, Build HCPRIO input data set, and Activate switch configuration.

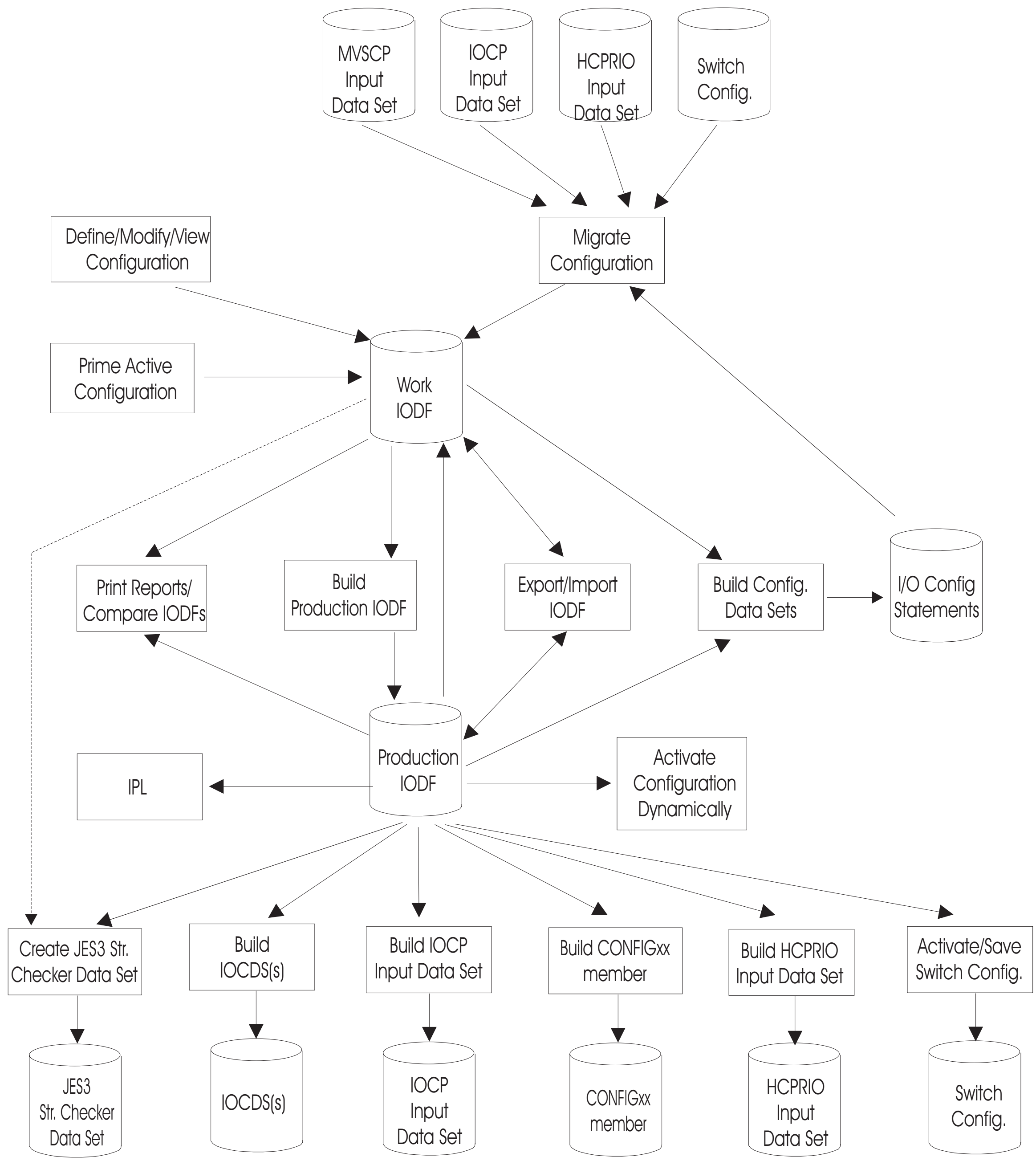


Figure 6. Relationship of data sets used by HCD

The environment in which HCD operates

HCD is part of z/OS. It needs a running z/OS system before it can be used to define a hardware configuration. Therefore, an installation should first load a z/OS system, using an old IODF, or a ServerPac Starter IODF to IPL the z/OS system for the first time. HCD can then be used on that system to define the full configuration.

HCD uses the unit information modules (UIMs) of z/OS. UIMs contain device dependent information, such as parameters and features of devices. The UIMs must be installed in the z/OS system before you use HCD to define a configuration. The UIMs are also used at IPL time to build the UCBs. That is why they have to be installed in SYS1.NUCLEUS at IPL time.

UIMs are provided for the IBM devices supported by z/OS, OS/390, or MVS by the device product owners. You can write your own UIMs for non-IBM devices. To get information about UIMs, see *z/OS MVS Device Validation Support*.

HCD and I/O Operations

The ESCON and FICON architectures are supported by a class of devices called Directors (switches) that manage the switching functions. These switches may be connected to a processor (via channel path), a control unit, or another switch. The switches connect channel paths and control units only for the duration of an I/O operation. The “internal” configuration of a switch is called switch configuration.

The I/O Operations component of System Automation for z/OS (formerly known as ESCON Manager) maintains and manages configurations in switches.

I/O Operations functions, such as the activation of switch configurations and the retrieval of the active configuration data, can be invoked from HCD. This gives you a single point of control for all switch configuration activities, as well as the possibility to check whether a certain data path (from processor to device) is fully configured or not.

Moreover, you can use HCD to migrate switch configurations into HCD from three different sources: directly from the switches, from a saved switch file, or from ISPF tables saved by I/O Operations. You also can save switch configuration data in a switch file, as well as activate the switch configuration. Thus, the switch is activated using the switch configuration stored in the IODF.

I/O Operations permits retrieval of information from the active system. Parts of this information (serial numbers, VOLSERs, port names) can be provided by HCD via the functions ″Priming″, ″Sensing″, ″Verification″ and ″Prompting for VOLSER″; I/O Operations must be installed for this purpose.

Prerequisites

For migrating existing switch configurations and activating switch configurations:

- System Automation for z/OS (I/O Operations), must be installed and active.
- If you want to prime or verify I/O definitions or generate an I/O Path report, then in order to obtain the data for a system in a sysplex, there must also be a VTAM session between the local system and the target system, and the target system must have I/O Operations installed and running.

For more information on installation requirements, refer to the *z/OS Program Directory*.

In addition, refer to the PSP Bucket for the latest information about the prerequisites.

HCD and the coupling facility

HCD provides the user interface to support processors that have coupling facility capability.

The coupling facility itself is implemented as an extension to PR/SM features on selected processors (refer to *z/OS HCD Planning* for a list) and runs in a PR/SM partition. It enables direct communication between processors through a specific communication partition (coupling facility partition), connected by coupling facility channels.

You use HCD to specify whether a logical partition is running a coupling facility or an operating system. New channel path definitions in the IODF are used to connect a coupling facility-capable processor to a coupling facility partition:

- The coupling facility receiver channel (CFR channel) path that accesses the partition the coupling facility is running on.
- The coupling facility sender channel (CFS channel) path that accesses the partition the operating system is running on.
- The coupling facility peer channel path that accesses either partition bidirectionally on IBM zSeries processors or their successors.

HCD automatically generates the coupling facility (CF) control unit and devices that are necessary for the IOCP. Figure 7 shows a processor configuration with coupling facility implemented.

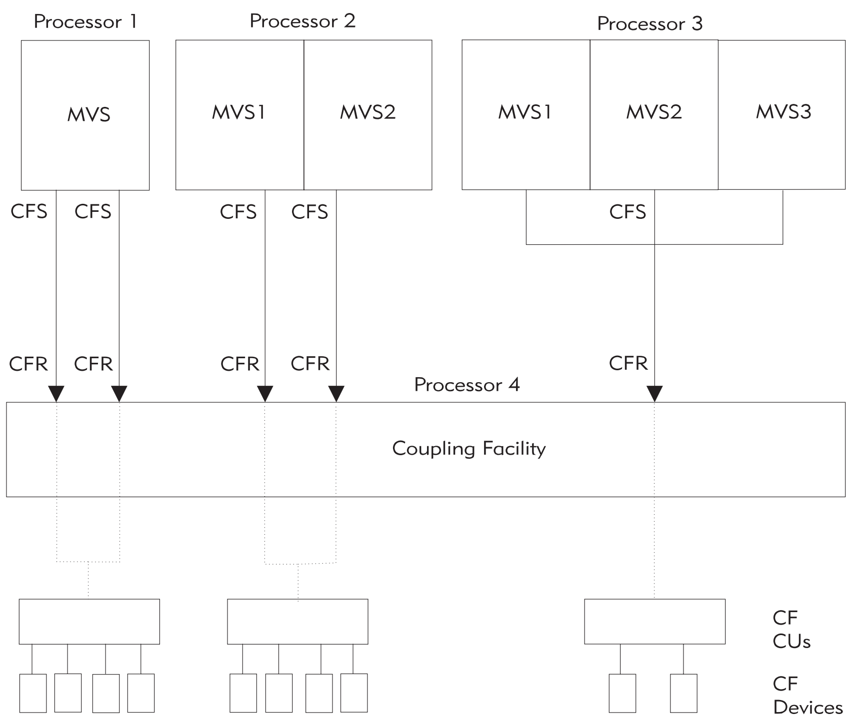


Figure 7. Processor configuration with coupling facility implemented

HCD enables you to dynamically reconfigure the coupling facility channels that are connected to the operating system partition.

Note: With CF duplexing, a CF logical partition can use the coupling facility sender function to communicate with another CF logical partition. That means, you can define sender channel paths (CFS, CBS, ICS) besides the receiver channel paths (CFR, CBR, ICR) in a CF partition. CF duplexing is supported starting with the 9672 Parallel Enterprise Servers G5 and G6 models and the 2064 zSeries models.

For more information on HCD and coupling facility, refer to *z/OS Parallel Sysplex Overview*.

Support of S/390 microprocessor clusters

Note on terminology:

The term S/390 microprocessor cluster, used in the HCD panels and throughout this book, refers to central processor complexes (CPCs) controlled through the Hardware Management Console.

HCD allows you to define and control configuration data for each CPC that is configured in an S/390 microprocessor cluster. You use HCD for those CPCs that can have their IOCDS and IPL attribute management functions controlled remotely:
- Writing IOCDSs
- Managing write-protection
- Marking the IOCDS as active POR IOCDS
- Updating IPL address and LOAD parameter values

HCD displays all CPCs that are configured in an S/390 microprocessor cluster and controlled by the Hardware Management Console. The CPCs are connected to the same network as the Hardware Management Console through a Token-Ring LAN. A CPC is identified by the system network architecture (SNA) address of its support element, which is specified when the processor complex is configured on the Hardware Management Console. HCD uses the SNA address to be able to write and manage IOCDSs from any processor in an S/390 microprocessor cluster, and to view and update IPL attributes.

Support of the sysplex environment

If you have interconnected systems, it is important to have a single point of control for systems in such a sysplex environment. HCD offers the support of the sysplex environment in several ways:
- You can define all processor and operating system configurations in one IODF.
- After a complete definition you can download the IOCDSs for all processors. This can be initiated from the controlling HCD.
- If you want to change configurations dynamically within the sysplex, you can initiate the activation of the hardware and software configuration changes for systems defined in a sysplex from the controlling HCD.

In addition, HCD offers a function that compares the active I/O configuration against the defined configuration in an IODF. This function can produce reports or lists of I/O paths to show the sensed data against the logical definitions of the paths in the IODF. HCD provides this function to get the data for your local system and for systems in a sysplex.

Based on a production IODF, HCD can also build CONFIGxx members for your local system or for systems in the sysplex.

For systems which are members of a sysplex, CONFIGxx members can be verified against selected systems. Responses are displayed in a message list.

Refer to Chapter 12, “How to invoke HCD batch utility functions,” on page 307, if you want to run batch jobs in a sysplex environment.

Chapter 2. Migration

Overview

This topic explains:

- An overview of the migration process
- Steps needed for migrating to HCD for z/OS Version 1 from a lower level HCD release

Migration overview

Your plan for migrating to the new level of HCD should include information from a variety of sources. These sources of information describe topics such as coexistence, service, hardware and software requirements, installation and migration procedures, and interface changes.

The following documentation provides information about installing your z/OS system. In addition to specific information about HCD, this documentation contains information about all of the z/OS elements.

- *z/OS Planning for Installation*

  This book describes the installation requirements for z/OS at a system and element level. It includes hardware, software, and service requirements for both the driving and target systems. It also describes any coexistence considerations and actions.
- *z/OS Program Directory*

  This document, which is provided with your z/OS product order, leads you through the specific installation steps for HCD and the other z/OS elements.
- *ServerPac Installing Your Order*

  This is the order-customized, installation book for using the ServerPac Installation method. Be sure to review “Appendix A. Product Information”, which describes data sets supplied, jobs or procedures that have been completed for you, and product status. IBM may have run jobs or made updates to PARMLIB or other system control data sets. These updates could affect your migration.

“Migration roadmap” on page 15

- identifies the migration paths that are supported with the current level of HCD
- describes the additional publications that can assist you with your migration to the current level

Developing a migration strategy

The recommended steps for migrating to HCD under z/OS are:

1. Become familiar with the supporting migration and installation documentation for the release.

   You should determine what updates are needed for products that are supplied by IBM, system libraries, and non-IBM products. Review *z/OS Planning for Installation* and the *z/OS Introduction and Release Guide* for information about HCD and other z/OS elements.
2. Develop a migration plan for your installation.

When planning to migrate to a new release of HCD, you must consider high-level support requirements, such as machine and programming restrictions, migration paths, and program compatibility.

3. Obtain and install any required program temporary fixes (PTFs) or updated versions of the operating system.

   Call the IBM Software Support Center to obtain the preventive service planning (PSP) upgrade for HCD, which provides the most current information about PTFs for HCD. Check RETAIN again just before testing HCD. For information about how to request the PSP upgrade, refer to the *z/OS Program Directory*. Although the *z/OS Program Directory* contains a list of the required PTFs, the most current information is available from the IBM Software Support Center.
4. Install the product using the *z/OS Program Directory* or the *ServerPac Installing Your Order* documentation.
5. Contact programmers who are responsible for updating applications at your installation.

   Verify that your installation's applications will continue to run, and, if necessary, make changes to ensure compatibility with the new release.
6. Use the new release before initializing major new function.
7. If necessary, customize the new function for your installation.
8. Exercise the new functions.

Year 2000 support for HCD

HCD is an element of z/OS. Beginning with Version 1 Release 2, OS/390 was certified as a Year 2000–ready operating system by the Information Technology Association of America (ITAA). Follow-on releases, including z/OS, are also Year 2000 ready.

Previous products, such as OS/390 Version 1 Release 1, and all releases of MVS/ESA SP V5, are Year 2000 ready with maintenance applied. Previous products that are not Year 2000 ready have not been marketed since December 31, 1997.

For HCD, the following changes were made to ensure Year 2000 readiness:

- All control blocks used externally maintain time stamps in the format `YYYY-MM-DD`.
- All reports show the extended date format.
- The activity and message log files show the extended date format.

For further information on Year 2000 Support, see *Year2000 and 2-Digit Dates: Guide*, GC28-1251. For additional information on Year 2000, see:

`http://www.ibm.com/IBM/year2000/`

For additional migration information

For information about migrating to z/OS, see *z/OS Planning for Installation*, GA22-7504.

For information about migrating to MVS/ESA SP V5, see:

- *MVS/ESA SP V5 Planning: Installation and Migration JES2*, GC28–1428.
- *MVS/ESA SP V5 Planning: Installation and Migration JES3*, GC28–1429.
- *Conversion Notebook for System Product Version 5* , GC28-1436
- *Conversion Notebook for System Product Version 4* , GC28-1608

- *Conversion Notebook for System Product Version 3* , GC28-1568
- *Conversion Notebook for System Product Version 2* , GC28-1567

Migration roadmap

This section describes the migration paths that are supported by the current release of HCD. It also provides information about how to migrate to the current HCD release from previous releases.

You can find further migration information in *z/OS Migration*.

Migration tasks

The following sections contain additional migration procedures or information:

- "Enhanced migration" on page xl
- "Upgrade an IODF" on page 48
- "IODF release level compatibility" on page 57
- "Migrating existing switch configurations" on page 189
- "IOCP input data sets using extended migration" on page 210
- Chapter 11, "How to migrate existing input data sets," on page 261
- "Upgrade IODF" on page 310
- "Migrate I/O configuration statements" on page 311

Information on IODF coexistence can be found in "IODF release level compatibility" on page 57.

Required changes when migrating to z/OS V1.7 HCD

z/OS V1.7 HCD starts using the new V5 IODF format, representing devices in device groups rather than containing individual device definition records.

z/OS V1.7 HCD can access an IODF from previous HCD releases and can perform view/read functions (for example, copy, activate) without permanently upgrading the IODF. However when you try to change the configuration contained in a lower version IODF, upgrading is required before the change. A message will inform you about the necessity of a permanent upgrade. "Upgrade an IODF" on page 48 provides information on how to upgrade from previous IODF versions to a V5 IODF.

Earlier HCD releases provide limited read access to V5 IODFs. There is a coexistence support for V5 IODFs on back-level z/OS releases for read-only functions like the ACTIVATE function. You need to install the corresponding PTF, and you must have z/OS V1.4 HCD (FMID HCS7708) running on your previous z/OS release.

If you need to update a V5 IODF using an HCD version earlier than z/OS V1.7 HCD, you can use a STEPLIB or JOBLIB allocation for the z/OS V1.7 libraries (SYS1.LINKLIB, SYS1.NUCLEUS and SYS1.SCBDHENU).

If you want to share an IODF among multiple z/OS or OS/390 systems that are at different release levels, you have to consider some restrictions concerning IPL, IODF usage, and dynamic reconfiguration. For more information on compatibility considerations for IODF data sets, refer to "IODF release level compatibility" on page 57.

Upgrading an IODF to z/OS V1.7 HCD

If you used HCD in a previous z/OS or OS/390 release, you can IPL the z/OS operating system with your old IODF but you must upgrade your back-level IODF if you want to update it with z/OS V1.7 HCD. You need not upgrade your back-level IODF if you want to access it read-only.

The following procedure is a step-by-step instruction on how to upgrade a back-level IODF to a V5 IODF using the HCD dialog:

1. Invoke HCD, specify the IODF name and select the task ***Maintain I/O definition files*** on the primary task selection panel. HCD detects the back-level V4 IODF format and upgrades the IODF in-storage to a V5 IODF. Depending on the size of the IODF, this task may be time-consuming.
2. Select the task ***Upgrade I/O definition file to new format***. Select the default options for `Target of upgrade` and `Condense IODF`.
3. On the following panel, HCD suggests an appropriate space allocation value. The proposed value is generally significantly smaller than the size of the source IODF.
4. After the IODF has been successfully upgraded, you can enter additional configuration changes into the V5 work IODF.
5. Create a production IODF from the work IODF and a corresponding LOADxx member.
6. Do one of the following:
   - Activate the z/OS production IODF dynamically.

     Note: Depending on the changes that you made in step 4, before activating the new configuration, you have to configure offline the affected channel paths or vary offline the affected devices. See *z/OS HCD Planning* for information about avoiding disruptions to I/O operations during dynamic changes.
   - Use the z/OS production IODF to create an IOCDS, then perform a power-on reset with the new IOCDS and IPL using the new IODF.

Setup considerations for migration

If you want to use HCD functions to prepare a V5 IODF, z/OS V1.7 HCD must be available on your back-level operating system. You can either install z/OS V1.7 HCD on your back level z/OS operating system in separate libraries, or you can share the DASD volume where the z/OS V1.7 system libraries reside. Note that when sharing the DASD volume, the HCD libraries are not cataloged in your running system. You have to access the libraries by specifying the volume and unit parameter.

If you want to prepare a V5 IODF using the HCD batch utility:

- Ensure that the products containing the necessary UIMs are installed.
- Access the SYS1.LINKLIB of the V1.7 z/OS operating system through the STEPLIB or JOBLIB statement.
- Access the parsing macro in SYS1.MACLIB of z/OS V1.7 through the HCDLIB statement.
- For IOCP input data set migration, ensure you know the support level ID of your processor. Use the batch utility to print the Supported Hardware report for assistance when checking the support level ID. An example is shown in “Supported Hardware Report” on page 400.
- Ensure that SYS1.NUCLEUS of z/OS V1.7 is used. Specify the following statement in your batch jobs:

```
//HCDPROF DD DSN=BPAN.HCD.PROF,DISP=SHR
```

In the HCD profile (in our example BPAN.HCD.PROF) you have to specify the following statements to access the z/OS UIMs:

Example:

```
UIM_LIBNAME=SYS1.NUCLEUS
UIM_VOLSER=510D18
```

If you want to prepare a V5 IODF using the HCD dialog:

- Ensure that the products containing the necessary UIMs are installed.
- Specify the library containing the UIMs in the z/OS V1.7 HCD profile.

  Example:

  ```
  UIM_LIBNAME=SYS1.NUCLEUS
  UIM_VOLSER=510D18
  ```
- Access SYS1.LINKLIB and SYS1.SCBDHENU of the z/OS V1.7 operating system using a TSO logon procedure that contains the following DD statements to allocate the load libraries.

  Example:

  ```
  //ISPLLIB  DD DSN=SYS1.LINKLIB,DISP=SHR,UNIT=3380,VOL=SER=510D18
  //         DD DSN=SYS1.SCBDHENU,DISP=SHR,UNIT=3380,VOL=SER=510D18
  ```

  With this TSO logon procedure you can use your TSO session for HCD only. Before using another program than HCD, start a TSO session without the HCD DD statements.

  If your target LINKLIB contains an IDCAMS level incompatible with the driver system, HCD may terminate with the error message IDC3009I. In this case, create a new library and copy the modules starting with CBD from the target system into this library. Then, change the ISPLLIB to point to this new library.
- For the migration of the input data sets, specify the volume serial number of the DASD, which contains the MACLIB, on the panel **Migrate IOCP / MVSCP / HCPRIO Data** to access the parsing macro.
- Copy the HCD CLISTs CBDCHCD, CBDCHCD1, and CBDCACTL from SYS1.SCBDCLST of the z/OS V1.7 system with a new name (for example, HCDCHCD and HCDCHCD1) to SYS1.SCBDCLST of your old system. Note that you also have to replace the old name of CBDCHCD1 in the new HCD CLIST (in our example, HCDCHCD) with the new name (HCDCHCD1). In the new CLIST (HCDCHCD), change the allocation of the Panel, Table, and Message library:

  ```
  /* Allocate Panel library                */
  ALLOCATE F(PLIB) DA('SYS1.SCBDPENU') SHR  +
   UNIT(3380) VOLUME(510D18)
  ISPEXEC LIBDEF ISPPLIB LIBRARY ID(PLIB)
  /* Allocate Table library               */
  ALLOCATE F(TLIB) DA('SYS1.SCBDTENU') SHR  +
   UNIT(3380) VOLUME(510D18)
  ISPEXEC LIBDEF ISPTLIB LIBRARY ID(TLIB)
  /* Allocate Message library             */
  ALLOCATE F(MLIB) DA('SYS1.SCBDMENU') SHR  +
   UNIT(3380) VOLUME(510D18)
  ISPEXEC LIBDEF ISPMLIB LIBRARY ID(MLIB)
  ```

  Use this changed CLIST to start the HCD dialog.

  Note: If you want to use the HCD utility functions
  - Print report
  - Build IOCP
  - Build IOCDS

– Compare IODFs
– Compare CSS / operating system views,

then specify GO.STEPLIB in the offered EXEC procedures (see "Customizing HCD EXEC procedures" on page 33) to access the new data sets:

```
//GO.STEPLIB DD DSN=SYS1.LINKLIB,DISP=SHR,VOL=SER=510D18,UNIT=3380
//GO.HCDPROF DD DSN=BPAN.HCD.PROF,DISP=SHR
```

In the HCD profile (in our example BPAN.HCD.PROF) you have to specify the following statements to access the z/OS V1.7 UIMs.

Example:

```
UIM_LIBNAME=SYS1.NUCLEUS
UIM_VOLSER=510D18
```

If you want to migrate IODEVICE configuration statements into an IODF, you might need temporarily more disk space than the final IODF consumes, because HCD can migrate one device at a time only and perform grouping only at the end of the migration.

Coexistence overview of functionality based on IODF version

Table 2 summarizes the available functionality on z/OS releases based on the IODF level.

Table 2. IODF compatibility overview

	System running z/OS R7	System running z/OS R4 to R6	System running z/OS pre-R4
IODF created with z/OS V1R7 (Version 5 IODF)	• No restriction to HCD use (read/update) • IPL • Dynamic Activate	Compatibility SPE installed: • Only read / no update in HCD **Note:** *View Configuration Data* (part of option 1 from the *HCD Primary Task Selection Panel*) is not supported. • IPL • Dynamic Activate Compatibility SPE not installed: • No access possible in HCD • No IPL • No Dynamic Activate STEPLIB/JOBLIB approach using z/OS V1R7 HCD libraries for full HCD access	• No access possible in HCD • No IPL • No Dynamic Activate
IODF created with z/OS pre-V1R7 (Version 4 IODF)	• Read access possible w/o upgrade • Update access requires IODF upgrade • IPL • Dynamic Activate	• No restriction to HCD use (read/update) • IPL • Dynamic Activate	• No restriction to HCD use (read/update) • IPL • Dynamic Activate

IODF format conversions between version 4 and version 5:

- z/OS V1R7: IODF upgrade function available to migrate from version 4 to version 5 IODF
- z/OS V1R4 - V1R6: Fall-back solution to downgrade from version 5 IODF to version 4 IODF via Export I/O definitions (Build I/O configuration statements) and Import I/O definitions (Migrate I/O configuration statements)

Chapter 3. How to setup, customize and start HCD

Overview

This information unit handles the following topics:

- "Setting up HCD"
- "Tailoring the CLIST CBDCHCD" on page 23
- "Starting and ending HCD" on page 24
- "Defining an HCD profile" on page 25
- "Customizing HCD EXEC procedures" on page 33

Setting up HCD

HCD is a base element of z/OS and therefore installed with the z/OS product. For more information, refer to *z/OS Planning for Installation*.

The installation of HCD is carried out using SMP/E. The install logic and the JCLIN are provided by HCD. For the installation, refer to the *z/OS Program Directory*.

Setting up HCD requires the following steps:

1. Install z/OS with the HCD FMIDs.
2. Install other products that are required for HCD (refer to *z/OS Planning for Installation*).
3. Before you start HCD, you have to set up the load libraries that contain the HCD help modules. You can achieve this in one of the following ways:
   - Include SYS1.SCBDHENU (or SYS1.SCBDHJPN for Kanji) in the linklist concatenation (LNKLSTxx member), or
   - Allocate data set SYS1.SCBDHENU (or SYS1.SCBDHJPN for Kanji) to ISPLLIB.

   If you choose to access the libraries through the ISPLLIB concatenation, ISPLLIB must be allocated prior to invoking ISPF with the TSO ALLOC command or through a CLIST. ISPLLIB is used as a tasklib by ISPF as it is searched first.

   When using the View graphical configuration report:
   - Include the GDDM load library in the linklist concatenation (LNKLSTxx member).
   - Allocate the GDDM sample data set:

     For GDDM 2.1 and 2.2:

     ```
     ALLOCate F(ADMPC) DSN('pplib.GDDM.GDDMSAM') SHR REUSE
     ```

     For GDDM 2.3 or later:

     ```
     ALLOCate F(ADMPC) DSN('pplib.GDDM.SGDDMSAM') SHR REUSE
     ```

     If you are using a programmable workstation and you communicate with the host using a 3270 emulator session, the GDDM-OS/2 link files must be installed on your workstation. Note that the high-level qualifier for the GDDM data set might vary from installation to installation.

4. Allocate the data set SYS1.SCBDCLST to the SYSPROC ddname concatenation.

   Note: SYS1.SCBDCLST has a fixed record format (RECFM=FB). If your other SYSPROC data sets have a variable record format (RECFM=V or VB), copy SYS1.SCBDCLST to a data set with variable record format. You have to remove sequence numbers (in the CLIST) after copying the members to a data set with variable record format.
5. For processing of large IODFs, the size of your TSO region may not be sufficient. When you specify the region size on the TSO logon panel, calculate as follows:

   ```
                   2 x IODF size + 4 MB
   Example:

   Assumed IODF size:  8000 blocks, 4 KB per block = 32 MB

   Suggested region size:  68 MB
   ```
6. For setup requirements when using HCD via the HCD LDAP Backend, see Chapter 14, "How to provide LDAP support for HCD," on page 347.

To run HCD, the modules in SYS1.SCBDHENU (containing HCD help members) and SYS1.NUCLEUS (containing the UIMs) must be accessible. For the HCD dialog, you can achieve this in three ways:
1. Include SYS1.SCBDHENU in the linklist concatenation (LNKLSTxx member).
2. Include SYS1.SCBDHENU in the JOBLIB/STEPLIB concatenation of the TSO logon procedure.
3. Include SYS1.SCBDHENU in the ISPLLIB load library concatenation. If you include SYS1.SCBDHENU into the ISPLLIB concatenation, ISPLLIB must be allocated prior to invoking ISPF (in TSO or through JCL in the logon procedure). ISPLLIB is used as a tasklib by ISPF and is searched first. A pure LIBDEF for ISPLLIB does not suffice to invoke HCD.

HCD allocates SYS1.NUCLEUS automatically at initialization time if the keyword `UIM_LIBNAME` is not specified in the HCD profile. You may use the HCD profile to specify a different name and the volume serial number of the library that contains the UIMs (see also "Defining an HCD profile" on page 25). If you do not specify a name in the profile, SYS1.NUCLEUS is assumed as default name for the UIMs. For IPL, however, the UIMs and UDTs must be in SYS1.NUCLEUS.

The following HCD libraries will get defined via the ISPF 'ISPEXEC LIBDEF' command if HCD is invoked via CLISTs CBDCHCD and CBDCHCD1:
- SYS1.SCBDPENU for panels
- SYS1.SCBDMENU for messages
- SYS1.SCBDTENU for tables

How to invoke HCD in dialog mode

To invoke HCD in dialog mode, ISPF must be active. After you have invoked ISPF, you can use the CLIST CBDCHCD to activate the HCD function. You may add HCD to an ISPF selection menu, for example, the ISPF/PDF Master Application Menu (ISP@MSTR), and invoke HCD using the CLIST CBDCHCD. Figure 8 on page 23 shows a sample panel that illustrates how to include HCD on the main ISPF/PDF panel. Alternatively, the CLIST can be invoked from the ISPF option 6, or from the command line.

Note that HCD must be invoked with the "NEWAPPL" parameter.

To ensure that the CBDCHCD CLIST can successfully allocate the following libraries, make sure that these libraries are cataloged:

- SYS1.SCBDPENU --> HCD Panel Library
- SYS1.SCBDMENU --> HCD Message Library
- SYS1.SCBDTENU --> HCD Table Library

Note: The HCD Panel, Message, and Table libraries are allocated by the CBDCHCD CLIST using the LIBDEF function of ISPF. If other ISPF Dialogs are using the LIBDEF function of ISPF, and you do not want HCD to overlay their allocations, you can update your ISPF startup by adding the HCD data sets to the ISPF ISPPLIB, ISPMLIB, and ISPTLIB concatenations.

```
%-----------------------  ISPF MASTER APPLICATION MENU  ----------------------
%OPTION  ===>_ZCMD                                          +USERID   - &ZUSER +
%                                                           +TIME     - &ZTIME
%                                                           +TERMINAL - &ZTERM
%                                                           +PF KEYS  - &ZKEYS
%   1 +ISPF/PDF    - ISPF/Program Development Facility
%   2 +SMP/E       - System Modification Program/Extended
%   3 +HCD         - Hardware Configuration Definition
%   4 +SDSF        - SYSTEM Display and Search Facility
%   5 +RACF        - Resource Access Control Facility
%   X +EXIT        - Terminate ISPF using list/log defaults
%
+Enter%END+command to terminate ISPF.
%
)INIT
  .HELP    = ISP00005     /* Help for this master menu            */
  &ZPRIM   = YES          /* This is a primary option menu        */
)PROC
  &ZSEL = TRANS( TRUNC (&ZCMD,'.')
               1,'PANEL(ISR@PRIM)  NEWAPPL(ISR)'
               2,'PGM(GIMSTART) PARM(&ZCMD) NOCHECK NEWAPPL(GIM)'
               3,'CMD(CBDCHCD) PASSLIB'
               4,'PGM(DGTFMD01) PARM(&ZCMD) NEWAPPL(DGT) NOCHECK '
               5,'PANEL(ICHP00) NEWAPPL(RACF)'
              ' ',' '
                X,'EXIT'
                *,'?' )
IF (&ZCMD = '%VSDSF')
    &ZSEL = 'PGM(ISFISP) NEWAPPL(ISF)'
)END
```

Figure 8. Sample ISPF Master Application Menu

Tailoring the CLIST CBDCHCD

A sample CLIST CBDCHCD (CBDCHCDJ for Kanji) is provided in SYS1.SCBDCLST to assist you in invoking HCD from the ISPF dialog. It allocates the HCD message log file (HCDMLOG), the trace data set (HCDTRACE), and the HCD term file (HCDTERM) with a default high-level qualifier of the userID (&SYSUID.). The CLIST also allocates the HCD data sets SYS1.SCBDPENU, SYS1.SCBDMENU, and SYS1.SCBDTENU (or SYS1.SCBDPJPN, SYS1.SCBDMJPN, and SYS1.SCBDTJPN for Kanji).

In CBDCHCD and CBDCHCDJ, the ISPEXEC LIBDEF statement for ISPPLIB, ISPTLIB and ISPMLIB is done with the STACK option. This leaves existing LIBDEFs untouched, so that after exit, the existing HCD libraries ISPPLIB, ISPTLIB and ISPMLIB are freed again.

If the prefixes for message, trace, and term data sets do not conform to the installation conventions, you may tailor the CLIST to match your installation defaults. If you want HCD to use your TSO prefix as the high level qualifier, you can call CBDCHCD with the parameter NOPREF(YES). This causes HCD to use the qualifiers &PREFIX..&SYSUID.

CBDCHCD invokes another CLIST, CBDCHCD1. You may tailor this CLIST as well.

In any case, use the application ID for HCD: NEWAPPL(CBD).

The CLIST also tailors the ISPF environment by:
- Setting PFSHOW on. This forces all 24 function keys to be shown (if ISPF is defined to show 24 function keys).
- Setting lower PFKEYS as primary function keys.

Note: HCD can be invoked with the activated TRACE option, when you have specified parameter TRACE(YES) in the default CLIST. The size of the trace data set can be changed by modifying the CLIST. In addition, you can delete the HCD provided trace data set and allocate one according to your specific needs.

Starting and ending HCD

You start HCD like any other ISPF application in your TSO/E system. The procedure for starting an application is different for each installation but you can probably select HCD from a menu of applications that are available in your system. This causes a TSO/E CLIST to be executed. The sample CLIST that is supplied with HCD is CBDCHCD in library SYS1.SCBDCLST.

After you start HCD, the first panel that you see contains a menu of the HCD primary tasks:

```
                       z/OS V1.7 HCD
Command ===> _________________________________________

                           Hardware Configuration

Select one of the following.

1 _1.  Define, modify, or view configuration data
   2.  Activate or process configuration data
   3.  Print or compare configuration data
   4.  Create or view graphical configuration report
   5.  Migrate configuration data
   6.  Maintain I/O definition files
   7.  Query supported hardware and installed UIMs
   8.  Getting started with this dialog
   9.  What's new in this release

For options 1 to 5, specify the name of the IODF to be used.

I/O definition file . . . 'DOCU.IODF01.WORK'                    +


F1=Help     F2=Split    F3=Exit     F4=Prompt   F9=Swap    F12=Cancel
F22=Command
```

Figure 9. HCD Primary Task Selection Panel

If you select task "1. Define, modify, or view configuration data", as shown in Figure 9 and press the Enter key, you trigger this task using the IODF 'DOCU.IODF01.WORK'.

To end an HCD session, either return to the primary task selection panel and press the F12=Cancel key or the F3=Exit key twice or use the fast path command GOTO X.

Notes:

1. Chapter 12, “How to invoke HCD batch utility functions,” on page 307 explains how you can invoke HCD from another program using the HCD programming interface.
2. To see a description of new functionality of the current release, select option **9. What’s new in this release**. Here you may find information about SPEs that are delivered after the completion of this document.

Defining an HCD profile

Before you start HCD, you can define an HCD profile to tailor HCD supplied defaults and processing options to your specific installation needs. Using a profile is optional and will remain in effect for the entire HCD session. At initialization time, HCD reads the profile and processes each statement in turn.

The profile statements are contained in a data set allocated to the DD name HCDPROF. The following statement, for example, allocates the data set to HCDPROF:

```
//HCDPROF DD DSN=&SYSUID..HCD.PROFILE,DISP=SHR
```

The data set must have the following characteristics:
- Be either a sequential or a member of a partitioned data set
- Have fixed-length, fixed-blocked record format
- Have 80 character records.

It is possible to define profile options using inline statements. The following example shows an inline profile definition:

```
//HCDPROF DD *
MIGRATE_EXTENDED = YES
VM_UIM = NO
/*
```

Note: When starting an HCD batch job from the dialog, the HCD profile data set is not passed automatically to the job but, if required, has to be specified in the JCL.

The following rules apply to a profile statement:

```
                        ┌─,─────┐
                        ▼       │
►►──keyword──┬─────┬────value───┴──────────────────────────►◄
             └──=──┘
```

The specifications for a profile statement are as follows:

keyword
is the name of the HCD keyword; each keyword starts on a new line.

= can be omitted, if the keyword is followed by a blank.

value
specifies one or more values to be assigned to the keyword.

Use /* and */ as delimiters for comments in a profile statement. An asterisk (*) in column one can be used for comments as well; a single comment can span several lines. Do not use sequence numbers in your HCD profile.

Keywords

The following keywords are supported for a profile statement:

Volume serial number to allocate output data sets

To place the IOCP, HCPRIO, and JES3 INISH stream checker data sets to a specific volume within HCD, you can specify this target volume via two profile options:

HCDDECK_VOL
: Specifies the volume serial number to allocate to a new IOCP, HCPRIO or other data set containing I/O configuration statements.

HCDJES3_VOL
: Specifies the volume serial number to allocate a new JES3 initialization stream checker input data set.

In a non-SMS managed environment, the generated corresponding output data set is placed on the indicated volume if you specify one of these options in the HCD profile. The profile option is not used, if the specified output data set already exists on a different volume. In this case, the new output data set replaces the existing data set on this volume.

The two options have no effect in an SMS managed environment since SMS overrules the VOLUME parameter.

If the keywords are omitted, the placements of the IOCP, HCPRIO, JES3 INISH, and other I/O configuration data sets are controlled via SMS or ESOTERIC system defaults (ALLOCxx of SYS1.PARMLIB or the UADS, respectively).

Volume serial numbers to allocate activity log, change log and HCM MCF data set

ACTLOG_VOL
: If the dataset names are not managed by SMS, this keyword specifies the volume serial number to allocate a new activity log; can be up to 6 characters long. Using an asterisk (*) indicates that the activity log file will be placed on the same volume where the associated IODF resides.

CHLOG_VOL
: If the dataset names are not managed by SMS, this keyword specifies the volume serial number to allocate a new change log; can be up to 6 characters long. Using an asterisk (*) indicates that the change log file will be placed on the same volume where the associated IODF resides.

MCF_VOL
: If the data set names are not managed by SMS, this keyword specifies the volume serial number where to allocate the MCF; can be up to 6 characters long. Using an asterisk (*) indicates that the MCF data set will be placed on the same volume where the associated IODF resides.

Automatic activity logging

CHANGE_LOG
: YES/NO. Specifies whether you want to have change logging enabled (YES). The default is NO. If enabled, and HCD additionally maintains an activity log file for the IODF, then HCD logs all updates applied to the IODF in a change log file, and automatically generates activity log entries for updates on HCD objects, like for example, add, delete, update or connect, disconnect. These entries are proposals and are presented in the

activity log panel where you can modify them before you exit the IODF (see also “Activity logging and change logging” on page 54).

Allow or prohibit mixed esoterics

MIXED_ESOTERIC

YES/NO. Specifies whether you want to allow or prohibit mixed devices (DASD and TAPE) under the same esoteric name. If you specify NO, which is the default, and your configuration contains an esoteric with mixed DASD and TAPE devices, the request to build a production IODF will fail with error message CBDA332I. If you specify YES, HCD issues message CBDA332I as warning message and continues the request.

HLQ for exporting IODFs

EXPORTED_HLQ

As a default, when exporting an IODF, the generated sequential data set is written with the high-level qualifier (HLQ) of the userID that issued the Export IODF function. If this convention is not adequate for your installation, you can use the keyword EXPORTED_HLQ to specify a different HLQ (up to 8 characters).

Allocation space for data sets allocated due to HCM requests

ALLOC_SPACE

This HCD profile option lets you overwrite the default allocation (CYL,50,50) for data sets that are temporarily allocated due to HCM requests, like HCDASMP, HCDRPT, HCDIN. For example, specify: `ALLOC_SPACE = HCDASMP,nn` where `nn` is a decimal number containing the new value used for primary and secondary allocation (in CYL).

Extending allocation space for MCF data set

MCF_EXTENSION

This HCD profile option lets you extend the allocation data space for MCF data sets to provide space for updates. With this keyword, you specify the percentage of additional space that is to be allocated when defining an MCF data set. Per default an MCF data set is allocated with 30 percent additional space than actually needed to hold the MCF data. You can use this space for updates that consume data space without the need to allocate a new MCF and delete the old one. For example, MCF_EXTENSION = 50 allocates 50% additional space.

Name and volume serial number for UIM library

UIM_LIBNAME

Specifies the name of the data set containing the UIMs, the associated UDTs, and any help members for the UIMs. If the keyword is omitted, SYS1.NUCLEUS is assumed (Note: only UIMs residing in SYS1.NUCLEUS are read during IPL!). When UIM_LIBNAME is specified, HCD does not implicitly access SYS1.NUCLEUS for loading the UIMs. If you specify an asterisk (*) as data set name, HCD assumes that the UIM data set (including SYS1.NUCLEUS) is part of the ISPF load library concatenation chain, contained in the JOBLIB/STEPLIB concatenation chain, or specified in the active LNKLSTxx member.

You can only define one data set with the UIM_LIBNAME statement. If you want to specify several data sets, specify an asterisk (*) as data set name and specify the data sets in the JOBLIB/STEPLIB concatenation chain.

UIM_VOLSER

Specifies the volume serial number of the UIM library. Required only if the data set is not cataloged and specified via keyword UIM_LIBNAME.

Load VM UIMs

VM_UIM
: YES/NO. Specifies that VM UIMs will or will not be loaded. The default is YES. Installations without VM should specify NO to gain some performance improvement during HCD initialization.

Options for text reports

LINES_PER_REPORT_PAGE
: Specifies the maximum number of lines per page for reports. The default value is 55.

UPPERCASE_ONLY
: YES/NO. Specifies whether all HCD reports will be written in uppercase or not. This is useful when using printers that do not have the English codepage. The default is NO.

Layout of graphical reports

GCR_SCALE
: Specifies the scaling factor for graphical reports when using BookMaster. The default is *GCR_SCALE=.6*.

GCR_COMPACT
: YES/NO. Specifies whether to see more objects in a graphical report. The default is NO. Depending on the report type, a different maximum number of objects is shown on one page:

Report Type	COMPACT=NO	COMPACT=YES
CU	12 channels, 8 control units	16 channels, 10 control units
LCU	8 channels, 8 control units	8 channels, 8 control units
CHPID	8 channels, 64 control units	16 channels, 64 control units
Switch	1 switch	1 switch
CF	1 coupling facility	1 coupling facility

GCR_FORMAT
: Specifies the formatting type:

BOOKIE
: For BookMaster. This is the default.

DCF To create a data set for DCF containing script commands.

GML To create a data set for DCF containing GML tags.

GDF To create one or more members in GDF format for printing with GDDM (not for batch).

GCR_FONT
: Specifies the font to be used for printing; applicable only if GCR_FORMAT=DCF or GCR_FORMAT=GML was specified. Use the appropriate font supported by your installation. For information on how to create a graphical report, see "Create or view graphical configuration reports" on page 238.

Color settings for graphical display function

(The following colors are valid specifications: green, red, blue, black, purple, pink, yellow, brown, and white.)

COLOR_NORM
: Specifies the color used when drawing the picture. Make sure that the color is visible on defaulted or specified background. The default is GREEN.

COLOR_TEXT
: Specifies the color used for any text in the picture. The default is GREEN.

COLOR_HIGH
: Specifies the color to be used when identifying a focused object. The default is RED.

COLOR_BACKGROUND
: Specifies the background color. If nothing is specified, the graphical display function uses the standard background of the terminal.

TRACE command

TRACE
: Activates and deactivates the HCD trace facility. All parameters of the TRACE command are valid except the ID=IODF parameter. You cannot use anything else (for example, no comments and no line numbers) in the same line except the TRACE statement. For information on syntax and description on TRACE command, see "TRACE command" on page 469.

Support of TSO option NOPREFIX

TSO_NOPREFIX
: YES/NO. Specifies whether the TSO profile option NOPREFIX is recognized by HCD. The default is NO. If you specify TSO_NOPREFIX=YES, and the TSO option NOPREFIX is active, all data set names specified in the HCD dialog are taken as is, i.e. HCD does not add a high-level qualifier. Data set names that are generated by HCD act independent of the TSO option NOPREFIX, and the user ID is added as the high-level qualifier.

Esoteric token when migrating MVSCP input data sets

ESOTERIC_TOKEN
: YES/NO. YES specifies that HCD will assign esoteric tokens in ascending order when migrating an MVSCP input data set. NO specifies that no tokens will be assigned. The default is NO.

Control unit type when migrating IOCP input data sets

MAP_CUTYPE
: Specifies how a control unit type in an IOCP input data set is mapped to a control unit type in the IODF. Specify one or more of the following parameters:

```
MAP_CUTYPE = xxxxx,yyyy-yy
```

xxxxx
: is the control unit type specified in an IOCP input data set

yyyy-yy
: is the control unit type and model to be used in the IODF.

For example parameters, see the sample profile in Figure 10 on page 32.

Extended migration

MIGRATE_EXTENDED
: YES/NO. Specify YES to exploit the extended migration possibilities as described in "Changing I/O configurations by editing data sets" on page 273.

If you specify NO (which is the default), the additional keywords are not generated during IOCP build and when re-migrating IOCP input data sets, the migration function ignores the commented *$HCDC$ and *HCD tags.

Bypass IODF information update

BYPASS_UPD_IODF_FOR_SNA
: YES/NO. This provides a possibility of bypassing the attempt to update

the IODF information for SNA processors after having successfully built the IOCDS. This avoids the attempt to update the IODF with IOCDS status information, which usually will fail as a result of the IODF being in an exclusive access mode with the dialog.

If you specify NO (which is the default), then for SNA and non-SNA processors, an attempt is made to update IOCDS information in the IODF after the IOCDS has been built successfully.

If you specify YES then, for SNA processors, no attempt is made to update the IODF after the IOCDS has been built successfully.

Display information during ACTIVATE

SHOW_IO_CHANGES
: YES/NO. When performing both a hardware and software change, specify YES (which is the default) to get information about the channel paths, control units, and devices that are deleted, modified, or added.

Loading an IODF into a data space

IODF_DATA_SPACE
: YES/NO. If you specify YES (which is the default), the IODF is loaded into a data space, thereby removing restrictions on the size of the IODF imposed by address space limitations.

If you specify NO, the IODF is loaded into the user address space.

IODF name verification for batch jobs

BATCH_IODF_NAME_CHECK
: YES/NO. If you specify YES (which is the default), HCD checks if the IODF specified for a batch job conforms to the naming convention as described in "IODF naming convention" on page 35. Processing of IODFs with invalid names is limited to deletion.

If you specify NO, HCD does not check the IODF names specified for batch jobs.

IODF checker automation

CHECK_IODF
: YES/NO. If you specify YES, HCD checks an IODF for consistency and structural correctness whenever the IODF accessed in update mode is being unallocated. This corresponds to the TRACE ID=IODF command and will consume processing time depending on the size of the IODF.

If you specify NO (which is the default), HCD does not check the IODF automatically.

Delay device regrouping

DELAYED_GROUPING
: YES/NO. If you specify YES, HCD performs any necessary device regrouping after a device group split only when the IODF is closed. This gives a better response time in the HCD dialog for large IODFs.

If you specify NO (which is the default), HCD performs a necessary device regrouping each time when users exit the ***I/O Device List***, or, in case the ***I/O Device List*** was called from either the ***Operating System Configuration List*** or the ***Channel Subsystem List***, when leaving these lists.

Default settings for OS parameters

OS_PARM_DEFAULT

This keyword overrides a parameter default value set by the UIM. The value is used as a default on the HCD Define Device Parameters/Features panel. The command structure is:

```
OS_PARM_DEFAULT = xxxxxx,yyyyyy

where:

xxxxxx is the parameter keyword
yyyyyy is the new parameter default value
```

The LOCANY default value, for example, is NO. It can be changed to YES by specifying the HCD profile option:

```
OS_PARM_DEFAULT = LOCANY,YES
```

Note: Default values cannot be set differently for different device types. Features, for example SHARED, cannot be defaulted using this keyword.

Extension of the attachable device list of a control unit

CU_ATTACHABLE_DEVICE

This keyword allows the attachable device list of a control unit to be extended to include additional device types. Both the control unit type and the device type must be defined via UIMs. The command structure is:

```
CU_ATTACHABLE_DEVICE = xxxxxx,yyyyyy

where:

xxxxxx is the control unit type
yyyyyy is the additional device type
```

Note that more than one device type can be added to the same control unit type.

```
Example:
  CU_ATTACHABLE_DEVICE = RS6K,3174
  CU_ATTACHABLE_DEVICE = RS6K,3274
```

Example

The following figure shows a profile with sample data:

```
/*********************************************************************/
/*                                                                   */
/*            HCD PROFILE FOR z/OS RELEASE 1.7 HCD                   */
/*                                                                   */
/*********************************************************************/
/*                                                                   */
/* Options for tailoring the HCD dialog                              */
/*                                                                   */
TSO_NOPREFIX = NO             /*ENABLE TSO  NOPREFIX                 */
OS_PARM_DEFAULT = LOCANY,YES  /*   DEFAULT PARAMETERS                */
OS_PARM_DEFAULT = DYNAMIC,NO  /*   DEFAULT PARAMETERS                */
/*                                                                   */
/* Options for migration                                             */
/*                                                                   */
MIGRATE_EXTENDED = YES        /*ENABLE MIGRATION ENHANCEMENTS        */
MAP_CUTYPE = 3880,3880-23     /*REPLACE CU TYPE DURING MIGRATION     */
MAP_CUTYPE = 3705,3745        /*REPLACE CU TYPE DURING MIGRATION     */
ESOTERIC_TOKEN = YES          /*ESOTERIC TOKEN IN ASCENDING ORDER    */
/*                                                                   */
/* Options for  print/display                                        */
/*                                                                   */
LINES_PER_REPORT_PAGE = 60    /*MAX. NUMBER OF LINES PER PAGE        */
GCR_FORMAT = DCF              /*GRAPHIC DATA FORMAT BOOKMASTER       */
GCR_FONT = X0GT20             /*GOTHIC TEXT 20-PITCH (FOR 3820 PRT)  */
GCR_COMPACT = YES             /*GRAPHIC COMPACT VIEW                 */
COLOR_NORM = BLACK            /*DEFAULT = GREEN                      */
COLOR_TEXT = BLUE             /*DEFAULT = YELLOW                     */
/*                                                                   */
/* Options for activation                                            */
/*                                                                   */
BYPASS_UPD_IODF_FOR_SNA = YES /*NO IODF UPDATE WITH IOCDS DATA       */
/*                                                                   */
/* Options controlling placement of data sets                        */
/*                                                                   */
ACTLOG_VOL = *                /*ACTIVITY LOG ON SAME VOLUME AS IODF  */
HCDDECK_VOL = D83WL2          /*VOLUME FOR CONFIGURATION DATA SET    */
HCDJES3_VOL = D83WL4          /*VOLUME FOR JES3 OUTPUT DATA SET      */
/*                                                                   */
/* Options for enhanced validation                                   */
/*                                                                   */
CU_ATTACHABLE_DEVICE = RS6K,3274   /* EXTENT ATTACHABLE DEVICE LIST  */
```

Figure 10. Example of an HCD Profile

Customizing HCD EXEC procedures

Some of the HCD tasks, invoked from the dialog, generate batch jobs. These batch jobs use EXEC procedures, as shown in Table 3.

Your installation can use normal ISPF or TSO/E facilities to change the job control statements in these EXEC procedures. They are stored in the library SYS1.PROCLIB. You can customize these procedures according to your own needs.

You can also modify the EXEC procedures by using JCL overwrite statements in the HCD dialog. Thus, you can, for example, add a statement that refers to the HCD profile. See "Job statement information used in panels" on page 75 on how to specify JCL statements in the HCD dialog.

Table 3. Batch Jobs Used by the HCD Dialog

HCD Task	EXEC Procedure	Job Step Name	More Details
Build an IOCDS	CBDJIOCP	GO	see "Build an IOCDS or an IOCP input data set" on page 316
Build an IOCP input data set	CBDJIOCP	GO	see "Build an IOCDS or an IOCP input data set" on page 316
Print a configuration report	CBDJRPTS	GO	see "Print configuration reports" on page 324
Compare IODFs and CSS/OS views	CBDJCMPR	GO	see "Compare IODFs or CSS/OS Reports" on page 328
Import an IODF	CBDJIMPT	IMP	see "Import an IODF" on page 332
Transmit part of an IODF	CBDJXMIT	GO	see "Transmit a configuration package" on page 53

Chapter 4. How to work with I/O definition files (IODF)

Overview

This information unit includes:
- IODF naming convention
- Working with I/O definition files (specify, change, create, view, backup, delete, copy, export, import, and upgrade IODFs)
- Working with large IODFs
- Activity Logging
- Using an IODF among different release levels

When you start an HCD session, you need to specify the IODF that HCD is to use. How to do this, how to change to another IODF, and how to use HCD tasks to maintain your IODFs is described below.

Before you can activate your configuration, you must build a production IODF. This task is described in "Build a production IODF" on page 196.

Note: The IODF data sets must be cataloged so that you can use them with HCD.

IODF naming convention

You need to comply to naming conventions for work IODFs, production IODFs, and further data sets associated to an IODF (activity log, change log and HCM MCF data set).

The IODF is a VSAM LINEAR data set with different names for the cluster component and the data component. The name of the data set with a cluster component has the format:

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}.CLUSTER'
```

The name of the data set with a data component has the format:

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}'
```

Work IODF

The data set name for a work IODF has the format of:

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}'
```

hhhhhhhh
: is the high-level qualifier; up to 8 characters long.

cc
: is any two hexadecimal characters (that is, 0-9 and A-F).

yyyyyyyy
: are optional qualifiers, separated by a . and up to 8 characters long. The following qualifiers must not be used as last qualifier: CLUSTER, ACTLOG, CHLOG or MCF.

You can use any number of optional qualifiers but do not make the total name longer than 35 characters because, in some circumstances, HCD appends an additional qualifier.

If you use a change log or an HCM master configuration file, the total IODF name must not exceed 29 characters.

If you omit the high-level qualifier and the enclosing single quotation marks, HCD automatically adds your user prefix (your user ID is the default).

Production IODF

The data set name for a production IODF has the same format as a work IODF. You may specify additional qualifiers to differentiate among IODFs (for example for backup reasons). However, the optional qualifiers must be omitted if the IODF is to be used for IPL or dynamic activation. Thus, the format would be:

```
'hhhhhhhh.IODFcc'
```

hhhhhhhh
: is the high-level qualifier; up to 8 characters long.

cc
: is any two hexadecimal characters (that is, 0-9 and A-F).

Associated data sets

Files associated to an IODF, if used, also must conform to the IODF naming conventions, plus a required last qualifier:

Activity log (a sequential fixed 80 character data set):

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}.ACTLOG'
```

Change log (a VSAM LINEAR data set with cluster component and data component):

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}.CHLOG'
```

HCM master configuration file (MCF, a VSAM LINEAR data set with cluster and data components):

```
'hhhhhhhh.IODFcc{.yyyyyyyy. ... .yyyyyyyy}.MCF'
```

Create or specify an IODF

You specify the name of the IODF that you want to use on the primary task selection panel. The first time you use the dialog, HCD puts the default name `SYS1.IODF00.WORK` in the IODF name field (see Figure 27 on page 62). You can type over this name to specify the name you want to use.

If you specify an IODF name that does not exist, HCD assumes that you intend to create a new IODF and displays a panel to let you specify the required attributes. HCD then creates and automatically catalogs the IODF.

```
 ─────────────────── Create Work I/O Definition File ────────────────────


 The specified I/O definition file does not exist. To create a new
 file, specify the following values.

 IODF name  . . . . . . 'DOCU.IODF01.ZOS110.HCDUG.WORK'

 Volume serial number . ______  +

 Space allocation . . . 1024    (Number of 4K blocks)

 Activity logging . . . Yes     (Yes or No)

 Multi-user access  . . No      (Yes or No)

 Description  . . . . . ________________________________________
                        ________________________________________
                        ________________________________________

  F1=Help    F2=Split   F3=Exit    F4=Prompt  F9=Swap   F12=Cancel
```

Figure 11. Create Work I/O Definition File

- Volume serial number (of the data volume the IODF will reside on)

  This entry is ignored if your system is managed by SMS, otherwise it is mandatory.
- Space allocation

  The online HELP gives advice on how much space to allocate. If you run out of space while working with an IODF, you can use the ***Copy IODF*** task to copy the IODF to a larger data set.
- Activity logging

  You have to decide now whether you want HCD to maintain an activity log for the IODF; you cannot specify it later. If you want to use an activity log, your system must have Program Development Facility (PDF) installed.
- Multi-user access

  Specify whether or not you want to enable the IODF for multi-user access.
- Description

  Here you may enter any useful additional information concerning the IODF, for example, the system it applies to, a special purpose of the IODF, or the author.

The IODF remains in effect throughout all tasks of your current session and later HCD sessions, until you change it.

Multi-user access

Up to z/OS V1R9 HCD, multiple users could read an IODF simultaneously, but no user could read an IODF while it was accessed in update mode by another user. Also, a user could only update an IODF, if no other user accessed the IODF, neither in read nor update mode.

Starting with release z/OS V1R10 HCD, when creating an IODF, you can specify a multi-user access option in the ***Create Work I/O Definition File*** dialog (Figure 11). The default is single-user access.

Having exclusive access to an IODF, users can also switch between single-user mode and multi-user access using an option in the ***Change I/O Definition File Attributes*** dialog.

Notes:

1. To enable an IODF for multi-user access you need ALTER access authority.
2. You can check whether the multi-user access property is enabled for an IODF using ***View I/O definition file information*** from the ***Maintain I/O Definition Files*** task.

With the multi-user access option specified, an IODF is kept in exclusive update mode for a user only for the duration of a single transaction. If the updates of this transaction are committed, another user may update the IODF without requiring the first user to release it.

If a user is updating a multi-user access enabled IODF, HCD implements the following processing: HCD locks the IODF. If multiple subsequent users now also want to apply concurrent updates to the same IODF, they must wait in a queue. However, since the first user's single transaction may last a split-second only, HCD repeats all other users' subsequent update requests a couple of times. If all attempts fail, for example, because the first user updates the IODF using the dialog and is delaying required input, HCD will notify all other requesting users with a message, telling who is currently updating the IODF.

Associated change log files inherit the multi-user access ability from the IODFs.

> **Note:**
> When several users simultaneously work on the same IODF, exploiting the multi-user access capability, it is recommended that they co-ordinate their activities in order to ensure the consistency and integrity of the changes made to the IODF.

How to release a lock after an abnormal termination: In most cases of abnormal termination while working with IODFs in multi-user access, HCD invokes a recovery routine that deletes a pending lock. If, however, HCD cannot enter this routine, the lock remains active, and any user, when trying to access the IODF next time, receives a message about who is holding the lock.

In such a case, a user with ALTER access right must re-access the IODF exclusively and select action ***Change I/O definition file attributes*** to set back the multi-user access capability to NO. This action deletes the lock, and multi-user access can now be reactivated for that IODF.

Sharing IODFs

If you want to share an IODF across two or more systems, you must:

1. Catalog the IODF in the user catalog that is shared by those systems.
2. Define an ALIAS to that catalog in the master catalog of each system that uses the IODF (for details, refer to "Catalog considerations" on page 343).

Note: Control of sharing the IODF resource between multiple systems is achieved via Global Resource Serialization (GRS).

> **Important:**
> If you update an IODF simultaneously from different systems that are *not* in the same GRS complex, you may destroy data in the IODF.

Deciding on the number of IODFs

The decision whether to create one IODF for each processor, or to combine the I/O definitions for two or more processors in a single IODF, depends on your environment. This section explains when it is advantageous or even necessary to keep the I/O definitions of two or more processors in the same IODF.

Shared control units and devices
: If control units and devices are shared by different processors, the I/O definitions for these processors should be kept in the same IODF to keep change effort to a minimum and to avoid conflicting definitions.

Processor and related OS configuration(s)
: For a full dynamic reconfiguration, the IPLed OS configuration must be in the same production IODF as the processor configuration selected for POR.

Coupling facility support
: For coupling facility support, you have to maintain your coupling facility definitions for the processors to be connected in the same IODF.

Switch connections
: It is recommended that you maintain your switch configurations in the same IODF as the hardware and software configuration definitions to provide complete validation of the data path.

: In order to lookup the port connections of a switch, all connected objects to the ports of a switch have to be defined in the same IODF.

CPCs of an S/390 microprocessor cluster
: To manage IODFs and IPL parameters within the CPCs of an S/390 microprocessor cluster from a focal-point HCD, the corresponding processor configurations have to be kept in the same IODF.

Dynamic sysplex reconfiguration
: To dynamically reconfigure the I/O configuration of a system within a sysplex from a focal-point HCD, the processor and OS configuration of the sysplex system have to be defined in the same IODF.

CTC connection report
: All CTC connections listed in a CTC connection report must be defined in the same IODF. Misconfigurations can be detected only within the scope of one IODF.

Reporting
: The scope of the reports (textual or graphical) is a single IODF. All I/O definitions required for a report must be kept in the same IODF.

Validation
: The scope of the validation function is a single IODF.

HCM
: The scope of the configuration shown by HCM is a single IODF.

These requirements and recommendations may lead to a large IODF, depending on the size of the installation. The number of elements in the single IODF may be too large for effective management. HCD provides the possibility of creating manageable *subset IODFs* with a scope limited to a part of the I/O configuration from a *master IODF* describing the entire configuration. For details on this IODF management strategy refer to "The master IODF concept" on page 40.

The master IODF concept

In order to take full advantage of the available HCD functions and to keep a maximum of freedom for reconfigurations it is proposed to keep a master IODF. A master IODF may contain the I/O definitions for an entire enterprise structure. However, a user may decide to divide the I/O configuration definitions of the whole enterprise into several master IODFs, where little or no interference is expected.

Major configuration changes are done in the master IODF. These include:
- processor configurations,
- OS configurations,
- switch configurations, and
- definitions spanning multiple configurations, e. g. coupling facility connections.

After such changes have been made, a production IODF is built. From this IODF comprehensive reports can be obtained.

HCD provides a set of functions which allows the management of very large IODFs for their activation on individual systems, like POR, IPL, dynamic I/O changes, or for S/390 microprocessor management tasks. Using these functions, subset IODFs containing I/O definitions relevant to only one particular system may be built from the master IODF .

There are no strict rules about what a subset IODF must consist of. Typically it contains:
- a processor configuration with its related OS configuration, or
- all I/O configurations describing the CPCs in an S/390 microprocessor cluster, or
- all I/O configurations describing the systems of a sysplex.

The content of a subset IODF is specified in a configuration package (see “Work with configuration packages” on page 50).

The subset IODF is transferred to the corresponding target system where it is imported and used as the IODF for that system. A subset IODF constitutes a fully functional IODF. When it is built from a master IODF, the processor tokens are preserved. If necessary, updates concerning the target system alone may be carried out using the subset IODF. Subsequently, the subset IODF can be sent back to the system administering the master IODF and merged back into the master IODF, thereby updating it with the changes made at the target system.

The following chart illustrates the possible flow of I/O information according to the master IODF concept.

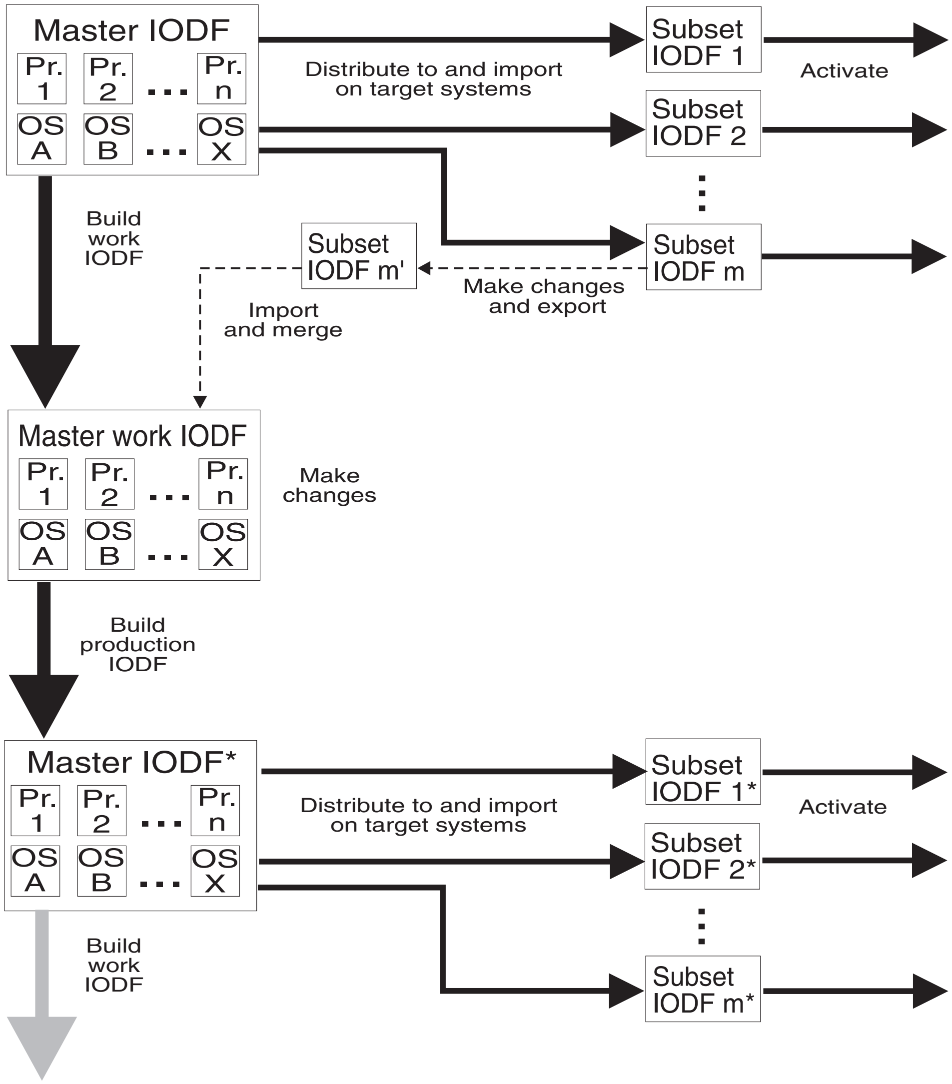


Figure 12. IODF Distribution/Merge Process

How HCD arranges devices into groups in an IODF

IODF versions up to V4 contained a separate device definition record for each single device. To reduce the size of IODFs and to improve the processing performance of large configurations, z/OS V1.7 HCD uses a new IODF format V5, arranging single devices into a device group, if they have the following characteristics in common:

- The device numbers of all devices are in consecutive sequence.
- All devices of the group have the same device type (unit, model) and attribute values (Serial-#, Description, VOLSER).
- All devices of the group are attached to the same control unit(s).
- All devices of the group are connected to the same processors/channel subsystems and have the same corresponding processor-specific attributes.
- All devices of the group are connected to the same operating systems and have the same corresponding OS-specific attributes (device type, parameters, features, console definition, subchannel set number).

- For each OS and each eligible device table (EDT) in the OS, all devices of the group are connected to the same esoterics.

Devices that adhere to the these rules are aggregated into device groups containing the maximum number of applicable devices. If you apply a change on one or more devices from a group, HCD checks how to rearrange the devices and device groups contained in the IODF in order to achieve the best possible organisation of devices into groups again according to the specified rules.

Change to another IODF

You can work with only one IODF at a time. If, during an HCD session, you want to change to another IODF, you must return to the primary task selection panel and specify the new IODF. If the old IODF has an activity log and has been modified, a panel is displayed to let you add a comment into the activity log ("Activity logging and change logging" on page 54 tells you how). The new IODF now becomes the current IODF.

Change a production IODF / Create a work IODF based on a production IODF

HCD allows you to perform all tasks on the data stored in a production IODF as long as you do not try to change it. If you try though, HCD displays the ***Create Work I/O Definition File*** panel where you can define a new work IODF based on the current production IODF.

HCD then copies the production IODF to that new work IODF, makes the work IODF the currently accessed IODF, and applies to it all further changes.

You must specify a new data set for the work IODF; you cannot use an existing one. HCD creates a default work IODF name by appending the qualifier WORK to the production IODF name. You can change this default work IODF name.

When you have completed the changes, you can use HCD to build a new production IODF from the work IODF.

View active IODF

HCD provides information about the IODF that has been used for last POR/IPL or for dynamic activation (that is, the currently active IODF); in addition the operating system ID and EDT ID used for IPL are shown, and the configuration token that is currently active in the HSA (hardware system area). For a description of this function, see "View active configuration" on page 219.

Backup work or production IODFs

You can use the ***Backup*** action bar choice on any action list panel to copy a work or production IODF to a backup data set. Thus you can keep track of different stages of the configuration as well as retrieve data lost by accident. When you do the first backup, you must also specify the volume serial number, if applicable, and the space allocation for the backup data set. HCD uses the normal catalog process to catalog copies of the IODFs.

If you backup a work IODF, you need to specify the name of the backup data set only once for each IODF (when you do the first backup). HCD saves the name of the backup IODF data set, so you can reuse this data set for each subsequent backup (or use a different one if you want).

If you backup a production IODF, HCD does not save the name of the backup data set, because a production IODF cannot be edited. It is suggested that you maintain a backup copy of your production IODF on a separate volume that is accessible from all systems that will be sharing the backup. When the primary IODF volume is inaccessible or the IODF itself is corrupted, the system can be IPLed through a backup IODF on the alternate volume.

It is also recommended that you choose an alternate high level qualifier for your backup IODF since a lost IODF volume may imply a lost IODF catalog. This high level qualifier can be cataloged in either the master catalog or in an alternate user catalog.

As an alternative method to create a backup IODF, you can use the following procedure:

1. Select ***Maintain I/O definition files*** from the ***Primary Task Selection*** (Figure 9 on page 24).
2. Select ***Copy I/O definition file*** from the ***Maintain I/O definition Files*** panel (Figure 13).
3. Specify the name of the backup IODF.

Maintain IODFs

HCD provides the tasks listed on the Maintain I/O Definition Files panel (Figure 13) to help you maintain your IODFs. You can reach this panel from the primary task selection panel (see Figure 27 on page 62).

```
┌─────────────── Maintain I/O Definition Files ───────────────┐
│                                                              │
│                                                              │
│ Select one of the following tasks.                           │
│                                                              │
│ __  1.  Delete I/O definition file                           │
│     2.  Copy I/O definition file                             │
│     3.  Change I/O definition file attributes                │
│     4.  View I/O definition file information                 │
│     5.  Export I/O definition file                           │
│     6.  Import I/O definition file                           │
│     7.  Work with Configuration Packages                     │
│     8.  Upgrade I/O definition file to new format            │
│                                                              │
│  F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel   │
└──────────────────────────────────────────────────────────────┘
```

Figure 13. Maintain I/O Definition Files

Delete an IODF

This task deletes an IODF. If the IODF has an activity log, that log is also deleted. Also, if an HCM master configuration file (MCF) is associated with the IODF, it is deleted along with the IODF. HCD asks you for confirmation before actually deleting the IODF.

Copy an IODF

You can invoke the task ***Copy I/O definition file from the Maintain I/O Definition Files panel (Figure 13).*** This task copies any IODF to another IODF (either existing or new). You must specify the name, volume serial number, if applicable, and the space allocation of the target data set. If the IODF has an activity log, that log may also be copied. Also, if an HCM master configuration file (MCF) is associated with the IODF, it is copied along with the IODF. However, a change log file (CHLOG), if available, is not copied.

During a definition task, you can use ***Copy IODF*** to copy the existing data to a larger data set if you have allocated insufficient space to a work IODF. In this case, you need to return to the primary task selection panel afterwards to specify the new data set as the IODF you are working with from now on.

You can also use the ***Copy I/O definition file*** task to upgrade a V4 IODF to a V5 IODF. The result of the copy process will always be a V5 IODF.

In the ***Copy I/O Definition File*** dialog, if you specify a target IODF that does not yet exist, HCD displays the dialog from Figure 14 where you can create a new target IODF. The space allocation default depends on the source IODF:

- for a V5 source IODF, the allocation default is the number of **allocated** blocks of the source IODF.
- for a V4 source IODF, the allocation default is the number of **used** blocks of the source IODF.

```
 ┌─────────────── Create New I/O Definition File ───────────────┐
 │                                                               │
 │                                                               │
 │ The specified target file does not exist.  To create a new    │
 │ file, specify the following values.                           │
 │                                                               │
 │ Volume serial number . . ______  +                            │
 │                                                               │
 │ Space allocation . . . . 102     (Number of 4K blocks)        │
 │ Activity logging . . . . No      (Yes or No)                  │
 │                                                               │
 │  F1=Help     F2=Split    F3=Exit     F4=Prompt   F9=Swap      │
 │ F12=Cancel                                                    │
 └───────────────────────────────────────────────────────────────┘
```

Figure 14. Create New I/O Definition File

If you copy an IODF which is enabled for multi-user access, this property is not inherited by a target IODF. However, an existing target IODF defined with the multi-user access property will always preserve this property, independent from the source IODF.

You can also invoke the ***Copy I/O definition file*** task in batch mode. For details refer to "Copy IODF" on page 323.

Change IODF attributes

With this task, you can change certain attributes of an IODF. You can change the description and you can enable or disable the IODF for multi-user access.

Note: To enable or disable an IODF for multi-user access you need ALTER access authority.

View an IODF

This task displays information about the currently accessed IODF. The information includes the type and version of the IODF, its description, the creation date, the last update, and how much of the allocated space for the IODF data set has been used.

You can also invoke the ***View IODF*** task from the ***View*** action bar, and by issuing the SHOWIODF command from the command line.

```
              View I/O Definition File Information


 IODF name  . . . . . . : 'IODFST.IODFD0'
 IODF type  . . . . . . : Production
 IODF version . . . . . : 5

 Creation date  . . . . : 2004-10-14
 Last update  . . . . . : 2004-10-21  14:48

 Volume serial number . : CMNSTC
 Allocated space  . . . : 2973   (Number of 4K blocks)
 Used space . . . . . . : 2965   (Number of 4K blocks)
    thereof utilized (%)  96

 Activity logging . . . : Yes
 Multi-user access  . . : No
 Backup IODF name . . . :

 Description  . . . . . : IODF for raised floor 710
                          For system D0, D2, D4 and D6
                          incl. sensed data and mig. SW data

 ENTER to continue.

 F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

Figure 15. View IODF information

Export an IODF

This task sends an IODF, and optionally, its activity log file to another (local or remote) system. On the Export IODF panel, specify or revise the IODF name you want to export, the user ID, or the nickname (only for an attended target system), node ID, and status (attended or unattended) of the operating system (OS) to which the IODF is to be sent.

If the target system is unattended, the IODF is sent as a job to the target system, which must be a system of type MVS. In this case no explicit action on the target system is required. You can specify whether to replace an existing IODF with the same name. If the existing IODF is the active IODF for the remote system HCD is running on, replace will not be possible.

If the target system is attended (receiving to be done by the user on the remote system), the IODF is sent to the target system as a sequential data set. There it has to be received by using the TSO RECEIVE command. As a second step the IODF is imported on the target system (see also “Import an IODF” on page 48).

To export an IODF, HCD uses the TSO command TRANSMIT. Therefore, HCD creates a cataloged sequential data set named `*tsoid*.EXPORTED.*iodfname*`, where *tsoid* is the sending TSO user ID or the TSO prefix, or is determined by the profile option `EXPORTED_HLQ`, and *`iodfname`* is the part of the IODF data set name after the high-level qualifier.

After processing the TRANSMIT command, the sequential data set is deleted.

If you have specified to send the selected IODF to a system with an operating system running in unattended mode, use the panel from Figure 16 to define the job control language (JCL) statements for importing the IODF on that unattended system.

```
 ---------------------- Define JCL for IODF Import -------------------------


 Specify or revise the job control statements for importing the IODF on an
 MVS system.

 //JOBNAME  JOB (ACCT,BOX),'USER',CLASS=CLASS,
 //            MSGCLASS=MSGCLASS,MSGLEVEL=(1,1),
 /*LEAVE THIS JOB CARD UNCHANGED: USERID AND PASSWORD ARE GENERATED
 /*ROUTE    XEQ HCD3
 _______________________________________________________________________
 _______________________________________________________________________
 _______________________________________________________________________
 _______________________________________________________________________
 _______________________________________________________________________

  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    F12=Cancel
```

Figure 16. Define JCL for IODF Import

You can also invoke the ***Export IODF*** task by using the ***Export*** task in batch mode. For details refer to "Export an IODF" on page 333.

Prerequisites:

1. Network Job Entry (NJE) must be active.
2. The target user ID and password, and, if the target system is not SMS managed, the volume serial number of the receiving data volumes have to be known when the IODF is exported to an unattended system.

User authentication for unattended mode

If you export an IODF to a target system running in unattended mode, there are two alternatives for user authentication:

- sending the target user ID and password to the target node (that is, the user ID which receives the IODF)
- defining a surrogate user ID on the target to act on behalf of the receiver

Sending user ID and password:

To authenticate the receiving user with its user ID and password at the receiving system, enter the correct password on the panel from Figure 17 on page 47 twice.

```
 Specify Target IODF and User Password

 Specify or revise the following values.

 Target IODF name . . . . 'HCDI.IODF00.HCDUG.COPY'
 Volume serial number . . ______  (If IODF does not exist
                                  at the target node)

 Replace target IODF . . . 2  1. Yes    (If IODF already exists)
                              2. No

 User ID . . . . . . . . : HCDI         Node  . : HCD3
 Password  . . . . . . . .
 Reentered password  . . .

  F1=Help    F2=Split   F3=Exit    F5=Reset   F9=Swap   F12=Cancel
```

Figure 17. Specify Target IODF and User Password

Defining a surrogate for the receiving user ID:

If you want to avoid sending passwords across the net, on the receiving system, you can define a surrogate user ID for the receiving user. The import job, submitted by the surrogate user, will run with the identity and authorization of the receiving user, without a password being sent.

To enable user authentication without sending a password, perform the following steps:

1. Define a surrogate user ID for the receiving user and the appropriate access rights for the sending and receiving users as shown in the example hereafter. This step is required as a setup only once.
2. When you export an IODF in unattended mode, on the ***Specify Target IODF and User Password*** panel (Figure 17), enter a dummy character for the password and password confirmation (for example, an '*') to suppress sending of a password to the receiving target system.
3. On panel ***Define JCL for IODF Import*** panel (Figure 16 on page 46), replace the statement

   ```
   /*LEAVE THIS JOB CARD UNCHANGED: USERID AND PASSWORD ARE GENERATED
   ```

   with the target/receiving user ID to provide the following JCL:

   ```
   //JOBNAME  JOB (ACCT,BOX),'USER',CLASS=CLASS,
   //             MSGCLASS=MSGCLASS,MSGLEVEL=(1,1),
   //             USER=user_r
   /*ROUTE    XEQ HCD3
   ```

In the example shown below, `user_s` and `node_s` denote user ID and node ID of the sender and `user_r` and `node_r` denote the respective ids of the receiving system (running an operating system in unattended mode).

On node_r issue:

```
RDEFINE NODES node_s.USER*.user_s UACC(UPDATE)
RDEFINE SURROGAT user_r.SUBMIT UACC(NONE) OWNER(user_r)
PERMIT user_r.SUBMIT CLASS(SURROGAT) ID(user_s) ACCESS(READ)
```

- The first statement controls whether jobs coming from `node_s` are allowed to enter the system from `node_s`. It also controls, whether jobs that enter the system from `node_s` nodes have to pass user identification and password verification checks.

- The second statement defines a `user_r.SUBMIT` profile in the SURROGAT general resource class for `user_r` who requires a surrogate user to act on his behalf.
- The third statement authorizes user_s to act as a surrogate for user_r.

Import an IODF

This task imports previously received IODF data into HCD. You can export and import IODFs between different HCD versions. You can, for example, export an IODF from HCD 1.4 and import it with HCD 1.7. Note that in this case you have to upgrade the lower version IODF before using it with HCD, because the export/import function does not change the format of the IODF.

You can also invoke the ***Import IODF*** task by using the ***Import*** task in batch mode. For details refer to "Import an IODF" on page 332.

At an unattended target system, the IMPORT batch utility is invoked automatically when an IODF, with its associated job control, arrives at the system.

Upgrade an IODF

This task upgrades an IODF from a back-level format to the new format that is required for the current release of HCD.

Invoke the ***Upgrade I/O definition file to new format*** task as follows:

1. On the HCD primary task selection panel (Figure 9 on page 24), specify the IODF to be upgraded at the bottom of the menu and then select option ***6. Maintain I/O definition files***.
2. From the Maintain I/O Definition Files panel (Figure 13 on page 43), invoke option ***8. Upgrade I/O definition file to new format***.

   HCD displays the following dialog:

```
 ------------------- Upgrade I/O Definition File -------------------


 Select a target for the IODF to be upgraded.

 IODF name . . . . . . . : 'DOCU.IODFA0.WORK'

 Target of upgrade . . . . 1   1.  To new work IODF
                               2.  In place

 Condense IODF . . . . . . 1   1.  Yes
                               2.  No

  F1=Help    F2=Split   F3=Exit    F4=Prompt  F9=Swap   F12=Cancel
```

Figure 18. Upgrade an IODF

Table 4 on page 49 shows the options you have. You can either:
- Upgrade into a new work IODF
- Upgrade in place

Table 4. Size considerations when upgrading a back-level IODF

Upgrade IODF		Upgrade into New IODF	Upgrade in Place
From	**To**		
V4 IODF	V5 IODF	1. with Condense option: Default size of new IODF is double the size of the related production IODF. You can change this default size, if necessary. 2. without Condense option: Default size of new IODF is the size of V4 IODF.	V5 IODF has same size (number of allocated blocks) as V4 IODF

Notes:

1. The ***Upgrade in place*** option cannot be requested for a production IODF (as a production IODF cannot be altered). The final result of the upgrade IODF function is always a work IODF.
2. If you plan to add or change many devices in the configuration, ensure that you increase the space allocation when creating the IODF to allow for these changes.

If you select to upgrade in place, the accessed IODF is formatted to a V5 IODF. While the allocated and used space values do not change, the space utilization of the used blocks will decrease depending on the number of devices that can be grouped.

If you select to upgrade to a new IODF, the accessed IODF will not be changed. HCD displays the **Create Work I/O Definition File** dialog (see Figure 19). The space allocation default is set as follows:

- If you select `Condense IODF = Yes`, the default allocation value is set to double the size required for a corresponding production IODF. This may result in much lower space requirements than without condensing.
- If you select `Condense IODF = No`, the default allocation value is set to the number of used blocks of the IODF to be upgraded.

```
                 Create Work I/O Definition File

 The current IODF was created by an earlier HCD release, and you
 have requested upgrade to a new data set. To create this data
 set, specify the following values.

 Source IODF  . . . . : 'DOCU.IODF00.TREXDOCU.HCMUG'
   Allocated space  . : 1024
   Used space . . . . : 27

 IODF name  . . . . . . _____________________________________

 Volume serial number . ______  +

 Space allocation . . . 64      (Number of 4K blocks)


  F1=Help    F2=Split   F3=Exit    F4=Prompt  F9=Swap   F12=Cancel
```

Figure 19. Create Work I/O Definition File

After the upgrade completed successfully, HCD issues a message of success and accesses the upgraded IODF with which you can start to work now.

You can also invoke the ***Upgrade I/O definition file to new format*** task in batch mode. For details refer to “Upgrade IODF” on page 310.

Note: An IODF can also be upgraded using the ***Copy IODF*** task (see “Copy an IODF” on page 43).

Work with configuration packages

| Configuration packages define subset IODFs which are extracted from the accessed
| IODF (centrally administered master IODF) and distributed for activation at
| selected target systems, while keeping the processor token in sync.

When invoked with option ***Work with Configuration Packages*** from the panel shown in Figure 13 on page 43, this task displays the Configuration Package list. Configuration packages can be added and edited, transmitted from a production IODF, and they can be deleted.

```
  Goto  Backup  Query  Help
------------------------------------------------------------------------------
                          Configuration Package List  Row 1 of 2 More:         >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more packages, then press Enter. To add, use F11.

IODF name  . . . . : IODFST.IODF11.MASTER

  Package  ------Target----- ----Last sent---
/ Name     User     Node     Date       Time  Description
_ CB88     OS390H1  PKSTCB88 1997-10-22 06:28 For A/T system M88TSO
_ CB89     OS390H1  PKSTCB88 1997-10-21 04:34 For A/T system M89TSO
******************************* Bottom of data *******************************


 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 20. Sample Configuration Package List — left panel

The target user and node as well as the description of a configuration package can be edited by overwriting the information on the panel. When scrolling to the right you can also overwrite the target IODF name and attended/unattended information.

Define a configuration package

To define a new configuration package perform the following steps:

1. On the Configuration Package List panel use F11=Add. If you want to use an existing configuration package as a model, select the package and the ***Add like*** action from the context menu (or use action code **a**). The Add Configuration Package panel is displayed.

```
┌──────────────────── Add Configuration Package ────────────────────┐
|                                                                    |
| Specify the following values.                                      |
|                                                                    |
| Package name . . . . . . CB8A____                                  |
| Package description  . . For A/T system M8ATSO                     |
|                                                                    |
| User ID  . . . . . . . . OS390H1                                   |
| Node ID  . . . . . . . . PKSTCB88                                  |
|                                                                    |
| Operating system status  2  1. Attended                            |
|                             2. Unattended (MVS only)               |
|                                                                    |
| Target IODF name . . . . 'IODFST.IODF8A'                           |
| Target volume  . . . . . CMNSTC  (for unattended, if not SMS)      |
|                                                                    |
|  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    F12=Cancel |
└────────────────────────────────────────────────────────────────────┘
```

Figure 21. Add Configuration Package

2. Enter a package name and other entry data as appropriate. The user ID and node specify the destination of the corresponding subset IODF. The name of the accessed IODF is used as default for the name of the IODF at the target system and for the `Descriptor field 1` and `Descriptor field 2` parameters during the Build Production IODF step, when the configuration package is transmitted (see step 5 on page 54 in section "Transmit a configuration package" on page 53). If no value is entered for the Operating system status, `Attended` is assumed which means that a user has to import the subset IODF into HCD at the target system. This is done automatically if `2 (Unattended)` is specified.
3. After you press ENTER, HCD displays the updated Configuration Package list.

Edit a configuration package

The target user and node, the attended/unattended information, the target IODF name, and the description of a configuration package can be edited on the Configuration Package List panel (see Figure 20 on page 50).

To edit a configuration package perform the following steps:

1. Display the Configuration Package List panel.
2. Make changes to the configuration package by overwriting the entries on the list panel.

   To change the IODF name and attended/unattended information scroll to the right and overwrite.
3. Press ENTER.

Delete a configuration package

To delete a configuration package perform the following steps:

1. On the Configuration Package List panel select the package and the ***Delete*** action from the context menu (or use action code **d**). The Confirm Delete Configuration Package panel is displayed.
2. Press the Enter key to confirm the deletion. HCD displays the updated Configuration Package list.

Work with configuration package objects

Configuration package objects are operating systems or processors. The objects in a configuration package determine the scope of the corresponding subset IODF. To change the content of a configuration package select the package from the Configuration Package List panel (see "Work with configuration packages" on page 50) and the ***Work with Configuration Package Objects*** action from the context menu (or use action code **s**). The Configuration Package Objects List panel is displayed.

Add a configuration package object: To add a configuration package object to a configuration package perform the following steps:

1. Use F11=Add or select an object from the Configuration Package Object List panel and the ***Add like*** action from the context menu (or use action code **a**). The Add Configuration Package Object panel is displayed.
2. Select the `Configuration type`, processor (PR) or OS configuration (OS), and specify the `Configuration ID` of the object.
3. Press the Enter key. The updated Configuration Package Object List panel is displayed.

Merging changes into a master work IODF: If a system has been supplied with a subset IODF and configuration changes have been made using the subset IODF, you may want to update the master IODF with these changes. This can be done by merging the changed configuration package objects from the subset IODF back into the master work IODF.

First the updated subset IODF is exported on the corresponding system and imported at the system administering the master IODF. You can update the master work IODF by merging or by replacing configuration package objects.

The ***Merge*** action updates new/changed data in the master work IODF.

The ***Replace*** action first deletes the object configuration present in the master work IODF and then replaces it with the new one.

To merge a configuration package object into a master IODF perform the following steps:

1. Access the master work IODF the configuration package belongs to.
2. Display the Configuration Package Object List panel and select one or more objects. Select ***Merge*** (action code **m**) or ***Replace*** (action code **r**) from the context menu.
3. Specify the source IODF the configuration package refers to and press the Enter key.
4. The master work IODF is updated and a new master production IODF can be built.

Notes:

1. Switch configurations are not repeated by ***Merge*** and ***Replace***. If necessary, switch configuration changes should be made in the master IODF before ***Merge*** or ***Replace*** are performed.
2. The ***Merge*** and ***Replace*** actions utilize the ***Repeat*** action for entering the new configuration data into the master work IODF. Refer to "Repeating (copying) processors" on page 96 and "Repeating (copying) operating system configurations" on page 83 for details on the ***Repeat*** action.

Delete configuration package objects: To delete a configuration package object from a configuration package perform the following steps:

1. Select an object from the Configuration Package Object List panel and the ***Delete*** action from the context menu (or use action code **d**).
2. Press the Enter key. The updated Configuration Package Object List panel is displayed.

Transmit a configuration package

Transmitting a configuration package means building a subset IODF and transmitting it to the target system specified in the configuration package. This action can only be carried out from a production IODF. To transmit a configuration package perform the following steps:

1. Select the package from the Configuration Package List panel and the ***Transmit configuration package*** action from the context menu (or use action code **x**).
2. If the following conditions are fulfilled, the Transmit Configuration Package panel is displayed:
   - The accessed IODF is a production IODF.
   - The selected configuration package contains at least one configuration object (OS or processor).
   - In the selected configuration package a destination user and node are specified.
   - In the selected configuration package a target IODF is specified.

   `Descriptor field 1` is defaulted to the HLQ of the target IODF name in the configuration package; `Descriptor field 2` is defaulted to the 2nd qualifier of the target IODF name in the configuration package.

```
                       Transmit Configuration Package

Package name . . . . . : PACK1        Package for BOEHCD1
High level qualifier . . HCDI         Volume . . . . ______ +
JCL member used  . . . . CBDJXMIT     Space . . . . 32 (4K blocks)

Descriptor field 1 . . . WEID         Descriptor field 2   IODFCC
Target user ID . . . . . WEID         Target node ID . . . BOEHCD1
Operating system status  1  1. Attended
                            2. Unattended (MVS only)

Specify or revise the job control statements for the transmit job.

//HCDIXMT JOB (3243),'WEID',CLASS=A,MSGCLASS=H,REGION=0M,NOTIFY=HCDI
//*
//*
```

Figure 22. Transmit Configuration Package

3. Review the entry data displayed. You may change `Descriptor field 1`, `Descriptor field 2`, the target user ID and node ID, the Operating system status, the high level qualifier and/or the volume of the IODFs and other data sets to be generated temporarily, as well as the estimated size of the target IODF.

   If you want to use a customized transmit procedure you can specify a different JCL member and/or a JCLLIB parameter in the job control statement area. Once changed, the statements will be retained across sessions. If you want to use different load libraries, specify JOBLIB, because the procedure contains several steps.

   If the transfer is performed unattended, the ***Specify Target IODF and User Password*** dialog is displayed. Refer to "User authentication for unattended mode" on page 46 for more information.

The master production IODF is updated with the last sent date and time when the job stream is built. The JCL member provided, CBDJXMIT, consists of the following steps:

1. A temporary work and a temporary production IODF, according to the values entered in the Transmit Configuration Package panel are initialized.
2. The processor configurations included in the selected configuration package are written to a data set and then migrated to the temporary work IODF.

   To generate coupling facility connections, HCD needs both the CF sender and CF receiver channel paths, or peer channel definitions, within the same IODF. Therefore, if a processor of the configuration package contains a connected sending CF channel path, the processor containing the coupling facility partition will be included (with the coupling facility partition only) even if it is not part of the configuration package. (The receiving CF channel paths of the CF partition are indicated as occupied if they have connections to processors outside of the package.)

   The switches and ports which contain connections to a processor of the configuration package are distributed as well. Ports that contain connections to a processor, switch or control unit outside of the scope of the configuration package are indicated as occupied.
3. The OS configurations related to the selected configuration package are written to a data set and then migrated to the temporary work IODF.
4. The switch configurations related to the selected configuration package are written to a data set and then migrated to the temporary work IODF.
5. A temporary production IODF is built from the temporary work IODF.

   The processor token is not changed by this action.
6. The production IODF is exported to the specified user ID and node, attended or unattended, as selected.
7. The temporary work and production IODFs are deleted.

The transmit action can also be carried out using a batch utility. A sample job, CBDSXMIT, has been provided in SYS1.SAMPLIB.

Activity logging and change logging

When you end an HCD session or access a different IODF after modifying some configuration data, and if an activity log is enabled for the currently accessed IODF (“Create or specify an IODF” on page 36 explains how to specify an activity log), then HCD displays an activity log panel, showing the information which will be added to the activity log.

```
Date & Time . . . . . . :   2005-11-07  10:54:46
User  . . . . . . . . . :   BOKA
I/O definition file . . :   'BOKA.IODF00.ACT'
Change reference number :   000002

****** ************************** Top of Data ****************************
000001 Type your log entries here ...
000002 ...
000003 ...
000004 ...
****** ************************ Bottom of Data **************************
```

Figure 23. Example of an Activity Log without automatic logging

This information comprises the date and time, the user ID of the user who modified the IODF, the name of that IODF, and a change reference number. You can add your own comments to the log, for example, describing what you have done.

You can enable ***automatic activity logging*** by entering the following keyword into the HCD profile:

```
CHANGE_LOG = YES
```

With this setting, HCD generates automatic entries into the activity log panel, describing the updates on HCD objects, like for example, add, delete, or connect, disconnect. You can see examples of such entries in Figure 24 on page 56. You can edit the entries before you exit this panel.

The activity log panel is an ISPF/PDF panel, so the normal ISPF/PDF rules apply to it. Activity log editing requires the profile option AUTOSAVE ON. When calling the ISPF editor, macro CBDCACTL is used. You can tailor this macro to your installation needs (for example, for setting specific profile options). Use the F3=Exit key to continue.

HCD appends the qualifier ACTLOG to the IODF data set name to create the data set name for the activity log. If the ACTLOG data set does not yet exist, HCD dynamically allocates one using ESOTERIC system defaults (see “SMS-related considerations” on page 344). If you want to use a specific volume, you can specify the volume serial number to allocate a new activity log in the HCD profile (see “Defining an HCD profile” on page 25).

You can view or print the activity log associated with the currently accessed IODF during an HCD session by selecting the option ***Print or compare configuration data*** from the primary task selection panel and then ***View the activity log*** or ***Print the activity log***.

You can also use the ISPF/PDF facilities to browse or print an activity log.

HCD generates its proposed activity log entries from the change log file. Setting the `CHANGE_LOG = YES` option in the HCD profile causes HCD to create the change log file and store in it all update operations on the related IODF in a wrap-around manner.

The change log file is a VSAM data set. If it is not accessible for any reason, HCD cannot create any automatic activity log entries.

The name of the change log file is built from the related IODF data set name plus the suffix CHLOG. It is allocated in the same size as the related IODF.

You can write the contents of the change log file to the HCD trace data set using the TRACE command with ID=CLOG: `trace on, id=clog, level=8`

With the profile options `CHLOG_VOL` and `ACTLOG_VOL`, in non SMS-managed environments, you can specify the volume serial numbers where to allocate a new change log or activity log.

```
 ─────────────────────────── View Activity Log ──────────────────────────
                                                                          
 Command ===>                                             Scroll ===> PAGE
                                                                          
 Activity log . . : BOKA.IODF00.ACT.ACTLOG                                
                                                                          
 ****************************** Top of Data *******************************
 REFERENCE   DATE        TIME      USER ID              IODF NAME         
 _________________________________________________________________________
 000001:     2005-10-13  17:02:15  DOCU                     DOCU.IODFA0.TES
         Device 0001 added                                                
         OS device MVS1.0001 added                                        
         Device 0001(2) added                                             
         OS device MVS1.0001(2) added                                     
 000002:     2005-10-13  17:14:11  DOCU                     DOCU.IODFA0.TES
         Processor PROC2 added                                            
         CSS PROC2.0(2) added                                             
         Device 0003 added                                                
         OS device MVS1.0003 added                                        
 _________________________________________________________________________
 ***************************** Bottom of Data *****************************
                                                                          
  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 24. View Activity Log

Rules for automatic activity logging

HCD applies the following rules during automatic activity logging:

- When creating an object with immediate updates without leaving HCD, HCD only creates an *'add object'* log entry in the activity log.
- When updating the same object multiple times during one HCD session, HCD creates only one *update object* entry.
- Consecutive IDs, for example for channel subsystems, channel paths, control units or devices, are marked with a 'quantity' number in parenthesis behind the starting ID.
- When repeating an object into a new IODF, no entry is created in the target IODF since this IODF is not in access by the user.

Actions performed on IODFs and related activity and change log files

- When you delete an IODF, HCD also deletes the related activity and change log files.
- When you copy an IODF, HCD also copies the activity log file with all its contents. However, HCD does not copy the change log file. Instead, a new change log file is created for the new IODF.
- When you build a production IODF, HCD copies the activity log file, but not the change log file.
- When you enable or disable an IODF for multi-user access, the same action is applied to the change log file. Before an update request is performed on an IODF, the change log file is refreshed to have the latest updates available. The activities of multiple users are logged in chronological order.
- An activity log data set is not enabled for multi-user access. If multiple users simultaneously access and update the related IODF, the activity log file is

accessed sequentially in the order the users end the HCD session or access a different IODF. The users' activity log entries are written to the data set grouped by the user ID.

IODF release level compatibility

If you plan to share an IODF among multiple z/OS or OS/390 systems that are at different release levels, you have to consider several restrictions concerning IPL, IODF usage, and dynamic reconfiguration.

Table 5 shows possible OS/390 and z/OS HCD levels that could be installed on your system. For each HCD level, the table shows whether you can take the following actions:

IPL IPL the z/OS or OS/390 release

HCD Use HCD to work with the IODF

Dyn Do a dynamic reconfiguration

Table 5. Coexistence Considerations for IODFs

HCD installed with:	Action	IODF Level	
		V4 IODF	**V5 IODF**
OS/390 R9 HCD (1) (HCS6091)	IPL HCD Dyn	Yes Yes (8) Yes (7,8)	No No No
z/OS 1.4 HCD (2) (HCS7708)	IPL HCD Dyn	Yes Yes Yes (7)	Yes (3,5) Yes (4,9) Yes (3,4,5)
z/OS 1.7 HCD (HCS7720)	IPL HCD Dyn	Yes Yes (6) Yes	Yes Yes (9) Yes
z/OS 1.9 HCD (HCS7740)	IPL HCD Dyn	Yes Yes (6) Yes	Yes Yes (9) Yes
z/OS 1.10 HCD (HCS7750)	IPL HCD Dyn	Yes Yes (6) Yes	Yes Yes Yes

Notes:

1. OS/390 R9 HCD runs on OS/390 R10, z/OS 1.1, z/OS 1.2, z/OS 1.3 and z/OS 1.4.
2. z/OS V1.4 HCD runs on z/OS 1.4 Feature 0, z/OS 1.5 and z/OS 1.6. (As z990 Compatibility Support it has also be provided back to OS/390 R10.)
3. The Allocation Compatibility PTF for the corresponding z/OS release (APAR OA08197) is required.
4. The HCD R7 Compatibility PTF has to be installed (APAR OA07875). It provides limited read-only access to the V5 IODF.
5. Alternate subchannel sets are ignored.
6. Read-only access is provided. Upgrade of V4 IODF to V5 IODF is required for updates.
7. If the IODF contains processor configurations with hardware definitions that are not known to the corresponding OS/390 or z/OS release, you must use a z/OS release that has the corresponding support installed.

8. If the IODF contains processors supporting multiple channel subsystems, z/OS 1.4 HCD or higher must be used.
9. With HCD releases earlier than z/OS 1.10, you cannot directly access a multi-user access enabled V5 IODF. First you must remove the multi-user access capability from the IODF with z/OS 1.10 HCD or higher. In addition, you need to install the coexistence PTF for the corresponding z/OS release to prevent earlier HCD releases from accessing an IODF prepared for multi-user access (APAR OA22842).

Chapter 5. How to use the dialog

Overview

This information unit explains the following topics:
- Panel layout
- Working with lists
- Promptable fields
- Commands and function keys
- Getting help
- Navigating through the dialog
- Filtering
- Job statement information used in panels

Panel layout

HCD provides an action bar-driven interface that exploits many of the usability features of the Common User Access (CUA) interface. Figure 25 explains the areas of an HCD panel. These areas appear in the same position on every panel unless you use ISPF to change the position of the command line. Not all areas are included on all panels.

```
  Goto  Filter  Backup  Query  Help                                      1
--------------------------------------------------------------------------
                             I/O Device List       Row 1 of 14   More:      > 2
Command ===> ___________________________________________ Scroll ===> PAGE

Select one or more devices, then press Enter. To add, use F11.            3

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +        CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0001     3278-3        3   2  00E1 ____ ____ ____ ____ ____ ____ ____
_ 0002     3279-2        3   4  0097 ____ ____ ____ ____ ____ ____ ____
_ 0098     9033          2      0098 ____ ____ ____ ____ ____ ____ ____
_ 0099     9032          2      0099 ____ ____ ____ ____ ____ ____ ____      4
_ 00C1     3480          2   1  00C1 ____ ____ ____ ____ ____ ____ ____
_ 01D1     3390          2   1  00D1 ____ ____ ____ ____ ____ ____ ____
_ 01D2     3390          2      00D1 ____ ____ ____ ____ ____ ____ ____
_ 01D3     3390          2      00D1 ____ ____ ____ ____ ____ ____ ____
_ 01D4     3390          2   1  00D1 ____ ____ ____ ____ ____ ____ ____
# FFFC     CFS                  FFFE ____ ____ ____ ____ ____ ____ ____
# FFFD     CFS                  FFFE ____ ____ ____ ____ ____ ____ ____
# FFFE     CFS                  FFFE ____ ____ ____ ____ ____ ____ ____
# FFFF     CFS                  FFFE ____ ____ ____ ____ ____ ____ ____
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 25. Example of a Panel Layout

1 Action bar.

You can select any of the action bar choices and display pull-down choices. Use F10=Actions to move the cursor to the action bar.

2 Title Line.

- Shows the panel title.
- Displays panel identifiers (on the left-hand side, if you have asked for them).
- Displays positional information for the work area:

  `Row 1 of 3302` specifies that the first row of data that is displayed in the work area is the first row of 3302 available rows.

  `More: >` specifies that more data can be seen by moving the work area to the right using F20=Right. This can also be `More: <`, which means moving is possible to the left, or `More: < >`, which means moving is possible to the left and right.

  Instead of `Row 1 of 3302`, `Filter Mode` would be shown if the action list is filtered. For additional information, refer to “Filtering” on page 73.

3 Instruction Area.

Tells you how to proceed on the panel. On action list panels (see “Action lists” on page 63) you can get more instruction information by pressing the F13=Instruct key or by using the INSTRUCT command.

4 Work Area.

You can use the following facilities to control the work area:

- The ***Filter*** action reduces the number of objects in an object list; this is described further in “Filtering” on page 73.
- The F7=Backward and F8=Forward keys scroll the work area backward and forward. The end of the information is indicated by a line containing `- end -` or `BOTTOM OF DATA`.
- The F19=Left and F20=Right keys move the work area of an action list panel left and right (or RIGHT and LEFT command).
- The LOCATE command scrolls an object list so that a specific object (or the nearest lower match) is at the top of the work area. Search criteria is the object identifier shown in the leftmost data column.
- The TOP command scrolls backward to the top of the work area.
- The BOTTOM command scrolls forward to the bottom of the work area.

The following Figure 26 on page 61 shows the panel areas of a data entry panel.

```
┌───────────────────────── Add Channel Path ──────────────────────────┐
│                                                                      │
│                                                                      │
│ Specify or revise the following values.                              │
│                                                                      │
│ Processor ID . . . . : FR38LPAR     Raised Floor Production          │
│ Configuration mode . : LPAR                                          │
│ Channel Subsystem ID :                                               │
│                                                                      │
│ Channel path ID  . . . . __    +            PCHID . . . ___          │
│ Number of CHPIDs . . . . 1                                           │
│ Channel path type  . . . ___   +                                     │
│ Operation mode . . . . . DED   +                                     │
│ Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +  │
│ Description  . . . . . . ________________________________            │
│                                                                      │
│ Specify the following values only if connected to a switch:          │
│ Dynamic switch ID  . . . __  + (00 - FF)                             │
│ Entry switch ID  . . . . __  +                                       │
│ Entry port . . . . . . . __  +                                       │
```

Figure 26. Panel Layout of a Data Entry Panel

This panel has the following characteristics:

- The position and length of empty entry fields are shown by underscore characters (_) and highlighting. If an entry field contains an entry, the underscore characters are not shown.
- Fields that you cannot change are preceded by a colon (:).
- Fields that you must complete may (depending on the terminal) be highlighted by a different color.
- Input fields with a plus sign (+) indicate that you can prompt information for this field using F4=Prompt. For more information on the prompt facility, refer to “Promptable fields” on page 67.

Working with lists

HCD presents most of the information in form of lists. Depending on the list, there are different methods to select an item from the list or to perform actions. The different types of lists are:

- Numbered selection lists
- Unnumbered single selection lists
- Unnumbered multiple selection lists
- Action lists
- Message lists

This section describes the different types of lists and the respective selection methods.

Numbered selection lists

To select an item from a numbered selection list, type the number you want to select in the input field (left of the first list item) and press the Enter key. An example of a numbered list is the HCD primary task selection panel (see Figure 27 on page 62), displayed when you start an HCD session.

```
                              z/OS V1.7 HCD
Command ===> _______________________________________________________________

                           Hardware Configuration

Select one of the following.

1_1.  Define, modify, or view configuration data
   2.  Activate or process configuration data
   3.  Print or compare configuration data
   4.  Create or view graphical configuration report
   5.  Migrate configuration data
   6.  Maintain I/O definition files
   7.  Query supported hardware and installed UIMs
   8.  Getting started with this dialog
   9.  What's new in this release

For options 1 to 5, specify the name of the IODF to be used.

I/O definition file . . . 'SYS1.IODF00.WORK'                     +
```

Figure 27. Primary Task Selection

Unnumbered single selection lists

To select a list item from an unnumbered list from which you can select only one item, you can:

- Place the cursor in front of a list item and press the Enter key
- Select a list item with an **s** or a **/** (slash) and press the Enter key.

Figure 28 is an example of a list of IODFs from which you can select one IODF.

You can request a list like the one in Figure 28 by pressing F4=Prompt while your cursor is on the `I/O definition file` entry field (Figure 27). For more details concerning prompting, refer to "Promptable fields" on page 67.

```
 ------------------------- Available IODFs --------------------------
                                                        Row 1 of 3
 Command ===> _________________________________________________

 Select an IODF name.

   IODF Name                           Volume  Size    Created
   DOCU.IODFA0.WORK                    HCDSMS  360     2002-03-11
   DOCU.IODF00.FP.WORK                 HCDSMS  1080    1999-06-23
   DOCU.IODF00.FREEPRO                 HCDSM2  108     2001-09-07
   DOCU.IODF00.HCDUG.SCENARIO          HCDSM4  1080    2002-10-15
   DOCU.IODF00.MCSSDOCU.HCMUG          HCDSM3  1080    2002-11-11
 ************************ Bottom of data *************************


  F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward
  F9=Swap     F12=Cancel   F14=SortName F15=SortSize F16=SortDate
 F22=Command
```

Figure 28. Example of a Single Selection List

Unnumbered multiple selection lists

To select a list item from an unnumbered list, from which you can select one or more list items, place a slash (**/**) in front of one or several list items and press the Enter key. In some cases, list items in unnumbered multiple selection lists are already preselected. You can overwrite this preselection.

To select a range of objects, you can place a left parenthesis (in front of the first item in the range and a right parenthesis) in front of the last item in the range. See also "Using the context menu."

Figure 29 is an example of an unnumbered multiple selection list.

```
 ------------------------ Define Access List -------------------------
                                                          Row 1 of 4

 Select one or more partitions for inclusion in the access list.

 Channel path ID  . . : 20      Channel path type  . : CNC
 Operation mode . . . : SHR     Number of CHPIDs . . : 1

 / Partition Name   Number Usage Description
 _ PROD1            1      OS    First production partition
 / PROD2            2      OS    Second production partition
 / TEST1            3      OS    First test system
 _ TEST2            4      OS    Second test system
 ************************ Bottom of data ******************************
```

Figure 29. Example of a Multiple Selection List

Action lists

Figure 31 on page 65 is an example of an action list panel. You see a panel like this one when you want to define, modify, or view I/O devices.

HCD uses the concept of object-to-action processing. That is, to work with an object, you first have to select the object, and then the action. For some actions, you do not have to explicitly select an object; for example, to add an object to an action list.

In an action list, you have several possibilities to perform an action on a list object:
- Using the context menu
- Using the action code
- Typing over data in the panel

Using the context menu

To perform an action on one or several objects in an action list, you can use the context menu:

1. Select an object by placing a slash / in front of a list item.

   To select a range of objects, you can place a left parenthesis (in front of the first item in the range and a right parenthesis) in front of the last item in the range.
2. Press the Enter key. HCD displays a context menu showing all valid actions for the selected objects.

```
  Goto  Filter  Backup  Query  Help
------------- ┌──────────────── Actions on selected devices ────────────────┐
              │                                                            │
Command ===>  │                                                            │
              │ Select by number or action code and press Enter.           │
Select one or │                                                            │
              │ 2  1.  Add like  . . . . . . . . . . . . . . (a)           │
  -------Devi │    2.  Change  . . . . . . . . . . . . . . . (c)           │
/ Number Type │    3.  CSS group change  . . . . . . . . . . (g)           │
( 0001   3278 │    4.  OS group change . . . . . . . . . . . (o)           │
_ 0098   9033 │    5.  Device type group change  . . . . . . (t)           │
_ 0099   9032 │    6.  Subchannel Set ID group change  . . . (m)           │
_ 009A   9032 │    7.  Prime serial number and VOLSER  . . . (i)           │
_ 00C1   3480 │    8.  Delete  . . . . . . . . . . . . . . . (d)           │
_ 01D1   3390 │    9.  View device definition  . . . . . . . (v)           │
_ 01D2   3390 │    10. View logical CU information . . . . . (l)           │
_ 01D3   3390 │    11. View related CTC connections  . . . . (k)           │
) 01D4   3390 │    12. View graphically  . . . . . . . . . . (h)           │
_ 01D5   3390 │                                                            │
/ 01D6   3390 │  F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel │
_ 01D7   3390 └────────────────────────────────────────────────────────────┘
_ 01D8   3390          2  1  00D1 ____ ____ ____ ____ ____ ____ ____
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 30. Action List Panel with a Context Menu

3. Select an action by entering the number or action code (letter in parentheses) in the entry field. After pressing the Enter key, the context menu is closed and the action is performed for the selected rows.

   If only one action is possible on an action list panel, the context menu is not shown, but the action is performed immediately after entering a **/** (slash) or an **s**.

In the example in Figure 30, the following objects are changed:
- Objects 0001 through 01D4, and
- Object 01D6

A # marker in the selection column indicates that the row is disabled and not available for processing. For example, coupling facility devices are marked in such a way.

Using the action code

As you get familiar with the dialog, you might find it easier to select a list item and an action in one operation by means of an action code. To do this, enter the action code in the entry field to the left (the action column) of the associated list item; then press the Enter key. Figure 31 on page 65 shows an example (**d** for delete and **c** for change).

```
  Goto  Filter  Backup  Query  Help
 --------------------------------------------------------------------------
                             I/O Device List      Row 1 of 1443 More:      >
 Command ===> ___________________________________________ Scroll ===> PAGE

 Select one or more devices, then press Enter. To add, use F11.
   ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +       CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0001     9032-3       3   4  0001 ____ ____ ____ ____ ____ ____ ____
_ 0002     9032-3       3   4  0002 ____ ____ ____ ____ ____ ____ ____
d 0020     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0021     BSC2         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0022     BSC2         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0023     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0024     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
c 0025     BSC2         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0026     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
d 0027     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0028     TWX          1   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 0029     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 002A     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 002B     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 002C     BSC2         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
_ 002D     BSC1         4   4  00E0 ____ ____ ____ ____ ____ ____ ____
# FFFC     CFS          1   4  FFFE ____ ____ ____ ____ ____ ____ ____




 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 31. Action List Panel with Action Codes

You can select more than one list element and, if necessary, you can specify different action codes for each of the objects. You are first asked to confirm the deletions. Then the other actions (in the example above a change **c**) are performed.

To get a list of action codes, place the cursor in the action column field and then press the F4=Prompt key. The same context menu is shown when using the **/** in front of a list item and pressing the Enter key. For an example, see Figure 30 on page 64, or "Appendix A. How to navigate through the dialog" on page 371. If you press the F1=Help key instead of the F4=Prompt key, you get a list from which you can request explanation of the action codes.

Action codes and selection markers: You can also specify individual action codes within a marked range. If you do so, the following rules apply:

- When you press the Enter key, the single action codes are processed. The row selected with selection markers are not processed, they are still shown after processing the action codes.
- When you press the Enter key again, HCD shows the context menu for the rows selected with selection markers.

After successful operation, selection markers and action codes are removed from the list. If the operation is interrupted due to an error, selection markers and action codes not yet processed are still shown. You can remove them by pressing the F5=Reset key.

Typing over existing data

You can also make changes to editable fields by typing in new data or typing over existing data directly on the displayed panel.

You have to press the Enter key to process the changes. HCD then validates the data and displays the panel again. When you exit action list panels, all changes to the list since you last pressed the Enter key, are cancelled.

You can use the F5=Reset key to reset the values of all fields that you have changed since you last pressed the Enter key.

Message lists

One single operation can produce multiple messages. In this case, HCD displays a message list. You can then:

- Use the ***Explain message*** action from the context menu (or action code **e**) to get an explanation of the message.

```
                              Message List
  Save  Query  Help
 ----------------------------------------------------------------------------
                                                              Row 1 of 52
 Command ===> ___________________________________________ Scroll ===> PAGE

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 e E   CBDG060I A switch and a port must be specified for control unit
 #              0090 to connect the control unit to channel path 34 of
 #              processor CTC01.
 _ E   CBDG060I A switch and a port must be specified for control unit
 #              0098 to connect the control unit to channel path 34 of
 #              processor CTC01.
 _ E   CBDG060I A switch and a port must be specified for control unit
 #              0300 to connect the control unit to channel path 61 of
 #              processor PR9672.
 _ E   CBDG065I The switch control unit 0000 of switch 00 has no channel
 #              path attached via the switch.
  F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset
  F7=Backward   F8=Forward    F9=Swap      F10=Actions   F12=Cancel
 F13=Instruct   F22=Command
```

Figure 32. Message List

```
 ─────────────────────────── Message List ───────────────────────────
|                                                                    |
| Command ===>                                      Scroll ===> PAGE |
| CBDG060I A switch and a port must be specified for control unit    |
|  0090 to connect the control unit to channel path 34 of processor  |
|  CTC01.                                                            |
| Explanation:                                                       |
|  A channel path is connected to a switch, therefore all control    |
|  units on this channel path must be connected to a switch also.    |
|                                                                    |
| System Action:                                                     |
|  System waits for user action.                                     |
|                                                                    |
| User Response:                                                     |
|  Specify a switch and a port for the control unit.                 |
| - end -                                                            |
 ────────────────────────────────────────────────────────────────────
```

Figure 33. Explanation Message

- Use the ***Delete message*** action from the context menu (or action code **d**) to delete a message from the message list.
- Select ***Save messages*** from the ***Save*** action bar to save the displayed messages in the corresponding message log file.

Promptable fields

The HCD prompt facility reduces what you have to remember, what you have to type, and, possibly, what you have to correct due to typing errors. You can use the prompt facility if there is a plus sign (+) to the right of an entry field (or its column heading on an action list panel). Just place the cursor on the entry field and press the F4=Prompt key.

HCD then displays a prompt selection menu that lists all the values that are currently valid for the field. For long lists (of I/O devices, for example), HCD first displays a menu to let you limit the values listed (to only DASD devices, for example).

```
 ────────────────────── Add Partition ──────────────────────
|                                                           |
|                                                           |
| Specify the following values.                             |
|                                                           |
| Partition name . . . PROD                                 |
| Partition number . . 1                                    |
| Partition usage  . . OS     +                             |
|         ─────────── Available Partition Usage Types ───────
| Descrip |                                       Row 1 of 3 |
|         |                                                  |
|         | Select one.                                      |
|  F1=Hel |                                                  |
|  F9=Swa |   Usage   Explanation                            |
 ─────────|   OS      Operating system                       |
          |   CF      Coupling facility                      |
          |   CF/OS   Coupling facility or operating system  |
          | ***************** BOTTOM OF DATA ****************** |
           ──────────────────────────────────────────────────
```

Figure 34. Example of a Prompt Selection Panel

Prompt is also available for the action column. For this purpose you must place the cursor on the action column. HCD displays the same context menu as when using the / (slash) in the action column and pressing the Enter key. For an example, see Figure 30 on page 64. Note that there is no '+' sign shown for the action column heading.

To select a value, place the cursor to the left of (or on) that value or select the value with s or / (slash), then press the Enter key. HCD inserts that value into the entry field or, in case of selecting an action, performs that action immediately.

The prompt list is built dynamically; if a value can be used only once in a configuration then, after it has been selected, either it does not appear in the list again, or it is marked as nonselectable - with the hash sign (#).

Note: It is possible that HCD initially accepts a selection, but rejects it later after further validation when the entered context information is completed.

Commands and function keys

All HCD list panels have a command line on which you can enter the usual ISPF commands, TSO commands, or specific HCD commands.

You can use F22=Command to move the cursor to the command line. When the cursor is in the command line, F22=Command lets you step back through the commands that you have previously entered (including ISPF commands).

The HCD dialog uses 24 function keys, if your ISPF session allows the use of 24 function keys. The function keys assignments can be shown or hidden by entering PFSHOW in the command line.

To perform a function, just press that function key.

Getting help

HCD offers an extensive help facility. From any panel, you can get context-sensitive help by pressing the F1=Help key. Table 6 shortly explains the available types of help and how to obtain it.

Table 6. Online Help Information

Type of Help	Description	How to Get Help
Field	An explanation of what you can enter in a specific entry field on the current panel.	Place the cursor in the entry field and press the F1=Help key.
Extended	Gives information on the content and task of a function panel.	Move the cursor to a non-interactive field in the function panel and press F1, or select Extended help in the action bar, or press F2=Ex_help in field help panels.
Instruction	Specific instructions on what you can do on the current action list panel.	Press the F13=Instruct key. Or select ***Help*** from the action bar.

Table 6. Online Help Information (continued)

Type of Help	Description	How to Get Help
Command	An explanation of the HCD commands that you can enter in the command line.	Place the cursor in the command line and press the F1=Help key. For detailed help on a specific command, type the name of the command and press the F1=Help key.
Keys	An explanation of the function keys.	Press the F1=Help key, then press the F9=Keyshelp key from the help panel. Or select ***Help*** from the action bar.
Reference Phrase	An explanation of any of the highlighted words or phrases that appear on a help panel.	Place the cursor on the word or phrase and press the Enter key.
Message	An explanation of a message that is displayed on the current panel.	Press the F1=Help key when a message is displayed, regardless of the cursor position.
Help for Help	A general explanation of how to use the help facility.	Press the F1=Help key, then press the F1=Help key again from the help panel. Or select ***Help*** from the action bar.
Action Bar	An explanation of the action bar of a panel.	Request extended help, then place the cursor on the reference phrase of the action you want help for, and press Enter.

On a help panel, you can use F5=Window to change the size of the window, to reduce the scrolling required, or to see more of the underlying panel.

Navigating through the dialog

Most tasks you do with HCD are done in one step. However, some tasks need more than one step (*multi-step tasks*). For example, when you define an I/O device, you usually want to define the processor and operating system data for that device at the same time. HCD lets you define this data together, in one task, by displaying a sequence of panels in a predefined order.

Moving forward and backward within a task

The following function keys are available to move forward and backward in a multi-step task.

Enter
Displays the next panel in the predefined order. HCD validates your data, but does *not* save it in the IODF until you complete the task. At the end of the task, HCD redisplays the action list panel that precedes the task.

F3=Exit
Completes the task. HCD saves in the IODF all valid data that you have entered so far in the task (plus any data in the following steps that has been inherited by, for example, an ***Add like*** action). It then redisplays the action list.

F6=Previous
Available on the second and subsequent steps. It cancels the

current step and redisplays the previous panel. Any data that you have entered on the current panel is lost.

F12=Cancel Cancels the current task. Data entered in the current step is lost but, if you have entered data in any of the previous steps, HCD gives you the option to save that data (and any inherited data in the following steps) in the IODF.

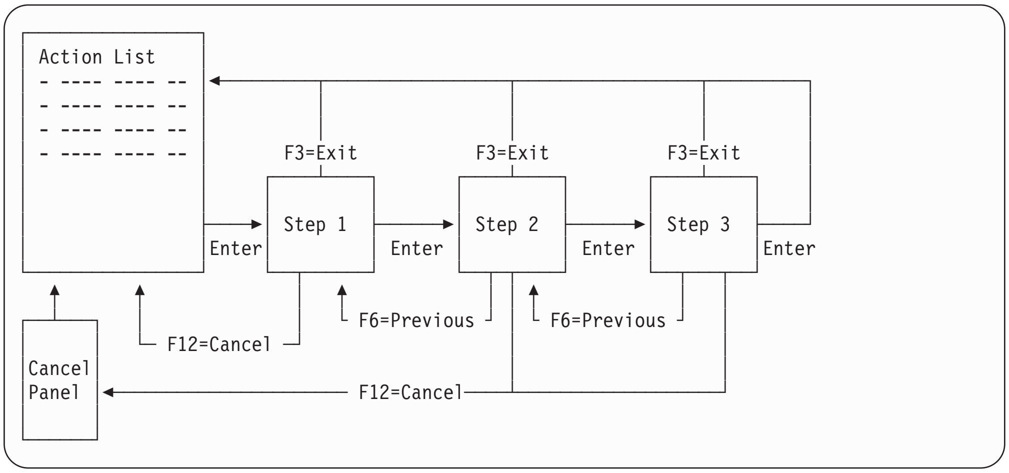


Figure 35. Moving within a Multi-Step Task

Fast path

HCD offers you a fast path to jump directly from an action list panel to another panel without having to navigate through the dialog.

HCD offers you two possibilities to use this fast path:
- Using the ***Goto*** action bar choice
- Using the GOTO command

Using the action bar choice

Select the ***Goto*** action bar choice and on the resulting pull-down menu the target object you want to navigate to.

```
 Goto  Filter  Backup  Query  Help
┌───────────────────────────────────┐
│    1. Operating systems           │ -------------------------------------
│    2. EDTs ...                    │ ce List        Row 1 of 16 More:      >
│    3. Esoterics ...               │ __________________ Scroll ===> PAGE
│    4. Generics ...                │
│    5. Consoles ...                │ s Enter. To add, use F11.
│    6. Switches                    │
│    7. Ports ...                   │ Control Unit Numbers + --------
│    8. Switch Configurations ...   │ - 3--- 4--- 5--- 6--- 7--- 8--- Base
│    9. Port Matrix ...             │ _ ____ ____ ____ ____ ____ ____
│   10. Processors                  │ _ ____ ____ ____ ____ ____ ____
│   11. Partitions ...              │ _ ____ ____ ____ ____ ____ ____
│   12. CHPIDs ...                  │ _ ____ ____ ____ ____ ____ ____
│   13. Control units               │ _ ____ ____ ____ ____ ____ ____
│   14. Devices                     │ _ ____ ____ ____ ____ ____ ____
│   15. Migrate configuration data  │ _ ____ ____ ____ ____ ____ ____
│   16. Leave HCD                   │ _ ____ ____ ____ ____ ____ ____
└───────────────────────────────────┘ _ ____ ____ ____ ____ ____ ____
_ 01D7   3390         2  1  00D1 ____ ____ ____ ____ ____ ____ ____
_ 01D8   3390         2  1  00D1 ____ ____ ____ ____ ____ ____ ____
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 36. Using the Goto Action Bar Choice

Objects marked with **...** are associated with another object (for example, an EDT list is associated with an operating system). If you select such an object, HCD displays a list on which you can select the associated object:

```
  Goto  Backup  Query  Help
 --------------------------------------------------------------------------
                   Operating System Configuration List              Row 1 of 2
 Command ===> ___________________________________________ Scroll ===> CSR

 Select one or more operating system configurations, then press Enter. To
 add, use F11.

 / Config. ID   Type     Description
 _ MVSVM        MVS      MVS Testsystems
 _ VM01         VM       z/VM for Testsystems
 ******************************* Bottom of data ********************************


F1=Help      F2=Split    F3=Exit      F4=Prompt    F5=Reset     F7=Backward
F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel
```

Figure 37. Operating System Configuration List as example of a Selection List

Using the GOTO command

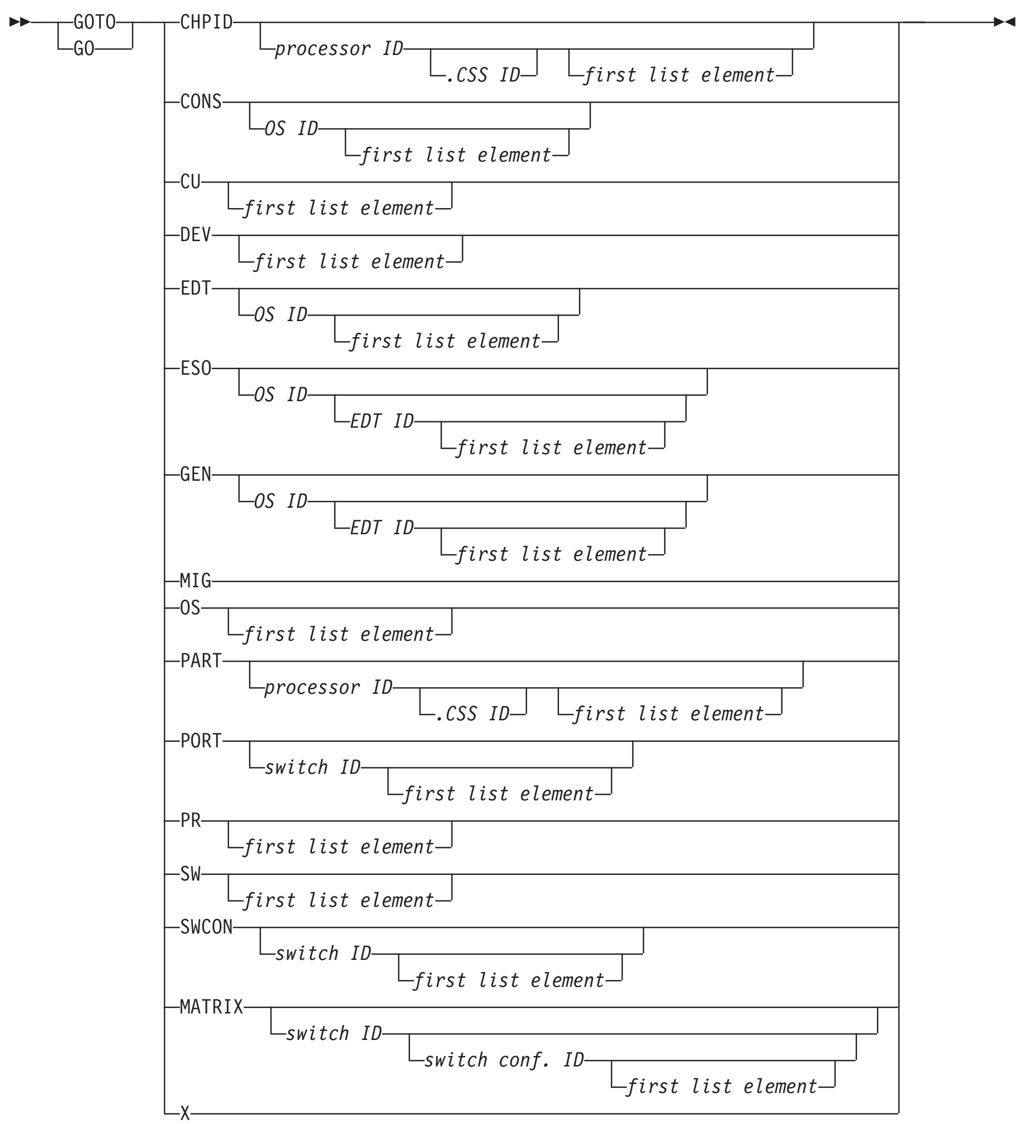
Specify GOTO (or just GO) and the target you want to jump to in the HCD command line. If you type GOTO without a target, a panel is displayed showing the same list of target objects as when using the ***Goto*** pull-down menu.

You can also jump to list panels that are associated with another object (for example, to the EDT list associated with an operating system). In this case, specify both the target and the object with which it is associated. If you omit this object, a selection list is displayed (for example, the Available Operating System list appears when going to the EDT list).

Optionally, you can also specify the object that will be shown as the first element of a list if you jump to a list panel.

The following figure shows you the syntax of the command. The parameters can be separated by either blank, comma, or dot.

GOTO command:



CHPID	Channel path list	**OS**	OS configuration list
CONS	Console list	**PART**	Partition list
CU	Control unit list	**PORT**	Port list
DEV	Device list	**PR**	Processor list
EDT	EDT list	**SW**	Switch list
ESO	Esoteric list	**SWCON**	Switch configuration
GEN	Generic list	**MATRIX**	Port matrix
MIG	Migrate configuration data	**X**	Leave HCD

First list element
: The object that will be shown as the first element of a list if you jump to a list panel (same as if using the LOCATE command).

Examples: To go to the channel path list of processor SYSA and display CHPID 27 as the first element of the list, enter:

```
GO CHPID SYSA 27
```

To go to the esoterics list of EDT A1 in operating system MVSPROD and display the esoteric group ESO12 as the first element in the list, enter:

```
GO ESO MVSPROD A1 ESO12
```

To specify the processor ID and channel subsystem ID for XMP processors in GOTO PART or GOTO CHPID commands, you use the dot to concatenate both parts:

```
GO PART P2084.3
```

Filtering

If a displayed object list is too long, and scrolling back and forth is getting cumbersome, you may use the ***Filter*** function that lets you limit the displayed information. The ***Filter*** function is available when the action bar shows a ***Filter*** action bar choice. This is the case in a:
- Processor list
- Channel path list
- CTC connection list
- CF channel path connectivity list
- Switch list
- Port list
- Control unit list
- Device list
- Esoteric list
- I/O Path list

For example, on the device list, you can limit the displayed information by the following filter criteria:
- Device type
- Device group
- Whether the devices are defined to an operating system or not
- Serial number and description
- Volume serial number
- Device parameters and features (if you navigated to the I/O Device List via the operating system configuration list)
- Whether the devices are connected to a control unit or not
- Up to four control units, to which the devices may be connected
- Subchannel set ID

Rather than seeing all devices defined in the IODF, you see only those devices that are, for example, of a certain type connected to a certain control unit.

How to request filtering is illustrated in the following scenario:

1. Navigate to a processor's ***I/O Device List***. Note that for XMP processors you first need to navigate to its ***Channel Subsystem List*** and then to its ***I/O Device List***. Now tab to the action bar and select ***Filter*** from the action bar. The pull-down menu shown in Figure 38 on page 74 is displayed:

```
  Goto  Filter  Backup  Query  Help
----- ┌──────────────────────────────────────┐ ----------------------------
      │    1. Set Filter                     │         Row 1 of 6 More:       >
Comma │    2. Clear Filter                   │ __________ Scroll ===> CSR
      │    3. Count rows on (filtered) list  │
Selec └──────────────────────────────────────┘ To add, use F11.

Processor ID : TSPROC1    Proc supporting multiple SSs      CSS ID : 0

  ----------Device--------- --#-- --------Control Unit Numbers + --------
/ Number   Type +        SS IM OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0001     3390A         0  0  1  0001 0002 ____ ____ ____ ____ ____ ____
_ 0001     3390A         1  2  1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0002,4   3390A         1  2  1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0002,8   3390A         0  2     0001 0002 ____ ____ ____ ____ ____ ____
_ 0006,3   3390             2  1  0001 ____ ____ ____ ____ ____ ____ ____
_ 000A     3380             2  1  0001 ____ ____ ____ ____ ____ ____ ____
****************************** Bottom of data *******************************

 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 38. Filter example

2. Select ***Set Filter***. This displays the Filter I/O Device List panel (Figure 39), tailored for the underlying I/O Device List, where you can specify your filter criteria. Note that for example, the 'Subchannel set ID' filter criteria is only available for the I/O Device List if invoked from the Channel Subsystem List of a z9 EC processor or later model, or from the Operating System Configuration List (action code **u** in both cases). Similar panels are displayed for the other lists.

   An alternative way to select filtering is to tab to the command line and type in FILTER SET.

```
┌─────────────────── Filter I/O Device List ────────────────────┐
│                                                               │
│                                                               │
│ Specify or revise the following filter criteria.              │
│                                                               │
│ Device type  . . . . 3390A___   +                             │
│ Device group . . . . ________   +                             │
│ Subchannel set ID  . 0  +                                     │
│                                                               │
│ Defined to OSs . . . Y  (Y = Yes; N = No)                     │
│                                                               │
│ Serial number  . . . __________                               │
│ Description  . . . . ________________________________         │
│                                                               │
│ Volume serial number . . . . . . . ______  (for DASD)         │
│                                                               │
│ Connected to CUs . . _  (Y = Connected; N = Not connected)    │
│ Specific CUs . . . . ____  or  ____  or  ____  or  ____       │
│                                                               │
│                                                               │
│  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset     │
│  F9=Swap    F12=Cancel                                        │
└───────────────────────────────────────────────────────────────┘
```

Figure 39. Filter I/O Device List

3. On this filter panel you can specify one or more filter criteria. All specified filter criteria must match to display the item. For example, if you specify a device type and a subchannel set where the devices of this type should be defined, and then press the Enter key, the I/O Device List is displayed again, now showing only those devices that match these filter criteria. Figure 40 on page 75

page 75 shows an example of a filtered list. If `Filter Mode` is displayed in the right top corner of the panel, it indicates that the filter mode is active.

```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                             I/O Device List       Filter Mode. More:      >
Command ===> ___________________________________________ Scroll ===> CSR

Select one or more devices, then press Enter. To add, use F11.

Processor ID : MSSPROC1   Proc with multiple SSIDs          CSS ID : 0

  ----------Device--------- --#-- --------Control Unit Numbers + --------
/ Number   Type +       SS IM OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0001     3390A        0  0  1  0001 0002 ____ ____ ____ ____ ____ ____
_ 0002,8   3390A        0  2     0001 0002 ____ ____ ____ ____ ____ ____
****************************** Bottom of data *******************************

 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 40. Reduced I/O Device List (using a filter)

Most of the entry fields support wildcards, that means that an asterisk (*) can be specified in front and/or after the specified term. The following table illustrates the wildcard processing using the device type field as an example.

Specified Term	**Result**
3380	Displays all devices of type 3380
3380*	Displays all devices of type 3380 regardless of its model
338*	Displays all devices whose type starts with ’338’
*80	Displays all devices whose type ends with ’80’
42	Displays all devices containing the string ’42’ within the type, for example 3420.

Use Field Help on the Filter panel to get information on whether wildcards are supported or not.

To remove the filter, use ***Clear Filter*** from the ***Filter*** action bar, or enter FILTER CLEAR in the command line.

To count the rows on a filtered list, use ***Count rows on (filtered) list*** from the ***Filter*** action bar choice, or enter FILTER NUM in the command line. An informational message displays the number of rows in the current list. If this list is filtered, only the rows matching the underlying filter criteria are counted.

Job statement information used in panels

Some of the HCD tasks, invoked from the dialog, generate batch jobs. These batch jobs use EXEC procedures as shown in Table 3 on page 33.

The first time you use a task that generates an HCD batch job, you must specify a JOB control statement for the job. This statement can contain user-specific information, such as an account number and SYSOUT class. For example:

```
//WASR    JOB (3259,BOX10),'SMITH',NOTIFY=WAS,
//            CLASS=A,REGION=4M,MSGCLASS=F,MSGLEVEL=(1,1)
```

You need to specify the statement only once; it is saved in your user profile and reused for all subsequent HCD batch jobs that you request (in this and following HCD sessions) until you change it. HCD does not validate the JOB statement.

With JCL overwrite statements you can modify the EXEC procedures that are invoked by the job.

Notes:

1. A batch job requires a region size large enough to contain the HCD code (4M bytes) as well as the IODF (or two IODFs when you compare two IODFs).
2. A batch job to build an IOCDS must run on the processor on which the IOCDS is to be updated, except for processors configured in an S/390 microprocessor cluster.
3. A batch job generated by HCD cannot run when the HCD dialog has exclusive access to the same IODF that the batch job uses. You can release the IODF by changing to another IODF or by ending the HCD session.
4. To use the HCD profile options (e.g. UIM_LIBNAME=*) for a batch job that is started from the dialog, you need to allocate the HCD profile data set to xx.HCDPROF, where xx is the job step name.
5. In a sysplex environment, use the JOBPARM parameter to specify in which system of the sysplex you want the batch job to run. For additional information, see Chapter 12, “How to invoke HCD batch utility functions,” on page 307.

Table 3 on page 33 lists the HCD tasks that use batch jobs. It also lists their job step names, and EXEC procedure names.

Chapter 6. How to define, modify, or view a configuration

Overview

This information unit describes:

- The possibilities for creating new objects
- The navigation methods through HCD
- A suggested sequence to define a configuration
- Step-by-Step instructions on how to work with (for example, define, change, prime, delete):
  - Operating system configurations
  - EDTs
  - Generics
  - Esoteric groups
  - Processors
  - Channel subsystems (for XMP processors only)
  - Partitions
  - Channel paths
  - Control units
  - Devices
  - Consoles
- The possibilities to view information about objects

The information on how to work with switches is described in Chapter 7, "How to work with switches," on page 169.

Before using the dialog of HCD to define a hardware configuration, you should have a plan of what your configuration should look like, and what you have to do to accomplish that. Preferably, the requirements of your configuration should be established in a configuration plan. Refer to *z/OS HCD Planning* (for a z/OS, OS/390, or MVS configuration) and *z/VM CP Planning and Administration* (for a VM configuration) for a description of what needs to be considered when this plan is prepared.

Creating new objects

You have three possibilities to create new objects: add, add like, and repeat (copy).

Add

Use the F11=Add key to define a new object. Initially, the entry fields contain (where applicable) default values supplied by HCD.

Add like

Use the ***Add like*** action from the context menu to define a new object that is based on the definition of an existing object. You just have to enter the fields that are different. A field that needs a unique value, such as the object's identifier, is not copied.

Repeat (copy)

The action ***Repeat (copy)*** from the context menu is similar to ***Add like***, but the definitions of all related objects are also copied. For example, if you repeat an operating system configuration, HCD also copies the definitions for all EDTs and consoles, and the connections to all I/O devices attached to that operating system. You can repeat parts of a configuration within the same or to another IODF.

This function is useful when you want to consolidate configuration data from several IODFs into one single IODF or to repeat configuration data (for example, esoterics) that is used several times in an IODF.

When copying parts of a configuration, the source data and the target data are merged.

- If the source object does not exist in the target IODF

  The new object is defined using the attributes you specified while copying the object. The objects and connections that are related to the object you want to copy are created with the same attributes as the source objects and connections.
- If the source object already exists in the target IODF

  The attributes of the target object are updated according to the attributes of the source object. If related objects or connections do not yet exist, they are created. If they already exist, their attributes are updated according to the attributes of the source.

Navigating through HCD

HCD offers three methods to navigate to objects:
- Centralized navigation
- Hierarchical navigation
- Graphical navigation

Centralized navigation

Centralized navigation means that you always navigate to objects starting from the Define, Modify, or View Configuration Data panel.

The tasks described in this section use this navigation method.

Hierarchical navigation

Hierarchical navigation means that you navigate to objects from top to bottom.

In Figure 41 on page 80 you start, for example, with option 3 to open the Processor List. From the Processor List, you can navigate to channel paths, from channel paths to control units, and finally from the control unit list to the device list. This device list - called Device List (attached) in Figure 41 on page 80- is different from the device list you reach with option 5 from the Define, Modify, or View Configuration panel:

- The devices on this list are limited to the control unit you selected on the preceding control unit list.
- The actions offered on this list differ from the actions available on the device list reached with option 5 from the Define, Modify, or View Configuration panel.

Hierarchical navigation is useful, for example, when you want to use the ***Attribute group change*** action necessary to change the DYNAMIC parameter for a group of devices. In this case, you have to navigate to the device list via the operating system configuration list.

Graphical navigation

Graphical navigation means that you navigate to objects by viewing a graphical configuration report and jumping to the object lists using the F4=Jump function. Refer to "Create or view graphical configuration reports" on page 238 for information on how to use the graphical configuration report.

The graphical navigation is useful when you prefer a graphical representation of your configuration to navigate from object to object.

Navigation map

Figure 41 on page 80 illustrates how you can navigate from object to object. You can either navigate to objects using the ***Work with object*** actions from the context menu or using the appropriate action code, for example **s**. Note that you can reach the Generic List with two action codes: **g** (ordered by name) or **p** (ordered by preference value). For information on how to use action codes refer to "Using the action code" on page 64.

Control Unit list and Device list

You reach these lists with option 4 and 5 from the Define, Modify, or View Configuration Data panel. These lists show all devices defined in the IODF.

The Control Unit list (attached) and the Device list (attached) can only be reached from an object higher in the hierarchy. These lists are limited to the object higher in the hierarchy and the actions available on these lists differ from the actions available on the device and control unit lists you reach with option 4 and 5 from the Define, Modify, or View Configuration panel (refer to "Hierarchical navigation" on page 78). You can, for example, limit a control unit list to the control units attached to one specific channel path by opening the list from the channel path list.

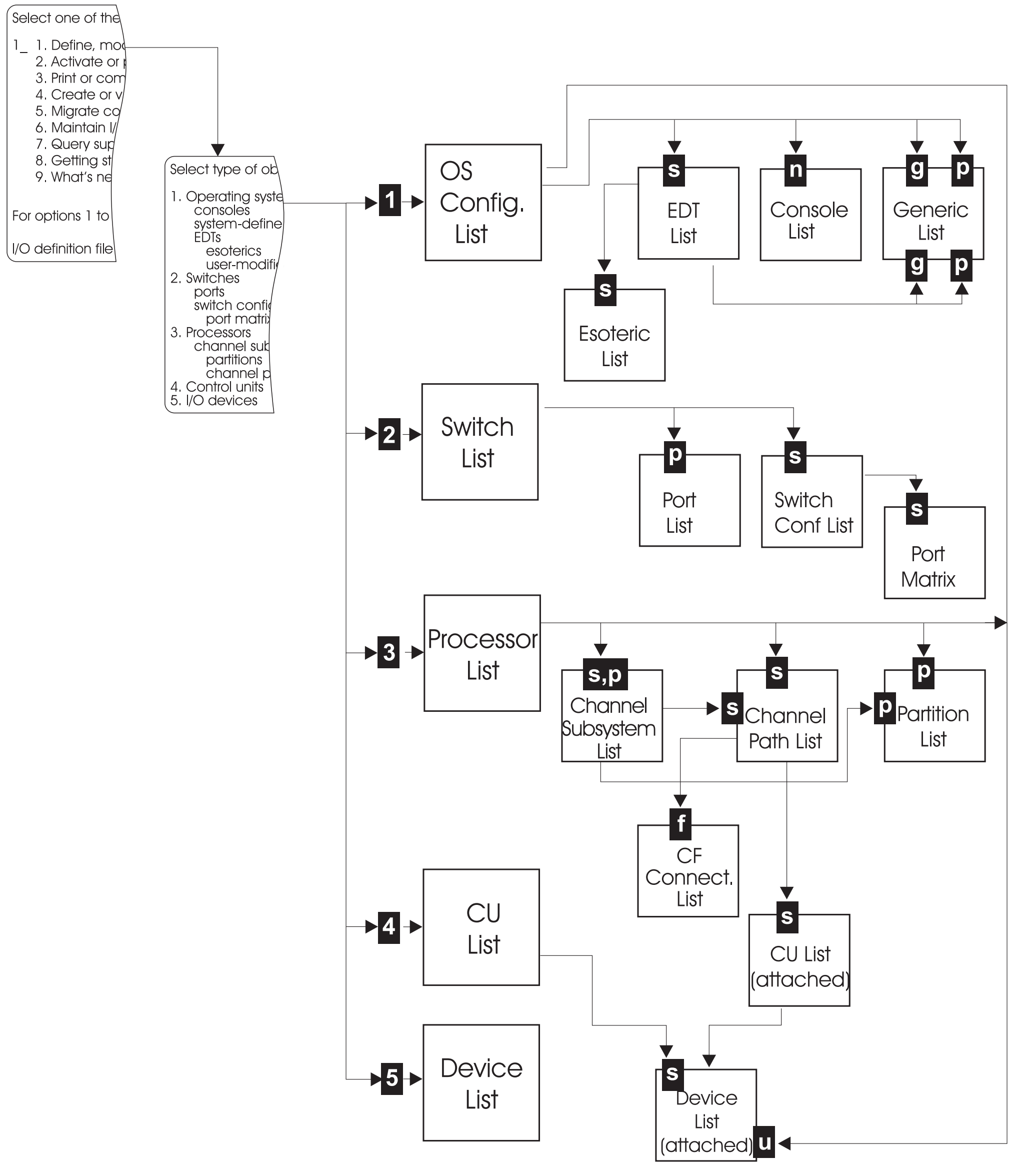


Figure 41. Navigation Map

Suggested sequence to define a configuration

A hardware configuration consists of:

- Information needed by z/OS, OS/390, or MVS/ESA, and by z/VM. This is known as the *operating system configuration* or *OS configuration*.
- Information needed by the channel subsystem (CSS). This defines all the hardware resources (such as control units, channel paths, and I/O devices) and how they are connected.
- In some cases, your configuration contains information needed by the switch. For definitions and modifications of switches, refer to Chapter 7, "How to work with switches," on page 169.

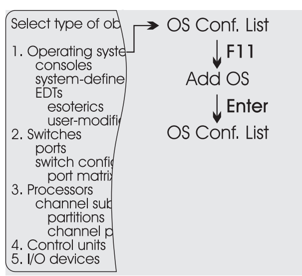
You can define the objects of a configuration in almost any order but at one point you have to connect objects together. You can only connect objects that are already defined; therefore it is useful to define the objects in a logical order. For example, when defining I/O devices during the hardware definition, you are prompted to add devices to existing operating system definitions. Therefore, it is useful to define the operating system before the devices.

The suggested sequence to define a configuration is:
1. Operating systems
2. EDTs (MVS-type only)
3. Esoterics (MVS-type only)
4. Switches (explained in Chapter 7, “How to work with switches,” on page 169)
5. Processors
6. Channel subsystems (for XMP processors)
7. Partitions (if processor in LPAR mode)
8. Channel paths
9. Control units
10. Devices
11. Consoles

Working with operating system configurations

An operating system (OS) configuration defines the data that is used by z/OS, OS/390, MVS/ESA, or z/VM to build its control blocks. An IODF can contain more than one OS configuration; MVS/ESA, z/OS, or OS/390 is told which one to use at IPL time.

Defining operating system configurations



It is recommended to define the operating system configuration before you define anything else. Proceed as follows to define an operating system configuration:

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system configurations***. HCD displays the Operating System Configuration List of all operating system configurations currently defined in the IODF:

```
  Goto  Backup  Query  Help
--------------------------------------------------------------------------
                  Operating System Configuration List             Row 1 of 1

Select one or more operating system configurations, then press Enter. To
add, use F11.

/ Config. ID   Type     Description
_ OPSYS02      VM       z/VM operating system
****************************** BOTTOM OF DATA ********************************
```

```
┌──────────────── Add Operating System Configuration ─────────────┐
│                                                                  │
│ Specify or revise the following values.                          │
│                                                                  │
│ OS configuration ID  . . . . . OPSYS01_                          │
│ Operating system type  . . . . MVS       +                       │
│                                                                  │
│ Description  . . . . . . . . . z/OS operating system             │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘
```

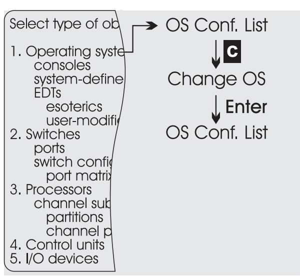
If there are no existing configurations in the IODF, the operating system configuration list is empty.

2. Use F11=Add to define a new configuration. The data-entry fields are shown in the following figure, with sample data:

```
┌──────────────── Add Operating System Configuration ─────────────┐
│                                                                  │
│ Specify or revise the following values.                          │
│                                                                  │
│ OS configuration ID  . . . . . OPSYS01_                          │
│ Operating system type  . . . . MVS       +                       │
│                                                                  │
│ Description  . . . . . . . . . z/OS operating system             │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘
```

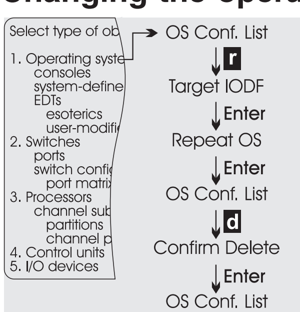
3. After you press the Enter key, HCD displays the updated operating system configuration list.

Changing operating system configurations



You can change the description of an operating system by just typing over the `Description` column or by using the ***Change*** action from the context menu (or action code **c**) on the Operating System Configuration List.

Changing the operating system configuration ID



To change the ID of an operating system, perform the following steps:

1. On the OS Configuration List select the operating system and the ***Repeat (copy) OS configurations*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
2. Press the Enter key to accept the default target IODF name, that is the IODF you are currently working with. The Repeat Operating System Configuration panel is displayed.

```
┌─────────────── Repeat Operating System Configuration ───────────────┐
│                                                                      │
│                                                                      │
│ Specify or revise the following values.                              │
│                                                                      │
│ OS configuration ID  . . . . . ________                              │
│ Operating system type  . . . : MVS                                   │
│                                                                      │
│ Description  . . . . . . . . . z/OS operating system                 │
└──────────────────────────────────────────────────────────────────────┘
```

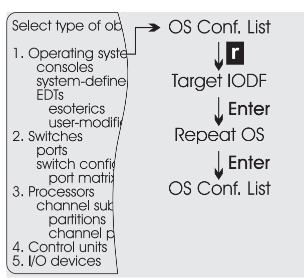
3. Specify the new identifier for the operating system and press the Enter key.

   HCD displays the OS Configuration List now showing the new operating system.
4. Delete the old operating system by selecting the operating system and the ***Delete*** action from the context menu (or action code **d**). HCD displays a confirmation panel before showing the updated OS Configuration List.

Repeating (copying) operating system configurations

You can copy operating systems within the same or to another IODF. When copying an operating system, the following related objects and connections are also copied:

- Devices defined for the operating system
- List of consoles (NIPCONs for MVS)
- EDTs including their esoterics and generic groups



In the following example, you copy an operating system to another IODF that already contains an operating system with the same ID that you specify in the repeat panel.

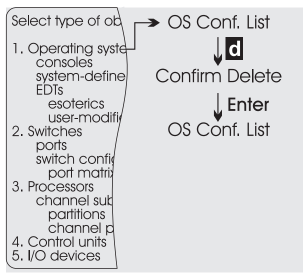
1. Make sure that the operating system in the target IODF has the same operating system type as the one in the source IODF.
2. On the Operating System Configuration List, copy the operating system using the ***Repeat (copy) OS configurations*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
3. Specify the IODF to which the selected operating system is to be copied. The default IODF is the IODF you are currently working with.
4. On the following Repeat Operating System Configuration panel, specify the required values and press the Enter key.

If a device defined to the operating system already exists in the target IODF, HCD tries to map the device. If more than one device with the same type and number exist, HCD maps the device to the first device found. To avoid this sometimes erroneous mapping, specify a processor and partition on the Repeat Operating System Configuration panel in which the operating system is to be run. Refer to "Migrating additional MVSCP or HCPRIO input data sets" on page 267 for detailed rules when a device is mapped.

Console devices (NIPCONs for MVS) from the source operating system are copied to the beginning of the target's console chain.

5. Because you copy an operating system that already exists in the target IODF, HCD displays a panel to confirm the merging of configuration data.

Deleting operating system configurations



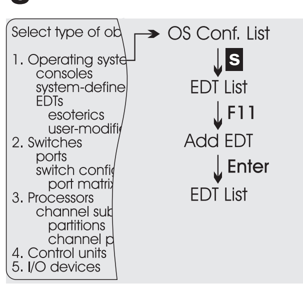
You can delete the complete definition of an operating system using the ***Delete*** action from the context menu (or action code **d**) on the Operating System Configuration List. This also deletes all EDTs, esoterics, consoles, and connections to devices defined for this operating system.

Working with EDTs

For an MVS-type operating system, you have to define at least one eligible device table (EDT). An EDT can consist of one or more esoteric device groups and names of the generic device types. Esoteric device groups are installation-defined groupings of I/O devices.

An OS configuration can contain more than one EDT; z/OS or OS/390 is told which one to use at IPL time. For background information about I/O device allocation in MVS that you need to understand before defining EDTs and esoteric groups, refer to *z/OS HCD Planning*.

Defining EDTs



Before you can define EDTs, you must have defined an operating system. You define an EDT as follows:

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system***

configurations. HCD displays the Operating System Configuration List of all operating system configurations currently defined in the IODF.

2. On the Operating System Configuration List, select the OS configuration and the ***Work with EDTs*** action from the context menu (or action code **s**). HCD displays the EDT List.

```
┌───────────────────────────── EDT List ──────────────────────────────┐
│  Goto  Backup  Query  Help                                          │
│ ----------------------------------------------------------------------│
│                                                          Row 1 of 1 │
│ Command ===> _______________________________________ Scroll ===> PAGE│
│                                                                     │
│ Select one or more EDTs, then press Enter. To add, use F11.         │
│                                                                     │
│ Configuration ID . : OPSYS01      MVS or z/OS operating system      │
│                                                                     │
│ / EDT Last Update By       Description                              │
│ _ AS  1994-10-04  DOCU     basic                                    │
│ *************************** BOTTOM OF DATA **************************│
│                                                                     │
│                                                                     │
└─────────────────────────────────────────────────────────────────────┘
```

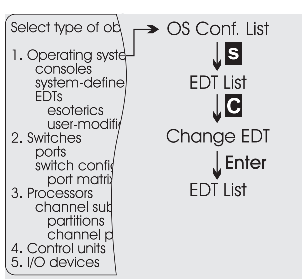
If there are no EDTs defined in the IODF, the EDT list is empty.

3. Use F11=Add to add a new EDT. The data-entry fields are shown in the following figure, with sample data:

```
┌─────────────────────────────── Add EDT ──────────────────────────┐
│                                                                  │
│     Specify the following values.                                │
│                                                                  │
│     Configuration ID . : OPSYS01      MVS or z/OS operating system│
│                                                                  │
│     EDT identifier . . . A1                                      │
│     Description  . . . . special                                 │
└──────────────────────────────────────────────────────────────────┘
```

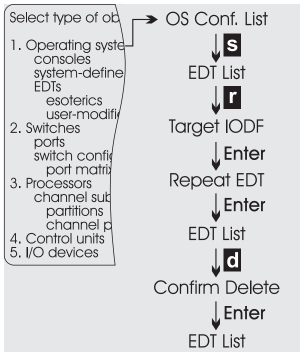
4. After you press the Enter key HCD displays the updated EDT List.

Changing EDTs



You can change the description of an EDT by just typing over the `Description` column or using the ***Change*** action from the context menu (or action code **c**) on the EDT List.

Changing the EDT ID



To change the ID of an EDT, perform the following steps:

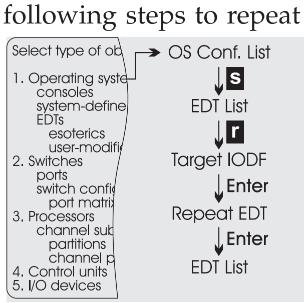
1. On the EDT List select the EDT and the ***Repeat (copy) EDTs*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
2. Press the Enter key to accept the default target IODF name, that is the IODF you are currently working with. The Repeat EDT panel is displayed.

```
┌─────────────────────────── Repeat EDT ──────────────────────────────┐
│                                                                     │
│                                                                     │
│ Specify or revise the following values.                             │
│                                                                     │
│ Configuration ID . . OPSYS01   +                                    │
│                                                                     │
│ EDT identifier . . . __                                             │
│ Description  . . . . special                                        │
└─────────────────────────────────────────────────────────────────────┘
```

3. Specify the new identifier for the EDT and press the Enter key. HCD displays the EDT List now showing the new EDT.
4. Delete the old EDT by selecting the EDT and the ***Delete*** action from the context menu (or action code **d**). HCD displays a confirmation panel before showing the updated EDT List.

Repeating (copying) EDTs

You can copy EDTs within the same or to another IODF. When copying an EDT, the esoteric groups and the VIO eligible parameter are also copied. Perform the following steps to repeat an EDT:

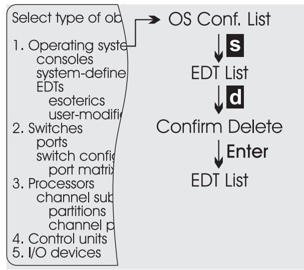


1. Make sure that the devices are already defined to the target operating system.
2. On the EDT List, select an EDT and the ***Repeat (copy) EDTs*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
3. Specify the IODF to which the selected operating system is to be copied. The default IODF is the IODF you are currently working with.

4. On the following Repeat EDT panel, specify the required values and press the Enter key.

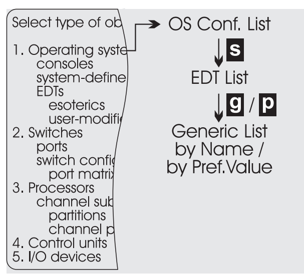
   If the EDT already exists in the target IODF, the esoteric groups and their devices are merged. In this case, HCD displays a panel to confirm the merging of data.

Deleting EDTs



You can delete the definition of an EDT using the ***Delete*** action from the context menu (or action code d) on the EDT List. This also deletes the esoterics.

Working with generics



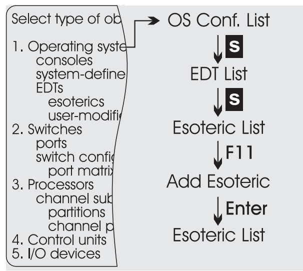
Device types with similar characteristics are logically grouped together and assigned a name to by the system. Such a group is called a generic device type. Reference to a generic device type is made by its name. To request a device allocation, a user can specify a generic device type rather than a specific device number. z/OS or OS/390 then allocates a device from the specified generic device type.

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system configurations***. HCD displays the OS Configuration List of all operating system configurations currently defined in the IODF.
2. On the Operating System Configuration List, select the OS configuration and the ***Work with EDTs*** action from the context menu (or action code s). HCD displays the EDT List.
3. To change the generics, select either the action ***Work with generics by name*** from the context menu (or action code g), or the action ***Work with generics by preference value*** (or action code p) on the EDT List. On the resulting panels you can then change the VIO indicator, the preference value for a generic, and you can display a subsequent panel that lists the devices belonging to the specific generic.

Working with esoteric groups

An esoteric device group identifies the I/O devices that are included in that group. The name you assign to an esoteric device group is called the esoteric name. To request allocation of a device from an esoteric device group, specify the esoteric name on the UNIT parameter of a JCL DD statement. The name *esoteric device group* is often shortened to *esoteric group* or simply *esoteric*.

Defining esoteric groups



You can define which esoteric device groups are in each EDT after you have defined the OS configuration. But you cannot assign I/O devices to an esoteric device group until the devices have been defined.

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system configurations***. HCD displays the OS Configuration List of all operating system configurations currently defined in the IODF.
2. On the Operating System Configuration List, select the OS configuration and the ***Work with EDTs*** action from the context menu (or action code S). HCD displays the EDT List.
3. On the EDT List, select the EDT and the ***Work with esoterics*** action from the context menu (or action code S). HCD displays the Esoteric List.

```
┌─────────────────────────── Esoteric List ───────────────────────────┐
│  Goto  Filter  Backup  Query  Help                                  │
│ ----------------------------------------------------------------------
│                                                           Row 1 of 1│
│                                                                     │
│ Select one or more esoterics, then press Enter. To add, use F11.    │
│                                                                     │
│ Configuration ID . : OPSYS01      MVS or z/OS operating system      │
│ EDT identifier . . : AS           basic                             │
│                                                                     │
│ / Esoteric  VIO    Token  State                                     │
│ _ ES001     No     ____   No device defined                         │
│ ************************** BOTTOM OF DATA ***************************│
```

4. Use F11=Add to add a new esoteric group. The data-entry fields are shown below, with sample data:

```
┌────────────────────── Add Esoteric ──────────────────────┐
│                                                          │
│                                                          │
│ Specify the following values.                            │
│                                                          │
│ Esoteric name  . . . ES002___                            │
│ VIO eligible . . . . No     (Yes or No)                  │
│ Token  . . . . . . . ____                                │
```

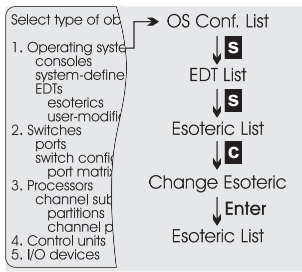
5. After you press the Enter key HCD displays the updated Esoteric List.

Assigning devices to esoterics

You must define the I/O devices before you can assign them to an esoteric group. This is described in “Defining devices” on page 138. The `State` column on the Esoteric List indicates the esoteric groups that have no devices defined; so you can check later that your groups are properly defined.

If I/O devices are already defined, you can assign them to esoteric groups as described in “Adding devices to esoterics.”

Changing esoteric groups



You can change the following data of an esoteric group by just typing over the corresponding columns or by using the ***Change*** action from the context menu (or action code **C**) on the Esoteric List:

- Esoteric name
- VIO eligible parameter
- Token

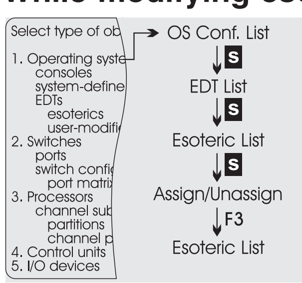
Adding devices to esoterics

You have two possibilities to add devices to esoterics:

While defining devices

When you define a device, HCD automatically prompts you to define the device to an operating system, then to an EDT and esoterics. Refer to “Defining devices” on page 138 for a step-by-step instruction on how to do that.

While modifying esoterics



You can add existing devices to esoterics at any time from the Esoteric List as follows:

1. On the Esoteric List, select the esoteric and the ***Assign devices*** action from the context menu (or action code **S**). HCD displays the Assign/Unassign Devices to Esoterics panel.

2. On the Assign/Unassign Devices to Esoterics panel, overwrite the values in the `Assigned` column to assign (`YES`) or unassign (`NO`) devices to the esoterics of the selected row.

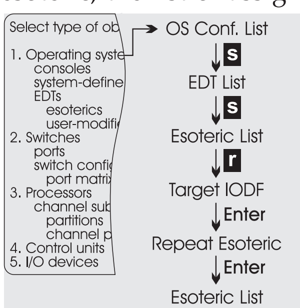
   If you do not want to assign a complete group of devices, you can limit the range by specifying a starting number and the number of devices. If you omit the number of devices, 1 is assumed.

```
┌────────────────── Assign/Unassign Devices to Esoteric ──────────────────┐
│  Goto  Filter  Backup  Query  Help                                     │
│ ---------------------------------------------------------------------- │
│                                                              Row 1 of 4 │
│                                                                         │
│ Specify Yes to assign or No to unassign.                                │
│                                                                         │
│ Configuration ID . : OPSYS01        MVS or z/OS operating system        │
│ EDT.Esoteric . . . : A1.ES001       VIO eligible . : No                 │
│                                                                         │
│                             Generic             Starting  Number of     │
│ Devices       Device Type   Name      Assigned  Number    Devices       │
│ 0001,1        3278-3        3277-2    Yes       ____      ____          │
│ 0098,1        9033          SWCH      No        ____      ____          │
│ 00C1,1        3480          3480      No        ____      ____          │
│ 01D1,8        3390          3390      No        ____      ____          │
```

3. Press the Enter key to process the changes. Then press the F3=Exit key to return to the Esoteric List.

Repeating (copying) esoteric groups

You can copy esoterics within the same or to another IODF. When copying an esoteric, the list of assigned devices is also copied.

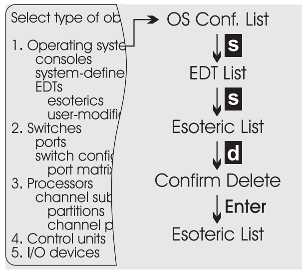


Perform the following steps to repeat esoterics:

1. Make sure that the devices are already defined to the target operating system.
2. On the Esoteric List select an esoteric and the ***Repeat (copy) esoterics*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
3. Specify the IODF to which the selected operating system is to be copied. The default IODF is the IODF you are currently working with.
4. On the following Repeat Esoteric panel, specify the required values and press the Enter key.

   If the esoteric already exists in the target IODF, the devices defined for the esoteric are merged. In this case, HCD displays a panel to confirm the merging.

Deleting esoteric groups



You can delete the definition of an esoteric using the ***Delete*** action from the context menu (or action code **d**) on the Esoteric List.

Working with processors

A note on terminology:

Throughout this document, the following terms are used:

XMP processor and SMP processor
: The term **XMP processor** designates processors that support multiple logical channel subsystems (LCSS). It is used in contrast to the term **SMP processor**, which designates processors of previous generations that support only one channel subsystem.

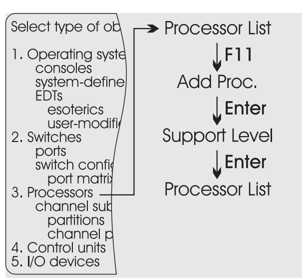
For XMP processors, the HCD dialog offers methods to explicitly define multiple logical channel subsystems (MCSS). For SMP processors, the single channel subsystem is implicitly defined with the processor.

You can define more than one processor in an IODF and for each defined processor you can configure processor-related data for further use by the CSS.

HCD allows you to define and control I/O configurations for a local as well as for all other processors that are part of an S/390 microprocessor cluster.

For processors that are physically partitioned, you must define each physical partition as an individual processor.

Defining processors



Define a processor as follows:

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Processors***. HCD displays the Processor List of all processors currently defined in the IODF.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                Processor List       Row 1 of 1 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more processors, then press Enter. To add, use F11.


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ PROC2    2064     1C1      BASIC 2345672064 This is the second processor
******************************* Bottom of data ********************************
```

2. Use F11=Add to add a new processor. The data-entry fields are shown in the following figure, with sample data:

```
┌───────────────────── Add Processor ──────────────────────────────┐
│                                                                   │
│ Specify or revise the following values.                           │
│                                                                   │
│ Processor ID . . . . . . . . . . PROC1                            │
│                                                                   │
│ Processor type . . . . . . . . . 2064     +                       │
│ Processor model  . . . . . . . . 1C1      +                       │
│ Configuration mode . . . . . . . LPAR     +                       │
│ Number of channel subsystems . . _        +                       │
│                                                                   │
│ Serial number  . . . . . . . . . 1234562064                       │
│ Description  . . . . . . . . . . This is the main processor       │
│                                                                   │
│ Specify SNA address only if part of an S/390 microprocessor cluster:│
│                                                                   │
│ Network name . . . . . . . . . . ________ +                       │
│ CPC name     . . . . . . . . . . ________ +                       │
│                                                                   │
│ Local system name  . . . . . . . ________                         │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```

Figure 42. Add a processor

On the **Add Processor** panel, you can specify the network name and the CPC name, when the processor is configured in an S/390 microprocessor cluster. If you specify a SNA address, refer for specific access authority to "Security-related considerations" on page 339. For XMP processors, you may specify a local system name. If you do not enter a name, and a CPC name is given, the local system name defaults to the CPC name. For SMP processors you must not specify a local system name.

Use `Prompt` on the Add Processor panel for the SNA addresses for those CPCs that are currently configured in the S/390 microprocessor cluster.

3. Depending on the processor type/model, there may be more than one support level for the processor type. The support level defines the supported channel path types, and the features such as CF duplexing and cascaded FICON switches. If the processor has several support levels, HCD displays another panel showing a list of available support levels for the processor.

```
 ─────────────────────────── Available Support Levels ──────────────────────────
                                                   Row 1 of 3 More:       >

 Select the processor support level which provides the processor
 capabilities you want to use.


   Support Level
   Basic 2064 support, IQD, FCP, CF Duplex
 #
   Basic 2064 support, IQD, FCP, CF Duplex, CAS
 #

 **************************** BOTTOM OF DATA *****************************
```

Figure 43. Available support levels

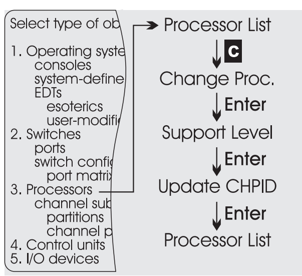
Select the appropriate support level. HCD uses this level when validating the configuration for this processor. It relates to the installed microcode.

Note: On the Available Support Levels panel you can retrieve an explanation of the processor support level for zSeries processors. Position the cursor on the support level description and press PF1 to get an enumeration of functions provided by this support level.

4. After you press the Enter key HCD displays the updated Processor List.

   You can now use the F20=Right key to scroll to the right to see the SNA address, if you have defined one.

Changing processors



You can change the following data of the processor:
- Type
- Model
- Configuration Mode
- Serial Number
- Description
- Network name
- CPC name

1. On the Processor List, select the processor and apply the ***Change*** action from the context menu (or action code **c**). The Change Processor Definition panel is displayed.

```
 ----------------------- Change Processor Definition -----------------------

 Specify or revise the following values.

 Processor ID . . . . . . . . : PROC1
 Support level:
 With parallel and ESCON channels, DYNAMIC and EMIF

 Processor type . . . . . . . . 2064      +
 Processor model  . . . . . . . 1C1       +
 Configuration mode . . . . . . LPAR   +

 Serial number  . . . . . . . . 1234562064  +
 Description  . . . . . . . . . This is the main processor

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . ________  +
 CPC name . . . . . . . . . . . ________  +

 Local system name  . . . . . . ________
```

2. To change the processor type, or model, overtype the old processor type, or model values, and press the Enter key. To change the support level for the same processor type, press the Enter key. If you have installed a new processor type or model, or a new processor support level, you need to upgrade the processor definition within HCD. No dynamic change is possible. HCD selects the proper configuration rules that are dependent on the processor type, and support level, and generates the correct input for the IOCDS download process.

   Note: If the processor change leads to error message CBDA102I, make sure that the new processor type/model supports the same configuration rules as the old processor type, for example, that the same channel path types are supported. Subsequent messages indicate an invalid support level. You first have to update your configuration according to the new processor type/model before you can change the processor.
3. If more than one support level is available for the processor type, the Available Support Levels panel is displayed where you can select the correct support level for your processor.

   Note: On the Available Support Levels panel you can retrieve an explanation of the processor support level for zSeries processors: Position the cursor on the processor support level description and press PF1 to get an enumeration of functions provided by this support level.
4. The Update Channel Path Identifiers panel is displayed. This panel shows the old channel path definitions, which you can change according to your new processor configuration.

```
 ─────────────────── Update Channel Path Identifiers ───────────────────
                                                           Row 1 of 24
 Command ===> __________________________________________ Scroll ===> CSR

 Specify any changes to the channel path identifiers in the list below.

 Processor ID . . . . . . : PROC1
 Channel Subsystem ID . . :

 CHPID  Type  Side  Until CHPID   New CHPID +
 20     BL          __            20
 21     BL          __            21
 22     BL          __            22
 24     CVC         __            24
 25     CVC         __            25
 26     CVC         __            26
 27     CVC         __            27
 28     CVC         __            28
 29     CVC         __            29
 2A     CNC         __            2A
 2B     CNC         __            2B
 2C     CNC         __            2C
  F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset
  F7=Backward   F8=Forward    F9=Swap      F12=Cancel
```

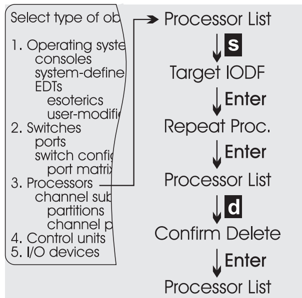
The column New CHPID shows the channel path IDs to which the values of column CHPID are mapped by default.

- You can overtype the values of the column New CHPID. Leave the column Until CHPID blank. Press the Enter key to move the old channel path IDs to the new channel path IDs.
- If you enter a value in the column Until CHPID, you move all defined CHPIDs in the range defined by the channel paths specified in the CHPID and Until CHPID column to the new range that starts with the value in the New CHPID column. If the values for the CHPID column have a ’gap’, the ’gap’ is also reflected in the New CHPID column range. When you entered a value in the Until CHPID column, press the Enter key. The Update Channel Path Identifiers panel is redisplayed where the new range is resolved in the New CHPID. The Until CHPID column is shown as blank. To process the updates, press the Enter key again.

Note: If the processor upgrade changed the SYSTEM value of the corresponding IOCP configuration, it may not be possible to do an IOCDS download. It is only possible to perform an IOCDS download for specific processor types because IOCP validates the generated IOCP statements according to the configuration rules of the executing processor. See “Supported Hardware Report” on page 400 for the processor type which allows you to download an IOCDS in preparation for a processor upgrade.

If a processor type change leads to change of the SYSTEM value of the corresponding IOCP configuration see “Build an IOCDS” on page 201 and “Build S/390 microprocessor IOCDSs” on page 203.

Changing the processor ID



To change the ID of a processor, perform the following steps:

1. On the Processor List, select the processor and the ***Repeat (copy) processor configurations*** action from the context menu (or action code **r**). The Identify Target IODF panel is displayed.
2. Press the Enter key to accept the default target IODF name, that is the IODF you are currently working with. The Repeat Processor panel is displayed.

```
┌─────────────────────────────── Repeat Processor ──────────────────────────────┐
│                                                                                │
│                                                                                │
│ Specify or revise the following values.                                        │
│                                                                                │
│ Processor ID . . . . . . . . . ________                                        │
│                                                                                │
│ Processor type . . . . . . . : 2064                                            │
│ Processor model  . . . . . . : 1C1                                             │
│ Configuration mode . . . . . : LPAR                                            │
│                                                                                │
│ Serial number  . . . . . . . . 1234562064                                      │
│ Description  . . . . . . . . . This is the main processor                      │
│                                                                                │
│ Specify SNA address only if part of an S/390 microprocessor cluster:           │
│                                                                                │
│ Network name . . . . . . . . . ________  +                                     │
│ CPC name . . . . . . . . . . . ________  +                                     │
```

3. Specify the new identifier for the processor and press the Enter key. HCD creates a new processor with the same characteristics and connections as the old one.
4. On the resulting Processor List, delete the old processor by selecting the processor and selecting the ***Delete*** action from the context menu (or action code **d**). HCD displays a confirmation panel before showing the updated Processor List.

Repeating (copying) processors

You can copy processors within the same or to another IODF. When copying a processor, the following related objects and connections are also copied:

- Channel subsystems (for XMP processors only)
- Partitions
- Channel paths
- Control units
- Devices

When you copy a processor within the same IODF, you create a new processor. When you copy a processor into a different IODF, you can either create a new processor with the ***Repeat (copy) processor configuration*** action, or, with the same action, merge the configuration of the source processor into an existing configuration of the target processor.

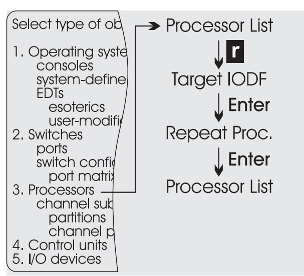
Before copying the processor to an existing processor in another IODF (merge the processor configurations), check the following:

1. Make sure that source and target processor have the same type-model and support level.
2. Check the partition usage type if the processor has several partitions.

   You cannot replace a partition that has a different usage type (except if there are no channel paths defined for this partition):

Usage Type in Source IODF	Matching	Usage Type in Target IODF
OS	→	OS
CF	→	CF
CF/OS	→	CF, OS, or CF/OS

   If the partition usage types do not match, change them in the target IODF.
3. If a channel path already exists in the target IODF, make sure that it has the same type.
4. If the target channel path connects to another dynamic switch than the source channel path, disconnect the channel in the target IODF.
5. To replace a shared channel path mode by a dedicated or reconfigurable channel path mode, change the mode or delete the incompatible channel path in the target IODF.



Copy a processor as follows:

1. Copy the processor using the ***Repeat (copy) processor configurations*** action from the context menu (or action code **r**) on the Processor List. The Identify Target IODF panel is displayed.
2. Specify the IODF to which the selected processor configuration is to be copied. The default IODF is the IODF you are currently working with.
3. On the following Repeat Processor panel, specify the required values and press the Enter key.

   Definitions for source partitions are merged with the definitions of the target partitions. If a target partition has another partition number than the source partition, HCD keeps the target partition number.

   If control units, devices, or CHPIDs already exist in the target IODF (same number and type), HCD tries to map them. "Migrating additional IOCP input data sets" on page 265 explains in detail when a device or control unit is mapped. The general rule is, that target definitions are updated from the source definitions.

   See "Explicit device candidate lists" on page 110 on how to handle explicit device candidate lists.

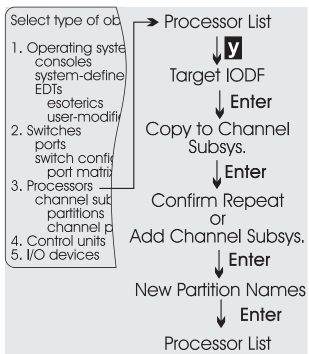
Copying an SMP processor to an XMP channel subsystem

You can copy the configuration of an SMP processor into an XMP channel subsystem within the same or to another IODF. When copying an SMP processor to a CSS, the following related objects and connections are also copied:

- Partitions
- Channel paths
- Control units
- Devices

You can use this function for the following alternative tasks:

1. **alternative 1:** merge the source processor with an existing CSS in the target processor
2. **alternative 2:** copy the source processor to a new CSS in the target processor



Copy an SMP processor to a channel subsystem as follows:

- On the Processor List, select an SMP processor and the action ***Copy to channel subsystem. . . (SMP)*** from the context menu (or action code y).
- Specify the IODF to which the selected operating system is to be copied. The default IODF is the IODF you are currently working with.
- On the following panel, specify your target processor ID and channel subsystem ID. Make sure that the target processor supports multiple logical channel subsystems.

```
 ---------------------- Copy to Channel Subsystem -----------------------


 Specify or revise the following values.


 Source processor:
 Processor ID  . . . . . : PROC01     Processor with single CSS

 Target channel subsystem:
 Processor ID  . . . . . . XMPP01__  +
 Channel subsystem ID  . . 0  +

```

  After pressing the Enter key:

  – **for alternative 1**, you are prompted to confirm or cancel the merging of the source processor into the existing target CSS. A message will inform you about the success of the operation.

  – **for alternative 2**, on the Add Channel Subsystem panel, you are prompted to define the ID for the new CSS and the maximum number of allowed devices.

```
 ─────────────────────── Add Channel Subsystem ────────────────────────


 Specify or revise the following values.

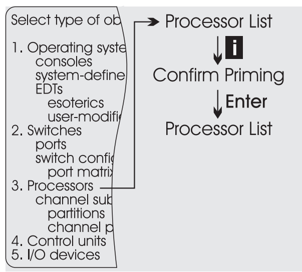
 Processor ID . . . . . . : TSPROC1      Proc supporting multiple SSs

 Channel Subsystem ID . . . 3  +
 Description  . . . . . . . CSS 3 of TSROC1_________________

 Maximum number of devices
   in subchannel set 0  . . 64512  +
   in subchannel set 1  . . 10000  +
```

If, by chance, partition names from the source processor already exist in the target processor, you are prompted to specify new names for those partitions.

Priming processor data



You can prime your I/O configuration in a work IODF with the processor serial number for the active processor.

To prime, select the action ***Prime serial number*** from the context menu (or action code **i**) on the Processor List.

The Confirm Priming Processor List shows the selected processors with the sensed data for the processor type and serial number of the active processor and their corresponding definitions in the IODF. If the processor type of the active processor and the defined processor match, they are shown in the Confirm Priming Processor List.

The sensed data for the processor serial numbers can be confirmed before being taken into the IODF. If a value is blanked out, the defined IODF value is not changed. If you use the F12=Cancel key, none of the sensed values is taken.

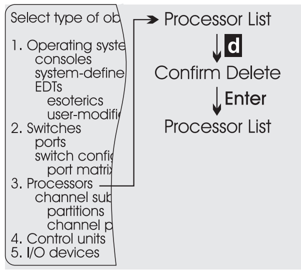
```
 ────────────────── Confirm Priming Processor List ──────────────────
                                                          Row 1 of 1
  Command ===> ________________________________ Scroll ===> CSR

  Press Enter to confirm priming, or Cancel to leave the list.
  A blank value will not change the IODF definition.

  Processor ---------- Type ----------- --- Serial Number ---
  ID        actual       defined       sensed     defined
  VMABASIC  9672-R61     9672-R61      0645049672
  ************************ Bottom of data ************************

   F1=Help      F2=Split     F3=Exit      F5=Reset     F7=Backward
   F8=Forward   F9=Swap     F12=Cancel
```

Deleting processors



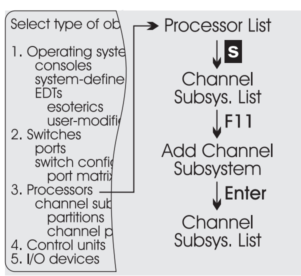
You can delete the definition of a processor using the ***Delete*** action from the context menu (or action code **d**) on the Processor List. If you delete a processor, all channel paths, partitions, and connections to control units and devices for that processor are also deleted; the control units and devices are not deleted.

Working with channel subsystems

> **Note:**
> All tasks described in this unit's subsections are only available for XMP processors.

For XMP processors, you may define multiple logical channel subsystems (up to n), identified by a unique 1-digit hexadecimal number (range 0 through n-1). For each channel subsystem, then, you may define its own set of partitions and CHPIDs.

Defining channel subsystems



Define a channel subsystem as follows:

- On the Processor List, select an XMP processor and the action ***Work with channel subsystems . . (XMP)*** from the context menu (or action code **s**). HCD displays the Channel Subsystem List.

```
  Goto  Backup  Query  Help
------------------------------------------------------------------------------
                            Channel Subsystem List                 Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more channel subsystems, then press Enter.  To add, use F11.

Processor ID . . . : TSPROC1      Proc supporting multiple SSs

  CSS Devices in SS0    Devices in SS1
/ ID  Maximum + Actual  Maximum + Actual  Description
_ 0   64512     28774   0         0       CSS 0  of TSPROC1
_ 1   64512     30681   65535     9877    CSS 1  of TSPROC1
_ 2   64512     16336   65535     5344    CSS 2  of TSPROC1
******************************* Bottom of data *******************************
```

- Use F11=Add to define a new channel subsystem. The data-entry fields are shown in the following figure, with sample data:

```
                      Add Channel Subsystem


Specify or revise the following values.

Processor ID . . . . . . : TSPROC1      Proc supporting multiple SSs

Channel Subsystem ID . . . 3  +
Description  . . . . . . . CSS 3 of TSROC1_________________

Maximum number of devices
  in subchannel set 0  . . 64512  +
  in subchannel set 1  . . 10000  +

 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset
 F9=Swap     F12=Cancel
```

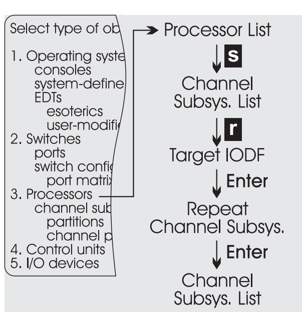
Define the ID for the new CSS and the maximum number of allowed devices. For z9 EC processors or later, you can specify the maximum number of devices for two subchannel sets.

Pressing the Enter key brings you back to the Channel Subsystem List.

Repeating (copying) channel subsystems

You can copy channel subsystems within the same or to another IODF:

1. merge the source CSS with an existing target CSS in the same processor
2. copy a source CSS to a new target CSS in the same processor
3. copy a source CSS to another XMP processor



Copy or repeat a channel subsystem as follows:

- On the Processor List, select an XMP processor and the action ***Work with channel subsystems . . (XMP)*** from the context menu (or action code **s**).

- On the Channel Subsystem List, for the source CSS, select action ***Repeat (Copy) channel subsystem*** from the context menu (or action code **r**).
- Specify the IODF to which the selected operating system is to be copied. The default IODF is the IODF you are currently working with.
- On the following panel, specify your target processor and CSS:

```
 ------------------- Repeat Channel Subsystem --------------------
|                                                                  |
|                                                                  |
| Specify or revise the following values.                          |
|                                                                  |
| Processor ID . . . . . . XMPP01    +                             |
| Channel subsystem ID . . 2  +                                    |
|                                                                  |
 ------------------------------------------------------------------
```

- Depending on what you want to do, continue as follows:
  - **To merge source and target CSS**, you are prompted for confirmation for merging the source CSS data into the target CSS data. If you confirm, you are prompted to specify new partition names, because the partitions within an XMP processor must be unique:

```
                   Specify New Partition Names
                                                 Row 1 of 2
Command ===> ____________________________________________

The partitions listed have already been defined in the
target processor. Specify new names and press ENTER.

Partition  New Name
LPAR01     ________
LPAR02     ________
********************* Bottom of data **********************
```

    A message indicates the successful processing.
  - **To copy the source CSS into a new target CSS**, you can specify or revise certain characteristics of the target CSS:

```
 --------------------- Add Channel Subsystem ----------------------
|                                                                   |
|                                                                   |
| Specify or revise the following values.                           |
|                                                                   |
| Processor ID . . . . . . . : TSPROC1    Proc supporting multiple SSs |
|                                                                   |
| Channel Subsystem ID . . . 3  +                                   |
| Description  . . . . . . . CSS 3 of TSROC1_________________       |
|                                                                   |
| Maximum number of devices                                         |
|   in subchannel set 0  . . 64512  +                               |
|   in subchannel set 1  . . 10000  +                               |
|                                                                   |
 -------------------------------------------------------------------
```

    You are prompted to specify new partition names. Also, a message indicates the successful processing.
  - **To copy a source CSS to another XMP processor**, the processing is identical as copying into a new target CSS. However, specifying new partition names is only necessary if the partition names of the source processor already exist in the target processor.

Note: PCHID values are not copied.

Copying/repeating channel subsystems with CTC connections

When copying channel subsystems or partitions within the same IODF, valid CTC connections in the source are not automatically copied and changed in the target configuration. Instead, HCD displays the ***CTC Connection Update List***. This list shows all valid CTC connections of the source configuration that need an update before being copied to the target. From this list, you can select those connections that you want to copy. For each selected CTC connection, HCD updates the CUADD definition such that the valid CTC connection is moved from the source to the target. For FCTC control units, HCD generates the full-byte CUADD value for target XMP processors, consisting of the concatenation of CSS and MIFID.

```
                     CTC Connection Update List                     Row 1 of 8
Command ===> _______________________________________________ Scroll ===> PAGE

Target processor ID: P2084
Target CSS ID . . .: 2

Select CTC connections to be moved to target configuration. Then,
press Enter.

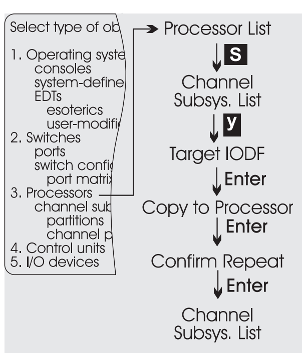
  -----------CTC or FC side----------- ---------CNC/FCV or FC side---------
/ Proc.CSSID Part.    Devices  CH CU   Proc.CSSID Part.    Devices  CH CU
_ TREX.0     TCSS0LP2 8004,2   20 8004 P2064M2    FREE2LP2 8000,2   21 8000
_ TREX.0     TCSS0LP2 9000,2   20 9000 RAPTOR     RAPOS4   9004,2   10 9004
_ TREX.0     TCSS0LP2 9002,2   20 9002 RAPTOR     RAPMIX9  9004,2   10 9004
_ TREX.0     TCSS0LP3 8006,2   20 8006 P2064M2    FREE2LP5 8002,2   21 8002
_ TREX.0     TCSS0LP3 9000,2   20 9000 RAPTOR     RAPOS4   9006,2   10 9006
_ TREX.0     TCSS0LP3 9002,2   20 9002 RAPTOR     RAPMIX9  9006,2   10 9006
_ TREX.0     TCSS2LP2 8000,2   21 8000 P2064M0    FREE0LP2 8004,2   20 8004
_ TREX.0     TCSS2LP5 8002,2   21 8002 P2064M0    FREE0LP3 8006,2   20 8006
****************************** BOTTOM OF DATA ********************************
F1=Help F2=Split F3=Exit F5=Reset F7=Backward
F8=Forward F9=Swap F12=Cancel
```

Figure 44. CTC Connection Update List

Copying a channel subsystem to an SMP processor

HCD offers actions to copy a channel subsystem to an SMP processor or merge the CSS to an existing SMP processor configuration. When copying a channel subsystem to an SMP processor, the following related objects and connections are also copied:

- Partitions
- Channel paths
- Control units
- Devices



1. Use action ***Work with channel subsystems . . (XMP)*** (or action code **s**) for an XMP processor which brings you to its Channel Subsystem List.

2. Now you select action ***Copy to processor*** (or action code **y**) for the CSS that you want to copy.
3. The Identify Target IODF panel is displayed. Specify the IODF where the target processor is defined. The default IODF is the IODF you are currently working with. Press the Enter key. The Copy to Processor panel is displayed.

```
 ---------------------------- Copy to Processor ----------------------------


 Specify or revise the following values.


 Source channel subsystem:
 Processor ID  . . . . . . : XMPP01     CSS 0 for XMPP01
 Channel subsystem ID  . . : 0

 Target processor:
 Processor ID  . . . . . . . ________  +

```

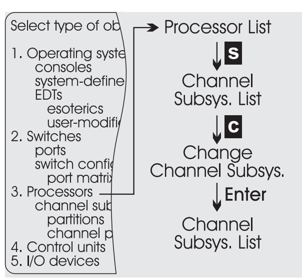
4. Specify your target processor and press the Enter key.

   Note: If the target processor does not yet exist, HCD invokes the Add Processor dialog. If the target processor already exists, you must confirm that you want to merge the configuration data. Anyway, make sure that the target processor does not support multiple logical channel subsystems.
5. Before returning to the Channel Subsystem List, a message will inform you about the success of the action.

Changing channel subsystems

You can change the following characteristics of a channel subsystem:

- Description
- Maximum number of devices per subchannel set



To perform this task, proceed as follows:

1. On the Processor List, select an XMP processor and the action ***Work with channel subsystems . . (XMP)*** from the context menu (or action code **s**).
2. On the Channel Subsystem List, for the CSS you want to change, select action ***Change*** from the context menu (or action code **c**).
3. The Change Channel Subsystem panel is displayed, where you can specify your changes. Then press the Enter key. This returns you to the Channel Subsystem List.

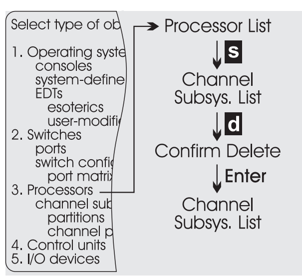
```
┌──────────────────── Change Channel Subsystem ────────────────────┐
│                                                                  │
│                                                                  │
│ Specify or revise the following values.                          │
│                                                                  │
│ Processor ID . . . . . . : TSPROC1     Proc supporting multiple SSs │
│ Channel subsystem ID . . : 0                                     │
│                                                                  │
│ Description  . . . . . . . CSS 0 of TSPROC1                      │
│                                                                  │
│ Maximum number of devices                                        │
│   in subchannel set 0  . . 64512  +                              │
│   in subchannel set 1  . . 15000  +                              │
│                                                                  │
│  F1=Help   F2=Split  F3=Exit  F4=Prompt  F5=Reset  F9=Swap        │
│ F12=Cancel                                                       │
└──────────────────────────────────────────────────────────────────┘
```

Changing the channel subsystem ID

To change a CSS ID is only possible via the deviation of repeating (copying) the channel subsystem with a new ID and then delete the source CSS. If you cannot repeat the channel subsystem in the same processor, because all available IDs are occupied, and you want to exchange the IDs of two existing CSSs, then you need to copy both CSSs into a different target processor, delete them in the source processor and copy them back to the source processor with the exchanged IDs.

It may be necessary to restore certain definitions afterwards, for example, coupling facility connections get lost during the copy process.

Deleting channel subsystems

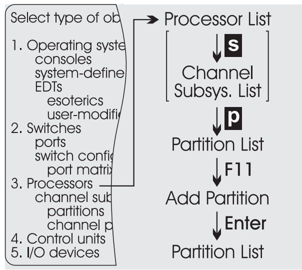


You can delete the definition of a channel subsystem using the ***Delete*** action from the context menu (or action code d) on the Channel Subsystem List. If you delete a channel subsystem, all channel paths, partitions, and connections to control units and devices for that CSS are also deleted; the control units and devices are not deleted.

Working with partitions

The following section describes how to work with partitions. Note that you can define partitions for a processor regardless of whether it is defined with configuration mode BASIC or LPAR.

Defining partitions



Define partitions as follows:

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Processors.*** HCD displays the Processor List of processors currently defined in the IODF.
2. On the Processor List:
   - **for SMP processors**, select the processor and the ***Work with partitions*** action from the context menu (or action code **p**).
   - **for XMP processors**, select the processor and the ***Work with channel subsystems . . (XMP)*** action from the context menu (or action code **s**) to display the Channel Subsystem List. From this list, select the appropriate channel subsystem and the ***Work with partitions*** action from the context menu (or action code **p**).

   HCD displays the Partition List showing the currently defined partitions for the designated processor.

```
                              Partition List
  Goto  Backup  Query  Help
 ----------------------------------------------------------------------
                                                             Row 1 of 2

 Select one or more partitions, then press Enter. To add, use F11.

 Processor ID  . . . . : PROC1     This is the main processor
 Configuration mode  . : LPAR
 Channel Subsystem ID  :

 / Partition Name   Number Usage + Description
 _ PROD1            1      OS      First production partition
 _ PROD2            2      OS      Second production partition
 **************************** Bottom of data *****************************
```

3. Use F11=Add to add the partitions. The data-entry fields are shown in the following figure, with sample data:

```
                     Add Partition


  Specify the following values.

  Partition name . . . TEST3
  Partition number . . 5
  Partition usage  . . CF     +

  Description  . . . . CF partition
```

The `partition usage` field marks a partition to be used for coupling facility support or for operating system usage. The type of partition usage can be either: `CF`, `OS`, or `CF/OS`.

Specify `CF/OS` if the partition usage will be determined at partition activation. You can then include this partition into the access list of all channel path types. At partition activation those definitions are ignored that are not valid for the actual usage.

4. Press the Enter key. HCD displays the updated Partition List, if you have not yet defined any channel paths.

   If you have already defined channel paths, HCD displays the Update CHPID Access and Candidate Lists panel, where you can include the partition in the access or candidate list of a channel path. For an explanation of access and candidate list, refer to “Defining channel paths” on page 112.

   After pressing the Enter key HCD displays the Update Device Candidate Lists panel, if the new partition is given access to a channel path that attaches devices with an explicit device candidate list. Use this panel to add the new partition to the device candidate list of the listed devices.

Defining reserved partitions

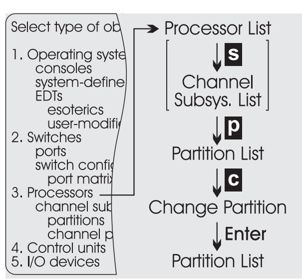
For XMP processors, HCD provides the capability to add or remove logical partitions via dynamic I/O configuration. In an IODF used to create your initial IOCDS for power-on reset (POR), you can define reserved partitions, which you plan to add dynamically at a later point in time. In the ***Add Partition*** dialog (see step 3 on page 106 from the previous list), you specify an ’*’ as the placeholder partition name for reserved partitions. Reserved partitions will appear with this ’*’ at the end of the Partition List. Furthermore, you specify a partition number, a usage type and optionally a description.

Reserved partitions do not appear in the access or candidate lists of channel paths or devices.

To activate a partition dynamically, you need to change the ’*’ name to a valid partition name and to define the appropriate partition configuration before building a new production IODF.

Note: You cannot change the partition number dynamically.

Changing partitions



You can change the following data of a partition using the ***Change*** action from the context menu (or action code c) on the Partition List. On the resulting Change Partition panel, you can change:

- Name
- Number
- Usage
- Description

If there are already channel paths attached to the partition, HCD displays the channel path access and candidate lists after pressing the Enter key on the Change Partition panel. On these lists, you can update the channel path access of the partition.

Note: You can also change these partition definitions (except the name) by simply typing over the appropriate columns on the Partition List.

Changing partition names dynamically

To dynamically change a partition name, you have to perform two steps:

1. Disconnect all channel paths and devices from the partition and change the partition name to * (see “Defining reserved partitions” on page 107). Activate this intermediate IODF. (This is the only required step if you want to keep this partition as a reserved partition).
2. Now you can change the * partition name to a new valid name, reconnect the wanted channel paths and devices and activate the new configuration.

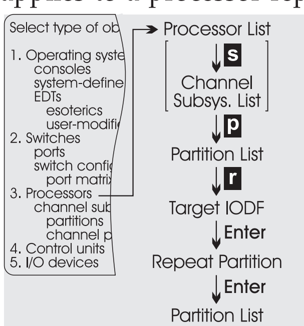
Repeating (copying) partitions

You can copy partitions within the same or to another IODF. When copying a partition, the following related objects and connections are also copied:

- Channel paths having the partition in their access list
- Control units reached by the partition
- Devices reached by the partition

Note: PCHID values are not copied.

Before copying the partition, perform the same checks as when repeating a processor (see “Repeating (copying) processors” on page 96). Omit step 1 that applies to a processor repetition only.



Then copy a partition as follows:

1. Copy the partition using the ***Repeat (copy) partitions*** action from the context menu (or action code r) on the Partition List. The Identify Target IODF panel is displayed.
2. Specify the IODF to which the selected partition is to be copied. The default IODF is the IODF you are currently working with.
3. On the following Repeat Partition panel, specify the required values and press the Enter key.

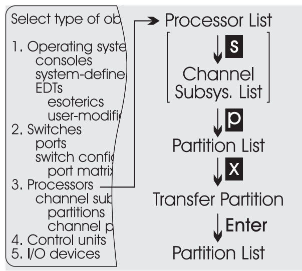
   Definitions for the source partition are merged with the definitions of the target partition. If the target partition has another partition number than the source partition, HCD keeps the target partition number.

If control units or devices already exist in the target IODF (same number and type), HCD tries to map them. “Migrating additional IOCP input data sets” on page 265 explains in detail when a device or control unit is mapped. If they are mapped, the attributes of the target control unit or device are kept.

See “Explicit device candidate lists” on page 110 how to handle device candidate lists.

Note: HCD provides special processing when copying/repeating partitions with CTC connections. For more information refer to “Copying/repeating channel subsystems with CTC connections” on page 103.

Transferring partition configurations



Use this function to transfer control units and devices attached to a channel path from one partition to another within the same IODF.

In contrast to the ***Repeat (copy)*** function, you do not copy the partition and channel paths, but move the attached control units and devices to another partition, possibly in another processor.

Before transferring the data, you must define the target channel path with its partition access and candidate list, dynamic switch ID, entry switch ID and entry port.

The new channel path may have a different type than the source channel path.

1. On the Partition List, select the ***Transfer (move) partition configs*** action from the context menu (or action code x).
2. On the ***Identify Target Partition*** panel, specify the target processor and partition.
3. The ***Transfer Partition Configuration*** panel is shown. To transfer all control units and devices reached by the source partition, specify a new CHPID value for every source CHPID. The new CHPID of the target partition must exist.

   The data-entry fields with sample data are shown in the following figure.

```
 ┌─────────── Transfer Partition Configuration ─────────────────┐
 │                                                 Row 1 of 8   │
 │ Specify the new CHPID values.                                │
 │                                                              │
 │ From:                          To:                           │
 │ Processor ID . . . : PROC1     Processor ID . . . : PROC2    │
 │ Partition name . . : PROD1     Partition name . . : PROD2    │
 │                                                              │
 │ CHPID  Type   Mode             New CHPID +                   │
 │ 01     BL     DED              __                            │
 │ 02     BL     DED              __                            │
 │ 03     BL     DED              __                            │
 │ 04     BL     DED              __                            │
 │ 20     CNC    SHR              __                            │
 │ 21     CNC    SHR              __                            │
 │ 25     CNC    DED              __                            │
 │ 26     CNC    DED              __                            │
 └──────────────────────────────────────────────────────────────┘
```

4. After you press the Enter key the Partition List is displayed again.

   The attribute values of the transferred control units and devices remain the same for unit address/range, destination link address, time-out, and STADET. The logical address, protocol, and I/O concurrency level of a control unit remain the same if they are compatible with the target processor and channel path. If they are not compatible, default values are used.

Explicit device candidate lists

If the devices that are affected by the ***Transfer (move) partition configs*** action from the context menu (or action code **x**) have an explicit device candidate list, the result of the transfer action depends on whether or not the device was already connected to the target processor. See Figure 45 for the different combinations. These combinations also apply to the ***Repeat Partition*** and ***Repeat Processor*** actions.

Transfer source partition	**Transfer target partition**			
	Device already connected to target partition			**Device not connected to target partition**
	no cand	**cand +**	**cand -**	
no cand	=	=	cand +	no cand
cand + (partition included)	=	=	cand +	cand +
cand - (partition not included)	cand - (*)	=	=	cand - (*)

Note: Result of the Transfer Action, Relation of Device to Partition:

= no action, target partition remains unchanged

no cand
no explicit device candidate list exists for partition

cand + partition included in explicit device candidate list

cand – partition not included in explicit device candidate list

Figure 45. Result of the Transfer (Move) Partition Configs Action

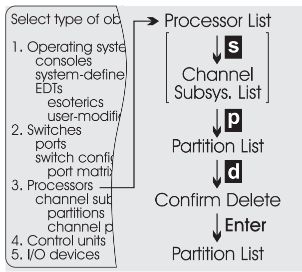
Note: (*) The source partition is not included in the explicit device candidate list. During the transfer, HCD checks whether all partitions of the source processor in the candidate list have the same name on the target processor.

If partitions with the same name on the target processor are identified they are added to the device candidate list for the target processor. If no partition with the same name is found for the target processor, no explicit device candidate list is built. Therefore, a partition transfer can result in a loss of candidate lists, if all partition names between source and target processor are different. It is recommended to run a device compare report after the partition has been transferred.

CF channel paths

Connections of CF sender and CF receiver channel paths will not be transferred. You have to connect them again after having transferred the partition.

Deleting partitions



You can delete the definition of a partition using the ***Delete*** action from the context menu (or action code **d**) on the Partition List.

Working with channel paths

Channel paths can be dedicated, reconfigurable, shared, or spanned. The following list explains when to use which channel path operation mode.

DED Dedicated; if you want only one logical partition to access a channel path, specify that channel path as dedicated. You cannot reconfigure a dedicated channel path. This is the default mode.

REC Reconfigurable; if you want only one logical partition at a time to access a channel path and you want to be able to reconfigure the channel path from one partition to another, specify that channel path as reconfigurable.

SHR Shared; if you want more than one logical partition to access a channel path simultaneously, specify that channel path as shared.

SPAN Spanned; if in XMP processors for certain channel types, you want to have a shared channel accessed by partitions from multiple logical channel subsystems, specify that channel path as spanned.

On the Add Channel Path panel, enter a channel path type and use F4=Prompt for the operation mode to find out the allowed operation modes for the specified type.

Channel paths can also be categorized as static or managed. For more information, see “Defining managed channel paths” on page 116.

Using Multiple Image Facility

If a processor complex has Multiple Image Facility (MIF) capability, and is running in LPAR mode, multiple logical partitions can access the same shared channel paths, thereby reducing the number of required physical connections. In contrast, if a processor complex does not have MIF capability, all logical partitions must use separate channel paths to share I/O devices. For more information about LPAR mode and MIF, see the *PR/SM Planning Guide*.

More about spanned channel paths in multiple LCSSs

Depending on the processor type, in the HCD dialog you may define certain channel paths with operation mode SPAN. A spanned CHPID will have partitions belonging to more than one channel subsystem in its access and candidate list.

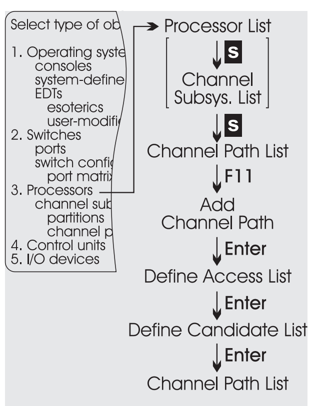
A spanned channel path will be created with the same CHPID number in all channel subsystems that are using it. For example, you have a processor MCSSPRO1 with channel subsystems 0 through 3, and you create CHPID 1A (type IQD, SPAN) and let it access partitions from CSS 0, 2, and 3. Then CHPID 1A is the same CHPID in CSSs 0, 2, and 3. In CSS 1, you can use CHPID 1A for a different channel path.

Generally speaking, a channel subsystem that is not using a spanned channel can use the CHPID of that spanned channel for a separate channel path definition.

If you define a channel as SPAN, but connect it to partitions from a single channel subsystem only, then HCD displays its operation mode as SHR. The other way round, if a shared channel path is eligible for being spanned, and you enlarge its access or candidate list with partitions from multiple logical channel subsystems, then HCD displays this channel's operation mode as SPAN.

Note:
It is dependent on the processor support level which channel path types can be defined as spanned. Managed channels cannot be defined as spanned.

Defining channel paths



At first, you define a channel path together with its access to logical partitions. Then you may define special channel path characteristics. These possibilities are described in "Defining special channel path characteristics" on page 116.

1. On the HCD entry panel, select the task ***Define, modify, or view configuration data*** and from the resulting panel, select ***Processors***. HCD displays the Processor List of defined processors.
2. On the Processor List:
   - **for SMP processors**, select the processor and the ***Work with attached channel paths (SMP)*** action from the context menu (or action code **s**).

- **for XMP processors**, select the processor and the ***Work with channel subsystems . . (XMP)*** action from the context menu (or action code **s**) to display the Channel Subsystem List. From this list, select the appropriate channel subsystem and the ***Work with attached channel paths*** action from the context menu (or action code **s**).

HCD displays the Channel Path List showing all channel paths defined for the selected processor/channel subsystem.

```
                              Channel Path List      Row 1 of 64 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more channel paths, then press Enter. To add use F11.

Processor ID . . . . : FR38LPAR     Raised Floor Production
Configuration mode . : LPAR
Channel Subsystem ID :

                    DynEntry Entry +
/ CHPID Type+ Mode+ Switch + Sw Port Con Mngd Description
_ 0A    CNC   SHR   77       77 EB       NO    ________________________________
_ 0B    CNC   SHR   77       77 31       No    ________________________________
_ 0C    CNC   SHR   89       89 D6       No    ________________________________
_ 0D    CNC   SHR   89       89 43       No    ________________________________
_ 0E    CNC   SHR   71       71 73       No    ________________________________
_ 0F    CVC   DED   __       __ __       No    console for F38C
_ 10    CNC   SHR   65       65 A9       No    ________________________________
_ 11    CNC   SHR   66       66 A9       Yes   ________________________________
_ 12    CNC   SHR   67       67 A9       No    ________________________________
_ 13    CNC   SHR   68       68 A9       Yes   ________________________________
_ 14    CNC   SHR   6D       6D F7       Yes   ________________________________
_ 15    CNC   SHR   6E       6E F7       No    ________________________________
_ 7E    FCV   SHR   89       89 F4       Yes   ________________________________
_ 7F    CBP   SHR   __       __ __   Y   No    CFQ1 ICB Sender Channel
_ 80    CBP   DED   __       __ __   Y   No    CFQ1 ICB Receiver Channel
```

If the Type contains three asterisks (***), the IODF channel path type is unknown to the currently used HCD.

3. Use F11=Add to add channel paths. The data-entry fields are shown in the following panel, with sample data:

```
 ─────────────────────────── Add Channel Path ───────────────────────────


 Specify or revise the following values.

 Processor ID . . . . : FR38LPAR     Raised Floor Production
 Configuration mode . : LPAR
 Channel subsystem ID :

 Channel path ID  . . . . 02   +           PCHID . . . ___
 Number of CHPIDs . . . . 1
 Channel path type . . .  FCV  +
 Operation mode. . . . .  SHR  +
 Managed  . . . . . . . . yes  (Yes or No)   I/O Cluster UTCPLX38  +
 Description  . . . . . . ________________________________

 Specify the following values only if connected to a switch:
 Dynamic switch ID  . . . 65  + (00 - FF)
 Entry switch ID  . . . . 65  +
 Entry port . . . . . . . 84  +
```

Figure 46. Add Channel Path

For physical channels on an XMP processor, you have to specify the physical channel identifier (PCHID) belonging to the channel path identifier (CHPID).

The CHPID Mapping Tool (CMT) can be used to make the mapping between CHPIDs and PCHIDs easier (see "How to interact with the CHPID Mapping Tool" on page 213).

4. For each static channel path you can specify which logical partitions can access that channel path. After you press the Enter key on the Add Channel Path panel, HCD displays the Define Access List.

```
┌──────────────────────── Define Access List ─────────────────────────┐
|                                                           Row 1 of 6 |
|                                                                      |
| Select one or more partitions for inclusion in the access list.      |
|                                                                      |
|                                                                      |
| Channel path ID  . : 20     Channel path type  . : CNC               |
| Operation mode . . : SHR    Number of CHPIDs . . : 4                 |
|                                                                      |
|                                                                      |
| / Partition Name Number Usage Description                            |
| / PROD1          1      OS    First production partition______      |
| / PROD2          2      OS    Second production partition_____      |
| _ TEST1          3      OS    First test system______________      |
| _ TEST2          4      OS    Second test system_____________      |
| _ TEST3          5      CF    CF partition___________________      |
| _ TEST4          6      CF/OS OS partition___________________      |
└──────────────────────────────────────────────────────────────────────┘
```

If you are working on *spanned* channel paths of an XMP processor, the Define Access List also shows the partitions defined for other channel subsystems:

```
┌─────────────────────────── Define Access List ───────────────────────────┐
|                                                                Row 1 of 1 |
| Command ===> _________________________________________ Scroll ===> CSR    |
|                                                                           |
| Select one or more partitions for inclusion in the access list.           |
|                                                                           |
| Channel subsystem ID : 0      CSS 0 for XMPP01                            |
| Channel path ID  . . : 00     Channel path type  . : IQD                  |
| Operation mode . . . : SPAN   Number of CHPIDs . . : 1                    |
|                                                                           |
| / CSS ID Partition Name   Number Usage Description                        |
| _ 0      LPAR01           1      CF/OS LPAR 1 of CSS 0                     |
| _ 0      LPAR02           2      CF/OS LPAR 2 of CSS 0                     |
| _ 1      LPAR11           1      OS    LPAR 1 of CSS 1                     |
| _ 1      LPAR12           2      OS    LPAR 2 of CSS 1                     |
| _ 2      LPAR21           1      OS    LPAR 1 of CSS 2                     |
| _ 2      LPAR22           2      OS    LPAR 2 of CSS 2                     |
| **************************** Bottom of data ***************************** |
|                                                                           |
└───────────────────────────────────────────────────────────────────────────┘
```

If you want a logical partition to access a dedicated, reconfigurable, or shared channel path when you initially activate the logical partition, place that logical partition in the channel path's access list. For shared channel paths and spanned channel paths, you can place more than one partition in the access list.

5. If you do not include all partitions in the access list, you are prompted for the candidate list (for reconfigurable and shared channel paths) after pressing the Enter key.

From the IOCP point of view, the channel path candidate list includes the channel path access list. From the HCD point of view, the channel path candidate list does not include the channel path access list. The partitions already in the access list do not appear in the candidate list.

```
 ---------------------- Define Candidate List ----------------------
                                                       Row 1 of 4

 Select one or more partitions for inclusion in the candidate list.

 Channel subsystem ID : 0      CSS 0 for XMPP01
 Channel path ID  . . : 00     Channel path type  . : ICP
 Operation mode . . . : SPAN   Number of CHPIDs . . : 1

 / CSS ID Partition Name Number Usage Description
 _ 0      TEST1          1      OS    First test system______________
 / 0      TEST2          2      OS    Second test system_____________
 _ 0      TEST3          3      CF    CF partition___________________
 _ 0      TEST4          4      CF/OS OS partition___________________
```

If you want to be able to configure a reconfigurable or shared channel path online to a logical partition, place that logical partition in the channel path's candidate list.

6. After pressing the Enter key, you return to the Channel Path List. Scroll to the right to get an overview of the access and candidate list of a channel path. The following matrix is displayed:

```
                              Channel Path List     Row 9 of 120 More: <

Select one or more channel paths, then press Enter. To add, use F11.

Channel Subsystem ID : 0           CSS 0 for MCSS01
1=F38B      2=F38C      3=F38D      4=F38E      5=F38F
6=F38G      7=F38H      8=CFQ1      9=CFQ2      A=F38A
B=          C=          D=          E=          F=
                          I/O Cluster  --------- Partitions 0x -----   PCHID
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   AID/P
_ 0A    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   05F
_ 0B    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   13A
_ 0C    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
_ 0D    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   2D3
_ 0E    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
_ 0F    CVC   DED   No    ________     _ a _ _ _ _ _ _ _ _ _ _ _ _ _   ___
_ 10    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
_ 11    CNC   SHR   Yes   UTCPLX38     * * * * * * * _ _ * _ _ _ _ _   ___
_ 12    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
_ 13    CNC   SHR   Yes   UTCPLX38     * * * * * * * _ _ * _ _ _ _ _   ___
_ 14    CNC   SHR   Yes   UTCPLX38     * * * * * * * _ _ * _ _ _ _ _   ___
_ 15    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
_ 15    CNC   SHR   No    ________     a a a a a a a _ _ a _ _ _ _ _   ___
```

Figure 47. Channel Path/Partition Matrix

The legend above the partition matrix shows how the partition names are associated with the columns of the partition matrix. The headings ***Partitions 0x***, ***Partitions 1x***, ***Partitions 2x*** and so on, if scrolling to the right, indicate that the partitions for the related channel subsystems (0, 1, 2, ...) are shown. The column numbers correspond to the partition numbers in the pertaining channel subsystem. In the example above, column 1 under Partitions 0x shows the definitions for the partition with partition number 1 in CSS 0.

The following entries may appear in the partition matrix:

a indicates that the partition is in the channel path's access list.

c indicates that the partition is in the candidate list.

*	is shown for a managed channel path in all logical partitions that potentially can access that channel path.

#	indicates that the channel path (which is defined to the channel subsystem named in the Channel Subsystem ID field) cannot be attached to the partitions of another channel subsystem. Either a channel path with the same identifier is already defined for the other channel subsystem, or the channel path cannot be spanned or it can be spanned, but the channel path mode is not SPAN or SHR. For information on how to change a CHPID's operation mode to SPAN, if applicable, refer to "Changing the operation mode of a channel path" on page 124.

Defining special channel path characteristics

This section handles the following topics:

- "Defining managed channel paths"
- "Defining multiple channel paths in one step"
- "Connecting a channel path to a switch"
- "Defining the maximum frame size" on page 117
- "Defining more than 160 TCP/IP stacks" on page 117
- | "Defining or editing a CIB channel" on page 118
- "Defining spanned channel paths" on page 118
- "Over-defining channel paths on an XMP processor" on page 118

Defining managed channel paths: You can define a channel path as being managed by Dynamic Channel Path Management (DCM). DCM will use such a channel path to dynamically assign the logical paths to control units in order to optimize I/O activity. A managed channel path must connect to a dynamic switch and may be used for control units that connect to the same switch. If a channel path is defined as managed in an LPAR mode processor, it must be defined as shared. It cannot be connected to logical partitions but must specify an I/O cluster name. An I/O cluster is a sysplex that owns the managed channel path. All systems of the sysplex on the given processor are allowed to share the managed channel path. A managed channel path cannot be connected to a control unit by HCD.

Defining multiple channel paths in one step: You can define, in one step, a group of channel paths of the same type and mode and with consecutive identifiers. It is recommended to define only a group of channel paths that have the same partitions in their access and candidate lists. Otherwise, you have to change the channel paths that have different partitions in their access and candidate list in a further step.

1. Define the group by specifying the first channel path identifier (CHPID) and the number of channel paths in the group. Define a channel path type, mode, and description. HCD applies the definition to all channel paths in the group.
2. Type over the fields that are different, for example description, in the Channel Path List.

Connecting a channel path to a switch: If you have already defined a switch, you can connect the channel path to the switch on the Add Channel Path panel. Specify the dynamic switch ID, the entry switch ID, and the entry port to connect the channel path to a switch.

The values are only valid for the first channel path if you have defined a group of channel paths in one step. To define values for the other channel paths of the group, HCD displays an additional panel. This panel allows you to define the entry ports for all subsequent channel paths of the group. For information on dynamic switch ID and entry switch ID, refer to “Possibilities of switch connections” on page 169.

```
┌─────────────  Update CHPID Settings  ─────────────┐
│                                       Row 1 of 3  │
│                                                   │
│ Specify or revise the following values.           │
│                                                   │
│ Processor ID . . . . : PROC1                      │
│ Channel Subsystem ID : 0                          │
│                                                   │
│              DynEntry  --Entry +--                │
│ CHPID  PCHID Switch +  Switch Port                │
│ 1C     ___   98        98     C8                  │
│ 1D     ___   98        98     __                  │
│ 1E     ___   98        98     __                  │
│ *************** BOTTOM OF DATA ****************** │
└───────────────────────────────────────────────────┘
```

Defining the maximum frame size: For an IQD channel path type, HCD allows you to specify the maximum frame size to be used for iQDIO requests on that channel path. If you define or update an IQD channel path, HCD will display a dialog panel that allows you to specify a maximum frame size for the channel path.

```
             Specify Maximum Frame Size


Specify or revise the value below.

Maximum frame size
in KB  . . . . . . . 16  +

 F1=Help     F2=Split    F3=Exit     F4=Prompt
 F5=Reset    F9=Swap    F12=Cancel
```

Defining more than 160 TCP/IP stacks: When defining or changing channel paths of type OSD for XMP processors with the corresponding support level, HCD prompts you with a dialog whether you want to allow for more than 160 TCP/IP stacks with this channel. This is done by disabling priority queuing. If priority queuing is disabled, the channel can support four times as many queues (4 * 480 = 1920 subchannels) corresponding to four times as many TCP/IP stacks (4 * 160 = 640) as with enabled queue prioritization.

```
 ─────────── Allow for more than 160 TCP/IP stacks ───────────

 Specify Yes to allow more than 160 TCP/IP stacks,
 otherwise specify No. Specifying Yes will cause priority
 queuing to be disabled.

 Will greater than 160 TCP/IP stacks
 be required for this channel?  . . . No

  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap
 F12=Cancel
```

Defining or editing a CIB channel: When defining or changing a CIB channel path, HCD prompts you with a dialog which asks for the specification of the ***Adapter ID*** of the HCA and the ***Port*** on the HCA of that channel path.

```
 ──────────────── Specify HCA Attributes ────────────────

 Specify or revise the values below.

 Adapter ID of the HCA  . . __  +
 Port on the HCA  . . . . . _   +


  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset
  F9=Swap    F12=Cancel
```

Defining spanned channel paths: You can define a suitable channel path as ***spanned*** directly when creating it. On the Add Channel Path panel from Figure 46 on page 113, specify

```
Operation mode . . . . . SPAN
```

After pressing the Enter key, HCD displays the combination of the Define Access List and the Define Candidate List, offering partitions from multiple logical channel subsystems. Note that if you, nevertheless, in both lists select only partitions from the current CSS, then the operation mode of the channel path is set back to SHR.

For information on how to change a CHPID's operation mode to SPAN, if applicable, refer to "Changing the operation mode of a channel path" on page 124.

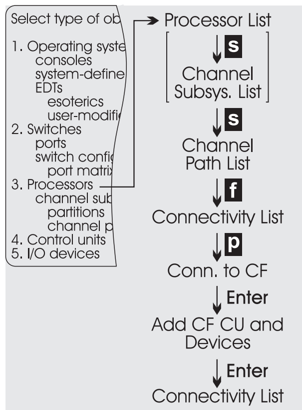
Over-defining channel paths on an XMP processor: For an XMP processor, you can define a channel path that is not physically installed on the machine. This may be useful if you want to migrate from a machine which had more channels defined than the target XMP processor has currently installed, or if you want to prepare a configuration for future upgrades of the channel cards.

To distinguish an over-defined CHPID from a physically installed CHPID, use character '*' for the PCHID value when creating the CHPID. An over-defined CHPID must adhere to all validation rules, but are not taken into account by an IOCDS download. Also they are not included in the IOCP statements or in a CONFIGxx member or during a dynamic activation.

If a control unit contains only CHPIDs with a PCHID value ’*’, the whole control unit (including any attached devices) is omitted from the configuration to be activated.

When installing the channel path later, you must edit the CHPID and replace the ’*’ by its valid PCHID.

Establishing coupling facility channel path connections



Before you start to establish a Coupling Facility (CF) channel path connection, you must have defined a processor that supports coupling facilities, a coupling facility partition, a coupling facility receiver (CF receiver) channel path and coupling facility sender (CF sender) channel path, or peer channel paths.

1. On the Channel Path List (Figure 47 on page 115) select a channel path and the ***Connect CF channel path*** action from the context menu (or type action code **f**). HCD displays the ***CF Channel Path Connectivity List*** showing all CF channel paths defined for a processor.

   To show that a CHPID is already connected in another IODF you can set the indicator in the `Occ` (occupied) column to `Y` (yes). You cannot connect a CHPID labeled `Y`. However, you can change the occupied status by overwriting.

```
                     CF Channel Path Connectivity List             Row 1 of 20
Command ===> ___________________________________________ Scroll ===> CSR

Select one or more channel paths, then press Enter.

Source processor ID . . . . . : SMPPROC   single CSS Processor
Source channel subsystem ID . :
Source partition name . . . . : *

  -------Source--------   -----------Destination--------   -CU-
/ CHPID  Type  Mode Occ   Proc.CSSID   CHPID  Type  Mode   Type

_ 80     CFP   DED  N     P2086.0      81     CFP   DED    STP
_ 81     CFP   SHR  N     P2094.1      94     CFP   DED    CFP
_ 18     CFS   SHR  N     SMPPROC      1C     CFR   REC    CFS
_ 19     CFS   SHR  N
_ 1A     CFS   REC  N
_ 1B     CFS   DED  N
_ 1C     CFR   REC  N     SMPPROC      18     CFS   SHR    CFS
_ 1D     CFR   REC  N
_ 1E     CFR   REC  N
_ 1F     CFR   DED  N
_ 30     CBP   SHR  N
 ****************************** Bottom of data ******************************
```

Figure 48. CF Channel Path Connectivity List

Notes:

a. The "Source partition name" field indicates a name only when the Filter function is employed.

b. Column *CU type* indicates the type of the connected control unit(s).

2. Select the source channel path for a coupling facility connection and the ***Connect to CF channel path*** action from the context menu (or action code **p**). HCD displays the Connect to CF Channel Path panel. The data-entry fields are shown in the following figure, with sample data:

```
 ---------------- Connect to CF Channel Path ----------------------


  Specify the following values.

  Source processor ID  . . . . . : SMPPROC
  Source channel subsystem ID  . :
  Source channel path ID . . . . : 19
  Source channel path type . . . : CFS

  Destination processor ID . . . . . . XMPPROC1  +
  Destination channel subsystem ID . . _   +
  Destination channel path ID  . . . . __  +

  Timing-only link . . . . . . . . . . No


```

Figure 49. Connect to CF Channel Path

3. To establish the CF channel path connection, specify the destination processor ID, destination channel subsystem ID and destination channel path ID.

   If the CF control unit definition does not yet exist, HCD automatically generates a CF control unit and CF devices for a sending channel path when CF channel paths are connected. HCD uses type CFS for a (legacy) CF sender channel path and type CFP for a CF peer channel path. The sending CF channel paths that connect one processor to a CF partition are assigned to the same CF control unit. For each CF sender channel path connection, HCD generates two CF devices. For each sending CF peer channel path, HCD generates seven CF devices. HCD proposes the highest unused control unit number and highest unused consecutive device numbers in the IODF. If a CF peer channel path does not connect to a target CF partition (i.e., the sending function is not used), HCD does not connect the channel path to CF control unit and CF devices.

If a CF control unit definition is already used for another CF connection from the processor of the sending CF channel path to the same target CF partition, HCD proposes the same control unit number. This control unit number may be overwritten by an unused control unit number, provided the partition lists of the channel paths on the existing control unit do not overlap with the partition list of the sending CF channel path for the new CF connection. Thus, it is possible to establish more than 8 CF links between a single CPC and a specific target CF partition.

Note: HCD checks the partition access lists of the channel paths for an overlap. That means, you can define an overlap in the partition candidate lists. In such cases however, you must ensure by operational means that at any one time, the CHPIDs of only one of the control units with overlapping partitions are configured online.

The following panel is displayed, where you have to confirm or revise the values for the CF control unit and CF devices. The data-entry fields are shown in the following figure, with sample data:

```
┌─────────────── Add CF Control Unit and Devices ────────────────┐
│                                                                 │
│                                                                 │
│ Confirm or revise the CF control unit number and device numbers │
│ for the CF control unit and devices to be defined.              │
│                                                                 │
│ Processor ID . . . . . . . : XMPPROC1                           │
│ Channel subsystem ID . . . :                                    │
│ Channel path ID  . . . . . : 19      Operation mode . . : SHR   │
│ Channel path type  . . . . : CFS                                │
│                                                                 │
│ Control unit number  . . FFFE  +                                │
│                                                                 │
│ Device number  . . . . . FFFE                                   │
│ Number of devices  . . : 2                                      │
│                                                                 │
│                                                                 │
└─────────────────────────────────────────────────────────────────┘
```

Figure 50. Add CF Control Unit and Devices

Notes:

a. The CF control unit and device definitions are displayed on the Control Unit List and on the I/O Device List, but in a disabled state where they cannot be modified or deleted.

b. If you specified a timing-only link in the dialog from Figure 49 on page 120, then the field ***Number of devices*** is set to 0 and cannot be changed, as no devices are created for such links. For more information on timing-only links (STP links), read "Defining Server Time Protocol (STP) links" on page 122.

4. After you press the Enter key, HCD redisplays the CF Channel Path Connectivity List with the new connection defined.

Defining Server Time Protocol (STP) links

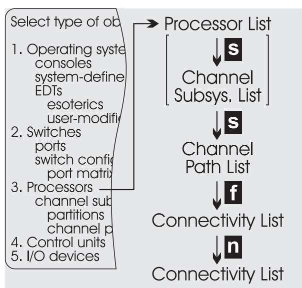
HCD supports Server Time Protocol (STP) links (timing-only links) between two zSeries (z890, z990 or later) processors. Timing-only links are only needed in case coupling links are not desired, not possible or not needed. If you want to define a coupling facility connection which will be used as a timing-only link, you must set the ***Timing-only link*** entry in the ***Connect to CF Channel Path*** panel (Figure 49 on page 120) to 'Yes'. Both source and destination processors must be timing capable in this case and the used channel paths must either be CFP or CBP.

Establishing a timing-only link between two processors does not require a CF partition, but can be established between two OS partitions.

For an STP only link, HCD generates a control unit of type 'STP' on both sides of the connection. No devices are defined. 'STP' is used as control unit type in the ***CF Channel Path Connectivity List*** in column *CU type*, which indicates the type of the connecting control unit(s) for non-STP links (see Figure 48 on page 120).

For changing a CF connection to an STP only connection and vice versa, you must break the existing connection and establish a new one.

Disconnecting coupling facility channel path connections

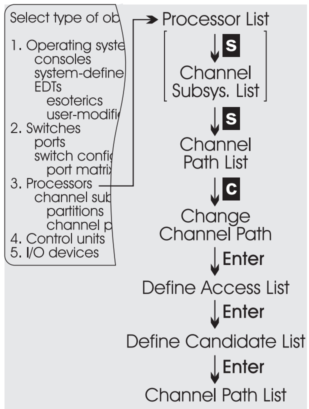


Perform the following steps to break a coupling facility channel path connection:

1. On the Channel Path List select any channel path and the ***Connect CF channel path*** action from the context menu (or action code f) HCD displays the CF Channel Path Connectivity List showing all CF channel paths defined for a processor.
2. Select the source channel path for a coupling facility connection and the ***Disconnect*** action from the context menu (or action code n).

   Note: The appropriate CF control unit definition is removed implicitly with the last broken connection to the coupling facility to which the control unit belongs. The appropriate CF device definitions are removed implicitly, when the coupling facility connection to which they belong is broken.

Changing channel paths



To change channel path data you have to follow the same panel flow as for defining channel path data:
- Changing channel path characteristics
- Changing channel path access and candidate list

The following steps describe the panel flow and where you can change the data.
1. On the Channel Path List, select a channel path and the ***Change*** action from the context menu (or action code **c**).
2. On the following Change Channel Path Definition panel you can change channel path definitions such as:
   - Channel path ID (see also "Changing processors" on page 93 for an example of the Update Channel Path Identifiers panel, and how to change the CHPID values)
   - Channel path type (see "Changing the type of a channel path" on page 124)
   - Operation mode (see "Changing the operation mode of a channel path" on page 124)
   - PCHID
   - Description
   - If connected to a switch
     Dynamic switch ID
     Entry switch ID
     Entry port
3. After pressing the Enter key, the Define Access List is displayed. Select one or more partitions to be included in the access list.
4. After pressing the Enter key again, the Define Candidate List is displayed (if applicable). Select one or more partitions to be included in the candidate list.

You can also change channel path definitions (except the channel path ID) and the channel path's access and candidate list by simply typing over the appropriate values on the Channel Path List. To change the access and candidate list definitions, scroll to the right to see the channel path/partition matrix (refer to Figure 47 on page 115). Overwrite the values in the channel path/partition matrix with either `a` for access list and `c` for candidate list.

Changing the ID of a channel path

Changing the ID of a channel path may first require the disconnection of the entry switch and entry port on the channel path. If channel paths of multiple processors or channel subsystems (e.g. spanned CHPIDs) connect to the same entry switch and entry port, proceed as follows:
1. Remove the entry switch and entry port from the channel path definitions.

2. Change the channel path ID of the corresponding channel paths.
3. Once again add the entry switch and entry port to the channel paths.

Changing the type of a channel path

Changing the type of a channel path from parallel to serial (or vice versa) will result in changing the type of all other channel paths that are attached to the affected logical control units. When changing the type of a channel path:

- The new/changed channel path type must not conflict with the already existing channel path IDs, control unit and device parameters. Adjust the values of the affected control units and devices according to the rules of parallel or serial channel path type. (For information on how to change control unit processor attachment and device parameters, see: “Changing control units” on page 134.)
- When changing from serial to parallel, you have to disconnect the entry switch and entry port first, if the channel path is connected to a switch.
- When changing a channel path of type BL or BY that is connected to more than one control unit, the channel path has to be defined to a corresponding CVC (converter channel path) first and then be changed to serial.

Note: A channel path type change cannot be performed in one step while changing the channel path ID.

Changing the type of a coupling facility channel path: To change the type of CF channel paths, disconnect the channel path you want to change before performing the type change. Any coupling facility devices associated with the changed channel path are removed by HCD. The associated control unit is removed only when the last connection to the coupling facility to which the control unit belongs is broken. (For details on that task, see “Establishing coupling facility channel path connections” on page 119.)

Changing the operation mode of a channel path

Changing the operation mode of a channel path is dependent on its type. For example, BL, BY, CVC, CBY, and CF receiver channel paths cannot be shared.

Before you can change the operation mode of a channel path, the rules for partition access and candidate lists of those channel paths that are attached to the affected logical control units must conform to the rules for the new operation mode. You have to check which partitions have access to these channel paths. When changing the channel path operation mode from SHR to REC or DED, you first have to remove partitions in the appropriate access and candidate lists. The partition lists for the affected logical control units have to be changed when the mode change has been done.

Changing the operation mode of a channel path to SPAN: If you want to change the operation mode to SPAN for applicable channel path types, you must ensure that the CHPID is unused in those channel subsystems into which it should be spanned. This means that the CHPID whose operation mode you want to change, must be unique throughout the processor complex. So you need to distinguish the following scenarios:

- For an existing shared CHPID that is uniquely defined throughout all LCSSs of the processor:

  Enlarge its access and candidate lists with partitions from other channel subsystems. For a shared CHPID, in the Channel Path List, scroll right once for each CSS of the current processor to see the available partitions that you can specify for access or candidates.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Channel Path List       Row 1 of 1 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more channel paths, then press Enter. To add, use F11.

Channel Subsystem ID : 0           CSS 0 for XMPP01
1=LPAR01     2=LPAR02     3=           4=           5=
6=           7=           8=           9=           A=
B=           C=           D=           E=           F=
                          I/O Cluster  --------- Partitions 0x -----   PCHID
/ CHPID Type+ Mode+ Mngd  Name +       1 2 3 4 5 6 7 8 9 A B C D E F   AID/P
_ 00    IQD   SPAN  No    ________     a c _ _ _ _ _ _ _ _ _ _ _ _ _   ___
******************************* Bottom of data ********************************
```

1=LPAR01 2=LPAR02 and --------- Partitions 0x ----- in our example indicate that partitions 1=LPAR01 and 2=LPAR02 are available in the CSS with ID=0 (0x).

With the codes a and/or c you specify which partitions you want to access. Note that if the CHPID's operation mode in column ***Mode*** of the Channel Path List was SHR before your changes, it is set to SPAN automatically after specifying partitions from different channel subsystems (0x, 1x, ...).

- For an existing dedicated or reconfigurable CHPID that is uniquely defined throughout all LCSSs of the processor:

  You can change its operation mode to SPAN using the ***Change*** action from the context menu (or action code c) on the Channel Path List. In the subsequent Define Access List and Define Candidate List panels, you must select at least two partitions from different channel subsystems, because otherwise, HCD sets the operation mode to SHR.
- For any existing CHPID that is multiply defined throughout the LCSSs in the processor complex:

  You must delete the CHPID from all but one LCSS, before you can change its operation mode to SPAN, using the ***Change*** action from the context menu (or action code c) on the Channel Path List and selecting appropriate partitions from the Define Access List and Define Candidate List panels.

When spanning a channel path, that has control unit(s) (and devices) attached, to a new CSS, HCD invokes a dialog asking whether these control unit(s) (and devices) should also be reachable from the new CSS.

```
 ---------- Confirm Copy Control Unit and Device Attachments -----------


 Control unit and device attachments are defined on the named channel
 path, which are eligible to be copied to all channel subsystems the
 channel path gets newly spanned to. To confirm copy action, select
 Yes. To not copy any control unit or device attachment, select No.

 Processor ID . . . . . : ERV01      mix system
 Channel subsystem ID . : 0          zos prod 1 / spare
 Channel path ID  . . . : 11

 Copy confirmed . . . . . 1   1.  Yes
                              2.  No

  F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

Specify `Yes`, if you want all existing CU and device connections of the designated channel path to be copied to all channel subsystems the channel path gets newly spanned to.

Changing the operation mode of CF channel paths: CF channel paths that connect a processor to the same coupling facility partition via the same control unit must be either all shared or all nonshared. Hence, if you want to change the operation mode for one channel path (from non-SHR to SHR), you have to change it for all. To do this proceed as follows:

1. Disconnect all receiving CF channel paths that connect a processor to the same coupling facility partition (see "Disconnecting coupling facility channel path connections" on page 122).
2. Change the operation mode of all sending CF channel paths.
3. Re-establish the connections for all channel paths that you disconnected in step 1.

The associated coupling facility control unit and coupling facility devices are removed and generated again by HCD.

Changing a coupling facility connection

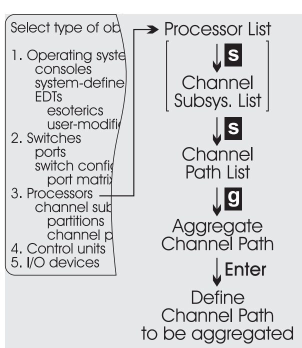
To change a coupling facility connection:

1. Disconnect a connection (see "Disconnecting coupling facility channel path connections" on page 122).
2. Establish the new connection (see "Establishing coupling facility channel path connections" on page 119).

Note: A `Y` (yes) in column `Occ` (occupied) of the channel path list indicates that this CHPID is occupied. This is useful if you have another IODF where the CF connection is already defined. If you wish to connect this path, you must first change the occupied status by overwriting the `Y` with `N`.

It is not possible to include the first CF or CF/OS LP in, or remove the last CF or CF/OS LP from, the combined access and candidate list of a connected CF peer channel. Instead, the CF connection first has to be removed. Then, the CF LP can be connected to or disconnected from the CF peer channel path; afterwards, the CF peer connection can be reestablished. This is to avoid implicit generations of deletions of CF control units and devices.

Aggregating channel paths



When selecting ***Aggregate channel paths*** from the Channel Path List against a channel path, HCD offers the possibility of moving all control units from a source channel path to the selected target channel path of the same processor. This is useful for combining several under-utilized channel paths to a single one.

You can aggregate channel paths using the ***Aggregate channel paths*** action. The following steps describe the procedure:

1. On the Channel Path List select a channel path and then the ***Aggregate channel paths*** action from the context menu or type action code **g** next to the selected CHPID.
2. On the following Aggregate CHPID definition panel you can enter the target channel path ID for the aggregate action.

```
┌─────────────────────────Aggregate CHPID ──────────────────────┐
│                                                                │
│                                                                │
│ Specify a CHPID to be aggregated with the selected target CHPID.│
│                                                                │
│ Processor ID . . . . : PROC1                                   │
│ Channel subsystem ID : 0                                       │
│ Channel path ID  . . : 00                                      │
│ Channel path type  . : CNC                                     │
│                                                                │
│ CHPID to aggregate . . . __  +                                 │
│                                                                │
│                                                                │
└────────────────────────────────────────────────────────────────┘
```

HCD displays a list of control units that are currently attached to the source CHPID. If possible, each control unit shows the switch port to which it is connected. Also, the target switch port and the target link address after the aggregate is shown if HCD can determine these. You can select all or a subset of control units to be aggregated to the target CHPID. The selected control units and their attached I/O devices are disconnected from the source CHPID and connected to the target CHPID. The target CHPID may now be connected to a different switch than the source CHPID. Panel ***Select Control Units to be Aggregated*** allows you to change the control unit port and link address for the move to the target CHPID.

```
                  Select Control Units to be Aggregated
                                                         Row 1 of 12
Command ===> __________________________________________ Scroll ===> PAGE

Select control units to be aggregated to target channel path. If none is
selected, no aggregation will take place.

  --- Control unit --   -- Source ---    -------- Target -------
/  Num   Type            Switch   Port    Switch  Port    Linkadd
_  0000  2107            50       09      50      09      6009
_  0010  2107            50       10      50      10      6010
_  0020  2107            50       11      50      11      6011
_  0030  2107            50       12      50      12      6012

F1=Help F2=Split F3=Exit F4=Prompt F5=Reset
F7=Backward F8=Forward F9=Swap F12=Cancel F22=Command
```

After successful aggregation, a message will be displayed and the Aggregate CHPID panel will remain to allow you to aggregate additional channel paths. If aggregation fails because of validation errors, the validation errors are displayed. If prompting for channel paths for aggregation, HCD will only show the channel paths that allow aggregation without validation errors. Prompting is thus a useful planning aid.

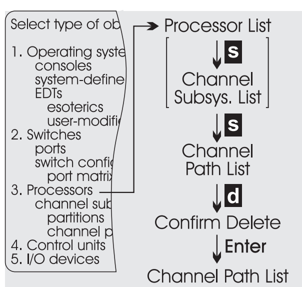
The **Aggregate Channel Paths** action is only possible if the following prerequisites are fulfilled:

- Source and target channel paths must be different.
- All selected control units connected to the source channel path must be connectable to the target channel path.
- The source channel path must not be connected to a control unit which is already connected to the target channel path. In addition, a link address - unit address - CUADD combination used by a control unit connected to the source channel path must not also be used by a control unit connected to the target channel path.
- Either the source channel path must have the same channel path mode as the target channel path, or all devices accessible by the source channel path must be connected to only one channel path.
- Source and target channel paths must have defined a dynamic switch.
- The user must not lose connectivity by a channel path aggregate action. The source channel path access and candidate list must be the same as or a subset of the target channel path access and candidate list.
- By connecting control units of the source channel path to the target channel path, the defined maximum value for the target channel path type (e.g. maximum number of unit address ranges) must not be exceeded.

As a result of an aggregation action, HCD will:

- Change the preferred channel path of a device to the target channel path if the source channel path was the preferred channel path of the device initially.
- Leave the reachability of devices by logical partitions unchanged.
- Move the CTC control units of the source channel path port to the entry port to which the target channel is connected.

Deleting channel paths

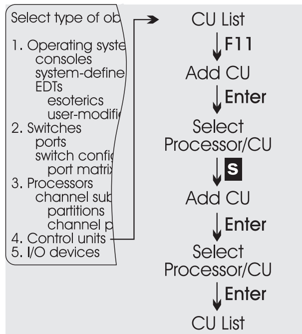


You can delete the definition of a channel path using the ***Delete*** action from the context menu (or action code **d**) on the Channel Path List. If you delete a spanned channel path, it is removed from all channel subsystems which had access to it.

Working with control units

The following section describes how to work with control units.

Defining control units



You need two steps to define a control unit:
- Define the control unit characteristics
- Define how the control unit is attached to processors.

Before you define a control unit, you should have defined the processors and channel paths to which the control unit is to be attached.

Defining the control unit characteristics

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Control units***. HCD displays the Control Unit List showing all control units currently defined in the IODF.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Control Unit List                Row 145 of 339
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more control units, then press Enter.  To add, use F11.

                           ---#---
/ CU   Type +        CUADD CSS MC  Serial-# + Description
_ 5E00 2105          6     5       28641      SUBCSE - S/N 28641
_ 5F00 2105          7     5       28641      SUBCSE - S/N 28641
_ 6000 2107          0     5       54321      SUBSQ02 - S/N 54321
_ 6100 2107          1     5       54321      SUBSQ02 - S/N 54321
_ 6200 2107          2     5       54321      SUBSQ02 - S/N 54321
_ 6300 2107          3     5       54321      SUBSQ02 - S/N 54321
_ 6400 2107          4     5       54321      SUBSQ02 - S/N 54321
_ 6500 2107          5     5       54321      SUBSQ02 - S/N 54321
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F22=Command
```

Column CUADD shows the CUADD value defined for the control unit, where available. If the CUADD is inconsistently set for the control unit among processors, an asterisk '*' is displayed.

Column #CSS shows the number of channel subsystems to which a control unit is connected. This column contains a value only if a connection exists.

Column #MC shows the greater of the number of managed channel paths defined for the connected processors or the number of managed channel paths defined for the selected processor when coming down from the processor. This column contains a value only if managed channel paths are defined for the control unit.

Note: The CF control units generated when connecting CF channel paths are listed but are disabled for any action. It is not possible to add a new such control unit via this dialog.

2. Use F11=Add to define a new control unit. The data-entry fields are shown below, with sample data:

```
┌─────────────────────── Add Control Unit ───────────────────────┐
│                                                                 │
│                                                                 │
│ Specify or revise the following values.                         │
│                                                                 │
│ Control unit number  . . . . 00D1  +                            │
│ Control unit type  . . . . . 3990-3______  +                    │
│                                                                 │
│ Serial number  . . . . . . . __________                         │
│ Description  . . . . . . . . DASD control unit_______________   │
│                                                                 │
│ Connected to switches  . . . __ __ __ __ __ __ __ __  +         │
│ Ports  . . . . . . . . . . . __ __ __ __ __ __ __ __  +         │
│                                                                 │
│ If connected to a switch:                                       │
│                                                                 │
│ Define more than eight ports . . 2   1.  Yes                    │
│                                      2.  No                     │
│                                                                 │
│ Propose CHPID/link addresses and                                │
│ unit addresses . . . . . . . . . 2   1.  Yes                    │
│                                      2.  No                     │
└─────────────────────────────────────────────────────────────────┘
```

Defining switch connections

The ***Add Control Unit*** panel can also be used to specify the switches and ports the control unit is attached to.

If you specify `Yes` for `Define more than eight ports`, the ***Define Control Unit Ports*** dialog will be displayed to allow you to specify up to 64 control unit/switch port connections. To connect a unit to a maximum of 128 switch ports, in this dialog, you can invoke another panel to define an additional 64 switch port connections.

If you specify `Yes` for `Propose CHPID/link addresses and unit addresses` and the control unit is connected to at least one switch, HCD suggests control unit to processor attachment parameters (channel path/link addresses and the unit address range) based on the switch/ports the control unit is connected to. HCD will propose up to eight channel path/link address pairs, starting with the channel path that has the lowest number of devices attached to it.

If you add a new control unit (via Add or Add-like), HCD automatically assigns as many logical paths as possible for all processors defined.

The following prerequisites must be fulfilled for this function:

- The control unit must support ESCON or FICON attachments and not be used for channel-to-channel (CTC) connections.
- The control unit must have physical switch / port connections (switch entry ports) defined.
- Channel paths that use the connected switch as a dynamic switch must exist.

HCD then automatically selects the channel paths and link addresses according to the following rules for each processor that has been defined.

- All channel paths that use a switch that connects to the control unit as a dynamic switch are candidates for assignment.
- The channel paths are sorted ascending by the value of the reversed channel path ID. The resulting sequence is again sorted ascending by the number of connected devices.
- The connected control unit ports are ordered ascending by the numbers of already connected control units and path connections, respectively.
- For each connected switch port in the resulting sequence, the channel paths are tested in sequence. If the switch port can be used as a link address, the CHPID/link address is taken.
- A maximum number (up to 8) of possible CHPID/link address combinations is assigned.

On the following ***Select Processor/Control Unit*** panel you can type over the fields that are different from the suggested attachment values.

Defining processor attachment data

1. After pressing the Enter key on the Add Control Unit panel HCD displays a list that shows all the defined processors. You can then define how the control unit is to be attached to one or more processors.
   A `Y` for Yes in the `Att` column indicates that the control unit is attached to the

```
                            Select Processor / CU     Row 3 of 5 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select processors to change CU/processor parameters, then press Enter.

Control unit number . . : 0000     Control unit type . . . : 3422

          ---------------Channel Path ID . Link Address + ---------------
/ Proc.CSSID 1------ 2------ 3------ 4------ 5------ 6------ 7------ 8------
_ XMPP01.0   09.0122 14.01A2 46.0222 52.02A2 33.0422 84.04A2 _______ _______
_ XMPP01.1   33.0422 84.04A2 0A.0522 14.05A2 _______ _______ _______ _______
_ XMPP01.2   33.0422 09.0722 14.07A2 _______ _______ _______ _______ _______
_ XMPP01.3   33.0422 84.04A2 0A.0522 14.05A2
```

Figure 51. Select Processor / Control Unit (1)

```
                            Select Processor / CU     Row 3 of 5 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

Select processors to change CU/processor parameters, then press Enter.

Control unit number . . : 0000     Control unit type . . . : 3422

                 CU   --------------Unit Address . Unit Range + -------------
/ Proc.CSSID Att ADD+ 1----- 2----- 3----- 4----- 5----- 6----- 7----- 8-----
_ XMPP01.0     Y 00   00.256 ______ ______ ______ ______ ______ ______ ______
_ XMPP01.1     Y 00   00.256 ______ ______ ______ ______ ______ ______ ______
_ XMPP01.2     Y 00   00.256 ______ ______ ______ ______ ______ ______ ______
_ XMPP01.3     Y 00   00.256 ______ ______ ______ ______ ______ ______ ______
```

Figure 52. Select Processor / Control Unit (2)

   processor.
2. Select a processor and the ***Select (connect/change)*** action from the context menu (or action code **s**).
   When a control unit is attached to multiple processors, you can use the ***Group connect*** action from the context menu (or action code **g**). This group action is particularly useful when performing symmetric changes, for example, on CPCs

defined in an S/390 microprocessor cluster. The changes are applied to all selected processors, when you issued the change action against a group of processors.

When you issue a change or group connect action, the following panel for processor-dependent control unit information is displayed:

```
┌───────────────────────── Add Control Unit ─────────────────────────┐
│                                                                    │
│                                                                    │
│ Specify or revise the following values.                            │
│                                                                    │
│ Control unit number  . : 0099        Type . . . . . . : 2105       │
│ Processor ID . . . . . : FR38LPAR    Raised floor production       │
│ Channel Subsystem ID . :                                           │
│                                                                    │
│ Channel path IDs . . . . 07    08    *    *    *    __   __   __  + │
│ Link address . . . . . . 80__  81__  ____ ____ ____ ____ ____ ____ + │
│                                                                    │
│ Unit address . . . . . . __    __    __   __   __   __   __   __  + │
│ Number of units  . . . . ___   ___   ___  ___  ___  ___  ___  ___   │
│                                                                    │
│ Logical address  . . . . __  + (same as CUADD)                     │
│                                                                    │
│ Protocol . . . . . . . . __  + (D,S or S4)                         │
│ I/O concurrency level  . 2   + (1, 2 or 3)                         │
│                                                                    │
└────────────────────────────────────────────────────────────────────┘
```

3. On the Add Control Unit panel specify the channel paths that connect the control unit to the processor.

   If the control unit is attached to a switch, you have to define a link address for each channel path. The link address is the port to which the control unit attaches. If the control unit attaches only to one port, the link address is the same for each channel. For addressing the target control unit in a fabric containing cascade switching, a two-byte link address is used, which specifies as first byte the switch address and as second byte the port address to which the control unit is attached.

   For a description what the link address is, see Figure 66 on page 170, Figure 67 on page 170 and Figure 69 on page 171.

   Note: For managed control units, i.e., control units that can have managed channel paths assigned by DCM, you must indicate how many managed channel paths can be connected to the control unit. Enter at least one static channel path and the corresponding link address, and, in addition, an asterisk (instead of the channel path ID and link address) for each managed channel path.

   You must also specify the unit address and the number of units, that is the unit address range of I/O devices that the control unit recognizes. Serial control units may have specified only one unit address range starting with 00.

   If the path to the control unit is not unique, and more than one serial control unit connects to the same channel path via the same link address, you have to specify a logical address (CUADD parameter). For more information refer to the explanation of the CUADD in the *IOCP User's Guide* for your processor.
4. Press the Enter key. HCD displays the updated Select Processor/Control Unit panel. There you may scroll to the right (using F20=Right) to see the data that you have entered on the previous panel.
5. Repeat defining processor attachment data for all processors the control unit should be attached to.
6. Press the Enter key to return to the Control Unit List.

Upgrading to two-byte link addresses

In a FICON fabric, all one-byte link addresses on a channel path may need to be migrated to a two-byte link address. HCD supports this definition change via the Change Channel Path Link Addresses dialog. If you specify a two-byte link address on a control unit for a specific channel path, and there are already one-byte link addresses specified on that path, the panel shown in Figure 53 appears.

This panel shows all link addresses specified for the specific channel path that must be changed. If there has been an entry switch defined for the channel, its ID and switch address (if defined) are displayed; else the displayed information is taken from the dynamic switch.

You can change the switch address. HCD then uses the modified value to preset the two-byte link addresses in the displayed `New` column. Its value is stored, if the entry switch is defined. Alternatively, the new two-byte link addresses can be entered.

Pressing Enter will change the control unit link addresses on the corresponding control units.

```
                  Change Channel Path Link Addresses

Command ===> ___________________________________________ Scroll ===> PAGE

Specify or revise the following values.

Processor ID . . . . . : MCSS01
Channel Path ID  . . . : 81
Entry Switch ID  . . . : B0

Switch Address . . . . . 26

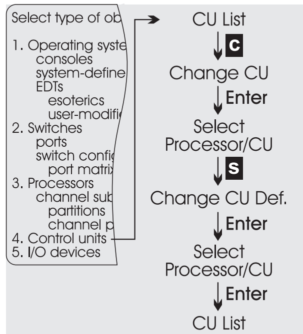
Control Unit  -- Link Address --
Number CSSID  Current       New
6000   0      02            2602
6200   1      03            2603
6400   1      04            2604
6600   1      05            2605
7000   2      09            2609
0E06   2      FE            26FE
***************************** Bottom of data ***************************


F1=Help       F2=Split       F3=Exit       F5=Reset      F7=Backward
F8=Forward    F9=Swap       F12=Cancel     F22=Command
```

Figure 53. Change Channel Path Link Addresses

You may want to change link addresses from two byte to one byte. This is possible, as long as all affected control units are attached to the channel path switch. If a defined two-byte link address is changed to a one-byte link address on a given channel path, all other two-byte link addresses defined for control units attached to that channel have to be changed to a one-byte link address also.

Changing control units



To change control unit data you have to follow the same panel flow as for defining control units.
- Changing Control Unit Characteristics
- Changing Processor Attachment Data

The following steps describe the panel flow and where you can change the data.

1. On the Control Unit List select a control unit and the ***Change*** action from the context menu (or action code **c**).
2. On the following Change Control Unit Definition panel you can change the following data:
   - Control unit number
   - Type-model
   - Serial number
   - Description
   - Connections to switches/ports

   Note: You can also change these control unit definitions (except the control unit number and the connections to switches/ports) by simply typing over the appropriate columns on the Control Unit List.
3. After pressing the Enter key you see the Select Processor/Control Unit panel. Select a processor and the ***Select (connect/change)*** action from the context menu (or action code **s**).
4. On the following Change Control Unit Definition panel you can change the processor attachment data:
   - Channel paths / Link addresses
   - Unit addresses / Number of units
   - Logical address
   - Protocol
   - I/O concurrency level

When changing control unit data of control units that affect other control unit or device data (like unit address/ranges), a list is displayed that shows all affected control units and proposed new address ranges for those control units. A panel like the following one is displayed:

```
┌──────────────── Modify Affected Control Unit Parameters ────────────────┐
│                                                             Row 1 of 2  │
│                                                                         │
│ Specify or revise any changes to the control unit parameters in the     │
│ list below.                                                             │
│                                                                         │
│ Processor ID  . . . . . . : PROC2                                       │
│ Channel Subsystem ID  . . :                                             │
│                                                                         │
│ CU   Prot. I/O +   -------------Unit Address . Unit Range + -------------- │
│      +     Conc.   1----- 2----- 3----- 4----- 5----- 6----- 7----- 8----- │
│ 0012  S     2      20.016                                               │
│ 0013  S     2      20.016                                               │
└─────────────────────────────────────────────────────────────────────────┘
```

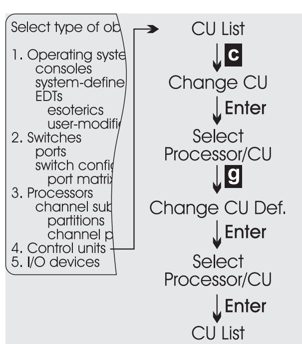
After you modified control unit data (like protocol, I/O concurrency level, or unit address range), and pressed the Enter key, the Modify Device Parameters panel is shown with the devices attached to the affected control units. The devices are grouped by ranges:

```
┌────────────────────────── Modify Device Parameters ─────────────────────────┐
│                                                    Row 1 of 1 More:      >  │
│                                                                             │
│ Specify or revise any changes to the device parameters in the list below.  │
│ To view attached control units, scroll to the right.                       │
│                                                                             │
│ Processor ID . . . .  : PROC2        This is the second processor           │
│ Channel Subsystem ID  :                                                     │
│                                                                             │
│ ---------Device--------- ---UA----                   Preferred  Exposure    │
│ No., Range Type          Old New + Time-Out  STADET  CHPID +    Device      │
│ 0012,016   3390          12  20    Yes       No      __                     │
└─────────────────────────────────────────────────────────────────────────────┘
```

HCD proposes starting unit addresses for the listed device groups.

Use the F20=Right key to scroll to the right to see the attached control units. Accept or change the definitions for unit address (UA New), Time-Out, STADET, and preferred CHPID.

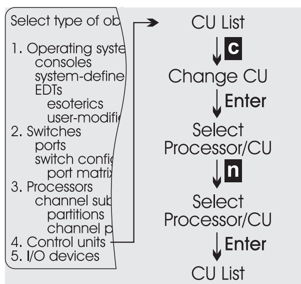
Changing control unit attachment parameters for multiple processors



You can change control unit (CU) attachment parameters or attach a control unit for a group of processors. If all parameters to be changed are identical, use the following group action.

1. On the Control Unit List, select a control unit that is attached to the group of processors and use the ***Change*** action from the context menu (or action code **c**).
2. On the Change Control Unit panel press the Enter key. HCD then displays a Select Processor/Control Unit panel with a list of processors already defined (see Figure 51 on page 131).
3. Select the processors for which you want to change the control unit-processor definitions and use the ***Group change*** action from the context menu (or action code **g**).
4. The Change Control Unit Definition panel is displayed showing the values/attributes for the first processor in the group. An asterisk (*) in the Processor ID field indicates that you are using the ***Group connect*** action from the context menu and the changes will be applied to more than one processor.

Disconnecting control units from a processor

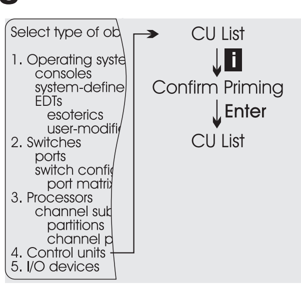


1. On the Control Unit List, select a control unit and the ***Change*** action from the context menu (or action code **c**). HCD displays the Change Control Unit Definition panel.
2. On the Change Control Unit Definition panel, press the Enter key. HCD displays the Select Processor/Control Unit panel.
3. On the Select Processor/Control Unit panel select a processor and the ***Disconnect*** action from the context menu (or action code **n**).

Disconnecting multiple control units from a processor:

If you want to disconnect multiple control units from one processor in one step, open the Control Unit list via the Channel Path List. On the Control Unit List, select one or multiple control units and use the ***Disconnect*** action from the context menu (or action code **n**).

Priming control unit data



You can prime your I/O configuration in a work IODF with the control unit serial number for the active processor. For the prerequisites for this function refer to "Prerequisites" on page 9.

To prime the control unit serial number, select the action ***Prime serial number*** from the context menu (or action code **i**) on the Control Unit List. The Confirm Priming Control Unit Data List shows the selected control units with the sensed data for the control unit types and serial numbers, and their corresponding definitions in the IODF.

```
┌────────── Confirm Priming Control Unit Data List ──────────┐
│                                                  Row 1 of 9│
│ Command ===> ___________________________ Scroll ===> CSR   │
│                                                            │
│ Press Enter to confirm priming, or Cancel to leave the     │
│ list. A blank value will not change the IODF definition.   │
│                                                            │
│ CU     ---------- Type ----------- --- Serial Number ---   │
│ Number actual        defined       sensed     defined      │
│ 90C1                 3990          __________ 33333   1    │
│ 9100   3990-L03      3990          30984              2    │
│ 9101   3990-L03      3990          30984      30984        │
│ 9140   3990-L03      3990          37160      A7199   3    │
│ 9141   3990-L03      3990          37160      A7199        │
│ 9180   3990-L03      3990          37201                   │
│ 9181   3990-L03      3990          37201                   │
│ 91C0   3990-L03      3990          37163      37163        │
│ 91C1   3990-L03      3990          37163      37163        │
│ ********************* Bottom of data **********************│
│                                                            │
│  F1=Help       F2=Split      F3=Exit       F5=Reset        │
│  F7=Backward   F8=Forward    F9=Swap      F12=Cancel       │
└────────────────────────────────────────────────────────────┘
```

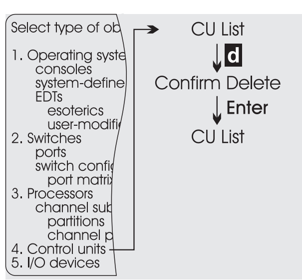
1 The control unit serial number is defined in the IODF, but no sensed data is available on the active system.

2 No control unit serial number is defined in the IODF, but the sensed data of the active system is available. To confirm the sensed data, and to define them in the IODF, press Enter.

3 The control unit serial numbers that are defined in the IODF, and that are sensed are different. Press Enter, to overwrite the defined data by the sensed data.

Note: The sensed values can only be blanked out or left unchanged. Blank out the sensed values, if you don't want to change the defined IODF values. To confirm priming, press Enter. Use the F12=Cancel key, if you don't want to use the sensed values, and to leave the list.

Deleting control units



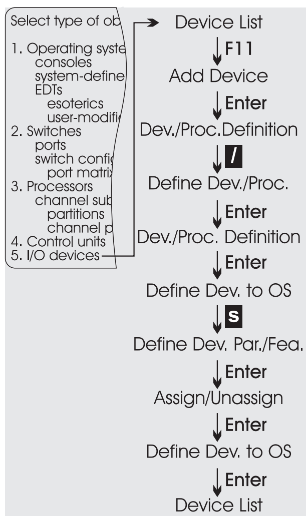
You can delete the definition of a control unit using the ***Delete*** action from the context menu (or action code **d**). Deleting a control unit means that all connections to channel paths, switches, and I/O devices are also deleted; these objects are not deleted.

Working with devices

Operating systems need I/O device data to address the devices. The CSS also needs the data to provide the required information for performing I/O operations to a specific device.

Four-Digit Device Numbers: Since MVS/ESA SP Version 5, HCD has supported the definition of four digits (numbers higher than ’0FFF’) for device numbers for the MVS operating system. The four-digit device numbers make it easier for large installations to use unique device numbers across their installation. The device numbers for MVS/ESA SP 4.3 and lower versions are still restricted to three digits. If you use four-digit definitions, these are ignored when you IPL or dynamically activate an MVS/ESA SP 4.2 or 4.3 system. The software products installed need to support four-digit device numbers as well.

Defining devices



You need three steps to define an I/O device:
- Define device characteristics and control unit connection
- Define CSS-related definitions for a device
- Define OS-related definitions for a device (including EDT and esoteric group assignment - MVS-type only).

Before you define a device that should be defined to an operating system and to the channel subsystem (CSS), you must have defined the operating system configuration, processor, channel path, and control unit. HCD omits some steps if data is missing. For example:
- You cannot define the processor data for the device if the device is not attached to a control unit or the control unit is not attached to a processor.
- You cannot define the EDT/esoteric group data for the device until you have defined an EDT for the OS.

Defining device data

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel, select ***I/O devices***. HCD displays an initial I/O Device List where devices with consecutive device numbers having the same definitions are automatically grouped together (Figure 54 on page 139).

A device group is shown as `device number,range`. A range value of one (1) is not explicitly shown. For example, the entry `'0002,4  3390A'` indicates a device group of four devices of type 3390A with consecutive device numbers from 0002 through 0005. Using action ***Work with single I/O devices*** from the context menu (or action code **s**) displays the I/O Device list showing all single devices defined in the IODF, with all device groups resolved (Figure 55 on page 140).

```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                             I/O Device List       Row 13 of 27 More:      >
Command ===> ___________________________________________ Scroll ===> CSR

Select one or more devices, then press Enter. To add, use F11.

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +       CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0000     3380             1  ____ ____ ____ ____ ____ ____ ____ ____
_ 0001     3390A        3   1  0001 0002 ____ ____ ____ ____ ____ ____
_ 0001     3390A        2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0001     3390A            1  ____ ____ ____ ____ ____ ____ ____ ____
s 0002,4   3390A        2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0002,8   3390A        3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0006,3   3390         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 000A     3380         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 000B     3820             1  ____ ____ ____ ____ ____ ____ ____ ____
_ 000C,12  3590             1  ____ ____ ____ ____ ____ ____ ____ ____
# FFFC     CFS                 FFFE ____ ____ ____ ____ ____ ____ ____
# FFFD     CFS                 FFFE ____ ____ ____ ____ ____ ____ ____
# FFFE     CFS                 FFFE ____ ____ ____ ____ ____ ____ ____
# FFFF     CFS                 FFFE ____ ____ ____ ____ ____ ____ ____

 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 54. I/O Device List with device groups

The # sign in front of a row indicates that this row is disabled. You cannot modify or delete it. In the example from Figure 54, you can see four devices of type CFS that are used for coupling facility connections.

If you scroll to the right in the I/O Device List, you would see additional columns ***Serial-#***, ***Description*** and ***VOLSER***.

```
  Goto  Filter  Backup  Query  Help
---------------------------------------------------------------------------
                             I/O Device List      Row 212 of 240 More:       >
Command ===> ___________________________________________ Scroll ===> CSR

Select one or more devices, then press Enter. To add, use F11.

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +        CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 0002     3390A         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0002     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0003     3390A         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0003     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0004     3390A         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0004     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0005     3390A         2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0005     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0006     3390          2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0006     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
_ 0007     3390          2   1  0001 ____ ____ ____ ____ ____ ____ ____
_ 0007     3390A         3      0001 0002 ____ ____ ____ ____ ____ ____
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F20=Right    F22=Command
```

Figure 55. I/O Device List with single devices

Columns CSS and OS state the number of channel subsystems and operating systems accessing the device. If the I/O Device List is called from the Processor List or Channel Subsystem List, the number in the ***IM*** column states how many partitions (images) of the selected processor or channel subsystem are accessing the device. For basic processors this value is one.

If the I/O Device List is called from either

- the Operating System Configuration List
- the Processor List for SMP processors
- the Channel Subsystem List for XMP processors,

using action ***Work with attached devices*** from the context menu (or action code **u**), then the list contains an additional column ***SS*** which indicates, if applicable, in which subchannel set the device should be placed.

2. Use F11=Add to add I/O devices. The data-entry fields are shown in the following figure, with sample data:

```
                          Add Device

 Specify or revise the following values.

 Device number  . . . . . . . .  01E1  +  (0000 - FFFF)
 Number of devices  . . . . . .  8
 Device type  . . . . . . . . .  3390A          +

 Serial number  . . . . . . . . __________
 Description  . . . . . . . . . PAV alias device _______________

 Volume serial number . . . . . ______  (for DASD)

 Connected to CUs . .  01E1   ____  ____  ____  ____  ____  ____  ____  +


  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 56. Add Device

In the ***Device number*** field, you can use the `F4=Prompt` key to have a list displayed containing unused device number ranges. If you select a proposal from this list, HCD fills ***Device number*** and ***Number of devices*** with the selected values.

The **Add Device** panel can also be used to specify the control units the devices are connected to.

Since VM dummy devices are definable with an arbitrary device type, a device with an unknown device type is accepted by HCD. It is treated like an unsupported device with the device type DUMMY. For MVS-type systems, you have to explicitly define the device as DUMMY.

Defining multiple devices in one step: You can define, in one operation, a group of I/O devices of the same type and with consecutive device numbers. You define the group by specifying the first device number and the number of devices in the group. Then HCD applies the definition to all devices in the group. On the I/O Device List, you can type over the values that should be different.

Use and definition of serial number of device: HCD allows you to assign the same device number to more than one I/O device; that is, device numbers alone do *not* uniquely identify a device in an IODF. To clearly identify devices, HCD keeps track of each occurrence of the same device number by appending an internal suffix to the device number.

When ***activating a configuration dynamically***, HCD might be unable to determine whether certain I/O devices in the ***currently active IODF*** and the ***IODF to be activated*** are physically the same. This may happen, if the new IODF was not created by copying or updating the current IODF but was newly created by migrating with IOCP or using the HCD dialog. In this case HCD is unable to determine which of the devices are physically identical.

To avoid problems when activating a configuration dynamically, you should check if more than one device uses the same device number attached to the same control units in the current IODF and in the newly created (not copied) IODF. If so, specify the same *serial number* for the devices that HCD should treat as physically the same.

Defining CSS-related definitions for a device

If you have defined a connection to a control unit on the *Add Device panel*, and the control unit is connected to a processor, then HCD displays the ***Device / Processor Definition*** panel (Figure 57) that shows the processors to which the control units are attached.

```
┌─────────────────── Device / Processor Definition ──────────────────────┐
│                                                          Row 1 of 1    │
│                                                                        │
│ Select processors to change device/processor definitions, then         │
│ press Enter.                                                           │
│                                                                        │
│ Device number  . . : 01E1          Number of devices  . : 8            │
│ Device type  . . . : 3745                                              │
│                                                                        │
│                                        Preferred  Device Candidate List│
│/ Proc.CSSID  SS+  UA+  Time-Out  STADET  CHPID +    Explicit        Null│
│_ XMPPRO1.0   __   05   No        Yes     __         No              ___ │
│_ G29.0       __   F0   No        No      __         No              ___ │
│_ G29.1       __   F0   No        No      __         No              ___ │
│ ************************* BOTTOM OF DATA ******************************│
```

Figure 57. Device / Processor Definition

On the ***Device / Processor Definition*** panel you can proceed in two ways:

- You can specify the CSS-related definitions directly by typing over the fields in each column. If you want to specify an explicit device candidate list for a device, type 'yes' into column ***Device Candidate List - Explicit***. This leads you to panel ***Define Device Candidate List*** (Figure 59 on page 144).
- You can select a processor and press the Enter key. The ***Define Device / Processor*** panel is displayed (Figure 58). From this panel you can edit the same values as shown in the ***Device / Processor Definition*** panel.

```
┌────────────────Define Device / Processor ─────────────────────────────┐
│                                                                        │
│                                                                        │
│ Specify or revise the following values.                                │
│                                                                        │
│ Device number  . . . : 01E1          Number of devices . . . . : 8     │
│ Device type  . . . . : 3745                                            │
│ Processor ID . . . . : XMPPRO1                                         │
│ Channel subsystem ID : 0                                               │
│                                                                        │
│ Subchannel set ID  . . . . . . . _   +                                 │
│ Unit address . . . . . . . . . . E1  + (Only necessary when different from│
│                                      the last 2 digits of device number)│
│ Time-Out . . . . . . . . . . . . No   (Yes or No)                      │
│ STADET . . . . . . . . . . . . . Yes  (Yes or No)                      │
│                                                                        │
│ Preferred CHPID  . . . . . . . . __  +                                 │
│ Explicit device candidate list . No   (Yes or No)                      │
```

Figure 58. Define Device / Processor

Defining the subchannel set for a device: Starting with z9 EC processors, each channel subsystem contains more than one subchannel set (SS 0, SS 1), where you can place the devices. Starting with z/OS V1R7 HCD, you can place PAV alias devices (types 3380A and 3390A) into an alternative subchannel set. In SS 0, you can place 63.75K devices, and in SS 1 you can place 64K-1 PAV alias devices.

You can specify the subchannel set ID for a device either in column **SS** of Figure 57 or in field **Subchannel set ID** of Figure 58.

Note:
HCD messages that refer to a device in a subchannel set with a subchannel set ID > 0 will display the device number in the format *n-devnumber* where n is the subchannel set ID. For example, the device 1234 located in subchannel set 1 will show up as *1-1234*. A device 4567 in subchannel set 0 will further on be shown as *4567*.

Rules for placing devices into subchannel sets:
Observe the following rules and recommendations when working with different subchannel sets:

- There is no required correspondence between device numbers in the subchannel sets. For example,

  ```
  devices in the range 8000-807F in SS0
  devices in the range 8000-807F in SS1 (PAV alias devices)
  ```

  may relate to completely separate devices. However, you can use this feature to have PAV base and aliases in different subchannel sets, but with the same device numbers.
- Unit addresses of base and alias devices on a single control unit must be unique. These cannot be duplicated across subchannel sets. So if you want to define the PAV base and alias devices in the range 8000-807F in different subchannel sets, but on the same control unit, you can define them like follows:

  ```
  base  devices, range 8000-807F in SS0, unit address 00-7F  (CU number 8000)
  alias devices, range 8000-807F in SS1, unit address 80-FF  (CU number 8000)
  ```
- You can use dynamic reconfiguration to move PAV alias devices to SS 1.

Restricting Partition Access for Devices: You can restrict logical partition access to an I/O device on a shared channel path by using the explicit device candidate list to select which logical partitions can access that I/O device. On the ***Define Device / Processor*** panel enter `Yes` or `No` in the `Explicit device candidate list` field to specify whether you want to restrict logical partition access to an I/O device:

- A `No` specifies that all logical partitions can access this I/O device. `No` is the default; all logical partitions are in this I/O device's candidate list.
- A `Yes` specifies that only your selected logical partitions can access this I/O device. Note that the partition must also be in the channel path access or candidate list to access the device. On the Define Device Candidate List, place a slash (/) character to the left of each selected Partition Name.

If you specify `Yes` in the `Explicit device candidate list` field, the following panel is displayed, showing possible candidate partitions:

```
┌───────────────── Define Device Candidate List ─────────────────┐
│                                                     Row 1 of 6  │
│                                                                 │
│ Select one or more partitions to allow them to access the       │
│ device, or ENTER to continue without selection.                 │
│                                                                 │
│ Device number  . . . : 01E1      Number of devices  . . . : 8   │
│ Device type  . . . . : 3745                                     │
│ Processor ID . . . . : PROC1     This is the main processor     │
│ Channel subsystem ID :                                          │
│                                                                 │
│ / Partition Name  Description                    Reachable      │
│ _ PROD1           First production partition     Yes            │
│ _ PROD2           Second production partition    Yes            │
│ _ TEST1           First test system              No             │
│ _ TEST2           Second test system             Yes            │
│ _ TEST3           CF partition                   No             │
│ _ TEST4           OS partition                   No             │
```

Figure 59. Define Device Candidate List

A Yes in the Reachable column indicates that the device can be reached from the respective partition, through at least one physical channel. You can only include reachable partitions into the explicit device candidate list by typing a slash ('/') into the action column. Deleting the slash means to remove the respective partition from the device candidate list.

Null device candidate list for XMP processors: If devices are connected to a control unit which is shared between multiple channel subsystems, some (not all) of these devices may specify an empty (or null) device candidate list for one or more CSSs. You create a null device candidate list for a device either by deselecting all candidate partitions from an existing list or by not selecting any partition for a new list.

If you define a null device candidate list of a device for a certain CSS, then no partition of this CSS may have access to the device. If you define an explicit device candidate list for a device, the ***Device / Processor Definition*** panel (Figure 57 on page 142) indicates whether this candidate list is a null device candidate list in column ***Device Candidate List - Null***. If no partition is allowed to have access to the device, value Yes is shown, otherwise value No. This field is left blank if no explicit device candidate list exists for the selected device (which is the default when creating new devices).

Defining OS-related definitions for a device

1. After pressing the Enter key on the ***Define Device / Processor*** panel, the ***Device / Processor Definition*** panel is displayed again. Select another processor or press the Enter key again to display the ***Define Device to Operating System Configuration*** panel that shows all the defined OS configurations.

```
┌────────── Define Device to Operating System Configuration ──────────┐
│                                                          Row 1 of 2 │
│                                                                     │
│ Select OSs to connect or disconnect devices, then press Enter.      │
│                                                                     │
│ Device number  . : 01E1          Number of devices  : 8             │
│ Device type  . . : 3390A                                            │
│                                                                     │
│ / Config. ID   Type     SS Description                     Defined  │
│ _ OPSYS01      MVS         MVS or z/OS operating system             │
│ _ OPSYS02      VM          VM operating system                      │
│ ************************* BOTTOM OF DATA ************************** │
```

Select an operating system and the ***Select (connect/change)*** action from the context menu (or action code **s**).

As described in “Defining the subchannel set for a device” on page 142, starting with 2094 (z9 EC) processors, you can place PAV alias devices (types 3380A and 3390A) into SS 1.

If you define a PAV alias device, as shown in our example from Figure 56 on page 141, HCD displays the ***Specify Subchannel Set ID*** panel that asks for the subchannel set where you want to place the device. The default depends on the value given for the corresponding CSS definition.

```
┌─────────────── Specify Subchannel Set ID ───────────────┐
│                                                          │
│                                                          │
│ Specify the ID of the subchannel set into which devices are │
│ placed, then press Enter.                                │
│                                                          │
│ Configuration ID . : OPSYS01                             │
│ Device number  . . : 01E1          Number of devices  : 8 │
│ Device type  . . . : 3390A                               │
│                                                          │
│ Subchannel Set ID    1  +                                │
│                                                          │
│  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap │
│ F12=Cancel                                               │
└──────────────────────────────────────────────────────────┘
```

Figure 60. Specify Subchannel Set ID

2. Pressing Enter on the dialog from Figure 60 brings you to the following panel where you can now define the data about device parameters and features that are required by the operating system configuration.
   The `Parameter/Feature` fields vary depending on the I/O device type and operating system type.

```
┌─────────────────── Define Device Parameters / Features ────────────────────┐
│                                                               Row 1 of 4  │
│                                                                           │
│ Specify or revise the values below.                                       │
│                                                                           │
│ Configuration ID . : OPSYS01      MVS or z/OS operating system            │
│ Device number  . . : 01E1         Number of devices  : 8                  │
│ Device type  . . . : 3390A                                                │
│                                                                           │
│ Parameter/                                                                │
│ Feature     Value +          R Description                                │
│ WLMPAV      Yes                Device supports work load manager          │
│ **************************** BOTTOM OF DATA ***************************   │
```

   A plus sign (+) in the `Value` column indicates that you may use F4=Prompt to get a list of possible values for the parameter/feature in the same row. Note that not all parameters are promptable.

   A `Y` in the `R` column indicates that a value for the parameter/feature in the same row is required.

   You accomplish the change by accepting the default values or by changing the `Value` entries and pressing the Enter key. The default values are set in the UIM for the device type. For parameters you can specify different default values via the OS_PARM_DEFAULT keyword in the HCD profile.

3. For eligible devices, after you have defined the device parameter and feature data and pressed the Enter key, HCD displays the ***Assign/Unassign Device to***

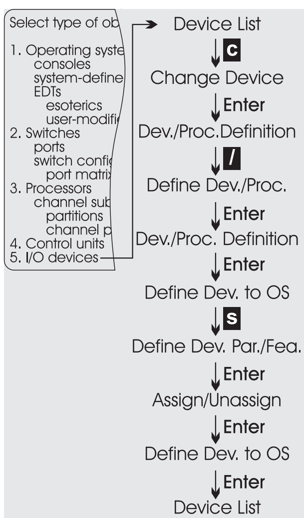
Esoteric panel.

```
┌─────────────────── Assign/Unassign Device to Esoteric ────────────────────┐
│                                                              Row 1 of 2 │
│                                                                         │
│ Specify Yes to assign or No to unassign. To view devices already        │
│ assigned to esoteric, select and press Enter.                           │
│                                                                         │
│ Configuration ID : OPSYS01          MVS or z/OS operating system        │
│ Device number  . : 01E1             Number of devices  : 8              │
│ Device type  . . : 3390A            Generic  . . . . . : 3390A          │
│                                                                         │
│ / EDT.Esoteric  Assigned  Starting Number Number of Devices             │
│ _ A1.ES001      No        ____            ____                          │
│ _ A2.ES002      No        ____            ____                          │
│ **************************** BOTTOM OF DATA ***************************** │
```

4. On the Assign/Unassign Devices to Esoterics panel, overwrite the values in the `Assigned` column to assign (`Yes`) or unassign (`No`) devices to the selected esoterics.

   If you do not want to assign a complete group of devices, you can limit the range by specifying a starting number and the number of devices. If you omit the number of devices, 1 is assumed.

Changing devices



To change device data, you have to follow the same panel flow as for defining a device:
1. Changing device and control unit definitions
2. Changing CSS-related definitions
3. Changing OS-related definitions

The following steps describe the panel flow and where you can change which data.
1. On the I/O Device List, select a device or a group of devices and the ***Change*** action from the context menu (or action code **c**). HCD shows the following panel:

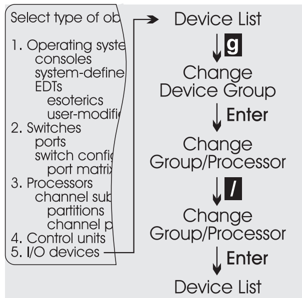
```
 ┌─────────────────────────── Change Device Definition ────────────────────────┐
 │ CBDPDV30                                                                     │
 │                                                                              │
 │ Specify or revise the following values.                                      │
 │                                                                              │
 │ Device number  . . . . . . . : 0005  (0000 - FFFF)                           │
 │ Number of devices  . . . . . : 4                                             │
 │ Device type  . . . . . . . . : 3333-1                                        │
 │                                                                              │
 │ Serial number  . . . . . . . . __________  +                                 │
 │ Description  . . . . . . . . . ________________________________              │
 │                                                                              │
 │ Volume serial number . . . . . ______  + (for DASD)                          │
 │                                                                              │
 │ Connected to CUs . 0001  ____  ____  ____  ____  ____  ____  ____  +         │
 │                                                                              │
 │ ENTER to continue.                                                           │
 └──────────────────────────────────────────────────────────────────────────────┘
```

Depending on whether you invoke this action for a single device or a group of devices, the line ***Number of devices*** shows how many devices are affected by the change.

2. On the following Change Device Definition panel you can change device and control unit definitions such as:
   - Serial number
   - Description
   - Control unit connections
   - Volume serial number

   Note: You can also change these definitions as well as the device type by simply typing over the appropriate fields on the Device List.
3. After pressing the Enter key, the Device / Processor Definition panel is displayed. Select a processor and press the Enter key to change the following CSS-related definitions:
   - Subchannel set ID
   - Unit address
   - Time-Out
   - STADET
   - Preferred CHPID
   - Explicit device candidate list
4. After pressing the Enter key twice , the Define Device to Operating System Configuration panel is displayed. Select an operating system and the ***Select (connect/change)*** action from the context menu (or action code **s**) if you want to change the following OS-related definitions:
   - Parameters/Features
   - Assignments to esoterics
5. After pressing the Enter key again, the Assign/Unassign Device to Esoteric panel is displayed. If you want to change the assignment of devices to esoterics, type over the values in the `Assigned` column by either `Yes` or `No`.
6. Press the Enter key twice to return to the I/O Device List.

Changing CSS-related definitions of a group of devices



You can change CSS-related definitions of a group of devices using the ***CSS group change*** action. This helps you, for example, to attach a group of DASDs to another control unit. To do this, the devices to be changed must be in the same device group, that is, they must all be of type, for example, DASD or TAPE.

1. On the I/O Device List select one or more devices and use the ***CSS group change*** action from the context menu (or action code **g**). The Change Device Group panel is displayed.

```
┌─────────────────────────── Change Device Group ────────────────────────────┐
│                                                                            │
│                                                                            │
│ Specify the control units the devices are attached to.                     │
│                                                                            │
│ Connected to CUs . . 00D1  00D2  ____  ____  ____  ____  ____  ____  +     │
└────────────────────────────────────────────────────────────────────────────┘
```

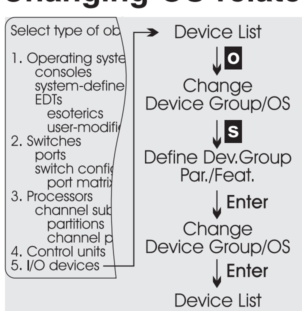
   HCD displays the definition of the first device in the group. You can modify this definition and HCD applies the definition to all devices in the group.

2. After pressing the Enter key, HCD displays the Change Device Group / Processor Definition panel, where you can select the processors for which you want to change the CSS-related definitions. For an example of this panel, see page 142 that shows the Device / Processor Definition panel which is similar to the one you see here.

Changing esoterics for a group of devices

For a description of how to change esoterics for multiple devices, refer to “Adding devices to esoterics” on page 89.

Changing OS-related definitions of a group of devices



You can change OS-related definitions for a group of devices using the ***OS group change*** action (or action code **o**). This helps you, for example, to attach a group of devices to another operating system. The device parameter/features will be the same for all devices in the group.

If you want to change OS-related definitions for PAV devices, HCD displays a similar dialog as shown in Figure 60 on page 145 which lets you change or specify the subchannel set ID where to place the device or the device group.

1. On the I/O Device List for single devices select one or more devices and use the ***OS group change*** action from the context menu (or action code **o**). HCD displays the Change Device Group / Operating System Configuration panel.

```
┌─────────── Change Device Group / Operating System Configuration ───────────┐
│                                                                 Row 1 of 1 │
│ Command ===> ___________________________________________ Scroll ===> PAGE  │
│                                                                            │
│ Select OSs to connect or disconnect devices, then press Enter.             │
│                                                                            │
│ / Config. ID   OS Type  Description                      Defined           │
│ _ OPSYS01      MVS      MVS or z/OS operating system     Yes               │
│ ***************************** Bottom of data ******************************│
│                                                                            │
│F1=Help       F2=Split       F3=Exit       F4=Prompt      F5=Reset          │
│F7=Backward   F8=Forward     F9=Swap      F12=Cancel     F22=Command        │
│                                                                            │
```

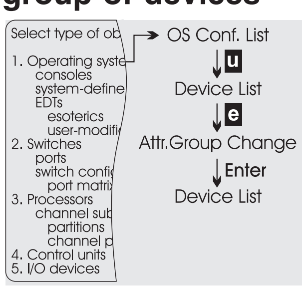
2. Select the operating system to which you want to attach the group of devices and the ***Select (connect/change)*** action from the context menu (or action code **s**). A panel like the following one is displayed.

```
┌───────────────── Define Device Group Parameters / Features ────────────────┐
│                                                                 Row 1 of 4 │
│ Command ===> ___________________________________________ Scroll ===> PAGE  │
│                                                                            │
│ Specify or revise the values below.                                        │
│                                                                            │
│ Configuration ID . : OPSYS01      MVS or z/OS operating System             │
│                                                                            │
│ Parameter/                                                                 │
│ Feature     Value    P Req.  Description                                   │
│ ADAPTER     TYPE7    + Yes   Channel adapter type                          │
│ OFFLINE     No               Device considered online or offline at IPL    │
│ DYNAMIC     Yes              Device supports dynamic configuration         │
│ OWNER       VTAM     +       Subsystem or access method using the device   │
│ ***************************** Bottom of data ******************************│
│                                                                            │
│ F1=Help      F2=Split       F3=Exit       F4=Prompt      F5=Reset          │
│ F7=Backward  F8=Forward     F9=Swap      F12=Cancel     F22=Command        │
│                                                                            │
```

3. You accomplish the change by accepting the default values or by changing the `Value` entries and pressing the Enter key.

The specified device parameters/features are applied to all devices of the group.

Changing the DYNAMIC, LOCANY or OFFLINE parameter of a group of devices



You can change the DYNAMIC, LOCANY or OFFLINE parameter of a group of devices using the ***Attribute group change*** action. This function helps you to change parameters for a group of devices without having to use the ***Change*** action for each device individually.

This function can only be invoked from the I/O Device List accessible from the Operating System Configuration List.

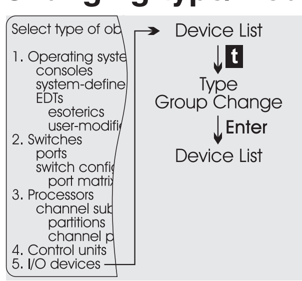
1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system configurations***.
2. Select an operating system and select the ***Work with attached Devices*** action from the context menu (or action code **u**). HCD displays the I/O Device List.
3. Select one or more devices on the I/O Device List and the ***Attribute Group change*** action from the context menu (or action code **e**). HCD displays the Attribute Group Change panel:

```
┌───────────────────── Attribute Group Change ─────────────────────────┐
|                                                                      |
|                                                                      |
| For all devices in the selected group, choose whether ...            |
|                                                                      |
| __  1.  Allow dynamic configuration ........... DYNAMIC=YES          |
|     2.  Do not allow dynamic configuration .... DYNAMIC=NO           |
|     3.  UCB can reside in 31 bit storage ...... LOCANY=YES           |
|     4.  UCB can not reside in 31 bit storage .. LOCANY=NO            |
|     5.  Device is set offline at IPL .......... OFFLINE=YES          |
|     6.  Device is set online at IPL ........... OFFLINE=NO           |
```

   Select the appropriate parameter.

HCD only changes the single parameter for all devices of the group, leaving the other parameters/features of the group unchanged.

Changing type/model of a group of devices



You can change the type or model for a group of devices using the ***Device type group change*** action. However, you have to make sure that all devices to be changed in one step have the same device type and model. The control units the devices are attached to, have to support the attachment of the new device type as well, and required parameters have to be identical. The new device type has to be supported by the same operating system type.

1. Select one or more devices on the I/O Device List.
2. Use the ***Device type group change*** action from the context menu (or action code **t**). HCD displays the Device Type Group Change panel.

```
┌──────────────── Device Type Group Change ─────────────────────┐
│                                                                │
│                                                                │
│ Specify a new device type-model.                               │
│                                                                │
│ Current device type-model  . : 3380                            │
│                                                                │
│ New device type-model  . . . . 3390________  +                 │
└────────────────────────────────────────────────────────────────┘
```

Specify a new device type-model.

Changing the subchannel set placement for a group of devices

You can change the placement of PAV alias devices any time, for example, if you want to migrate PAV alias devices into a subchannel set of a new processor. From the I/O Device List showing device groups or single devices, use action ***Subchannel Set ID group change*** from the context menu (or action code m). HCD displays the following dialog where you can specify the new ID of the subchannel set.

Note: When defining or changing the subchannel set placement for devices, you need to observe certain rules. For more information, read "Defining CSS-related definitions for a device" on page 142 and refer to the *z/OS HCD Planning*.

```
┌────────────────── Specify Subchannel Set ID ───────────────────┐
│                                                                │
│                                                                │
│ Specify the ID of the subchannel set into which devices are    │
│ placed, then press Enter.                                      │
│                                                                │
│ Subchannel Set ID    1  +                                      │
│                                                                │
│                                                                │
│                                                                │
│                                                                │
│  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap│
│ F12=Cancel                                                     │
└────────────────────────────────────────────────────────────────┘
```

Figure 61. Specify Subchannel Set ID

If at least one of the selected devices has a connection defined to a processor supporting multiple subchannel sets, HCD displays a dialog where you can select from the eligible channel subsystems where to move the devices.

```
┌────────────── Eligible Channel Subsystems ───────────────┐
│ CBDPUTPC                                       Row 1 of 3 │
│ Command ===> _________________ Scroll ===> CSR             │
│                                                            │
│ Select all channel subsystems for which the                │
│ subchannel set ID has to be changed for all                │
│ selected devices that have a connection to them.           │
│                                                            │
│                                                            │
│ / Proc.CSSID  Description                                  │
│ _ MSSPROC1.0  CSS0 of MSSPROC1                             │
│ _ TSPROC1.0   CSS0 of TSPROC1                              │
│ _ TSPROC1.1   CSS1 of TSPROC1                              │
│ **************** Bottom of data *****************          │
│                                                            │
│                                                            │
│  F1=Help        F2=Split       F3=Exit                     │
│  F7=Backward    F8=Forward     F9=Swap                     │
│ F12=Cancel     F22=Command                                 │
└────────────────────────────────────────────────────────────┘
```

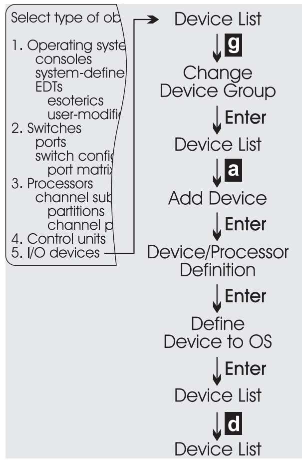
Figure 62. Eligible Channel Subsystems

Also, if at least one of the selected devices has a connection defined to an operating system configuration, HCD displays a dialog listing all OS configurations that have connections to any of the selected devices. You can select all OS configurations for which you want to change the subchannel set ID for the selected devices.

```
┌──────────────── Eligible Operating System Configurations ─────────────────┐
│ CBDPUTOC                                                       Row 1 of 1 │
│ Command ===> _____________________________________ Scroll ===> CSR         │
│                                                                            │
│ Select all operating system configurations for which the subchannel        │
│ set ID has to be changed for all selected devices that have a              │
│ connection to them.                                                        │
│                                                                            │
│                                                                            │
│ / Config.ID    Type             Description                                │
│ _ ZOS17        MVS              first z/OS 1.7 operating system            │
│ _ Z17SCND      MVS              second z/OS 1.7 operating system           │
│ ************************* Bottom of data ***************************       │
│                                                                            │
│                                                                            │
│  F1=Help       F2=Split      F3=Exit       F7=Backward   F8=Forward        │
│  F9=Swap      F12=Cancel    F22=Command                                    │
└────────────────────────────────────────────────────────────────────────────┘
```

Figure 63. Eligible Operating System Configurations

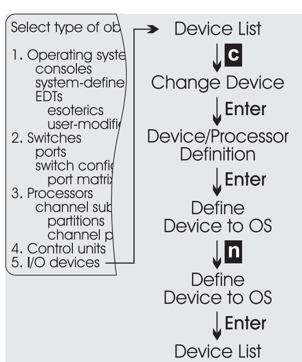
Changing the device number



To change the number of a device:

1. Remove the connections to the control units for the devices to be changed as follows:
   a. On the I/O Device List, select the devices to be changed and the ***CSS group change*** action from the context menu (or action code g). The Change Device Group panel is displayed.
   b. Remove the control unit numbers from the panel and press the Enter key.
2. On the I/O Device List, select the device and the ***Add like*** action from the context menu (or action code a). The Add Device panel is displayed.
3. Specify the new number for the device and the control unit numbers to which the devices are to be attached. Press the Enter key. HCD now displays a series of panels showing the settings of the previously selected device (the one to be changed). The settings are propagated to the new devices. Press the Enter key until HCD redisplays the I/O Device List now showing the new device.
4. Delete the old device by selecting the device and selecting the ***Delete*** action from the context menu (or action code d).

Disconnecting devices from an operating system



Perform the following steps to disconnect a device from an operating system.

1. On the I/O Device List select a device and the ***Change*** action from the context menu (or action code c).
2. On the following Change Device Definition panel, press the Enter key.

3. On the following Device / Processor Definition panel, press the Enter key once again. HCD displays the Define Device to Operating System Configuration panel.

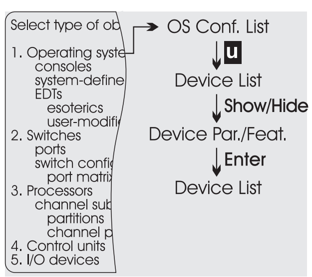
```
┌────────── Define Device to Operating System Configuration ──────────┐
│                                                           Row 1 of 2 │
│                                                                      │
│ Select OSs to connect or disconnect devices, then press Enter.       │
│                                                                      │
│ Device number  . : 01D1          Number of devices  : 1              │
│ Device type  . . : 3390                                              │
│                                                                      │
│ / Config. ID   Type     SS Description                    Defined    │
│   OPSYS01      MVS         MVS or z/OS operating system   Yes        │
│ _ OPSYS02      VM          z/VM operating system                     │
│ ************************* BOTTOM OF DATA ************************** │
```

4. On the Define Device to Operating System Configuration panel select an operating system and the ***Disconnect from OS*** action from the context menu (or action code **n**). The Define Device to Operating System Configuration panel is displayed again without showing a `Yes` in the `Defined` column.

Disconnecting multiple devices from an operating system:

If you want to disconnect multiple devices from one operating system in one step, open the I/O device list via the OS configuration list. On the I/O Device List, select one or multiple devices and use ***Disconnect from OS*** action from the context menu (or action code **n**).

Showing or hiding parameter/feature definitions of devices



You can define up to five parameters/features for a device that can be shown on the I/O Device List in addition to the default information. These parameters/features will be retained across sessions.

1. On the Operating System Configuration List, use the ***Work with attached devices*** action from the context menu (or action code **u**).
2. On the following I/O Device List, select the ***Show device parameters/features*** pull-down choice from the ***Show/Hide*** action bar (no action code available).
3. On the following Device Parameters/Features Profile panel, you can specify up to five parameters/features that will be displayed on the I/O Device List. HCD saves your settings across sessions.

```
 ─────────────────── Device Parameters / Features Profile ───────────────────
|                                                                            |
|                                                                            |
| Specify or revise the device parameters or features to be displayed in the|
| I/O Device List for an operating system configuration.                     |
|                                                                            |
| Parameters/                                                                |
| features . . LIBRARY     SHARED      OFFLINE     __________  __________  + |
|                                                                            |
|  F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset   F9=Swap   F12=Cancel|
 ────────────────────────────────────────────────────────────────────────────
```

4. On the I/O Device List, use the F20=Right key to scroll to the rightmost part of the panel, where the information is displayed. Note that the DYNAMIC parameter and LOCANY parameter are default information that is also shown on the leftmost part of the I/O Device List in columns **D** and **L**.

```
  Goto  Show/Hide  Filter  Backup  Query  Help
------------------------------------------------------------------------
                               I/O Device List      Row 1 of 11 More: <

Select one or more devices, then press Enter. To add, use F11.

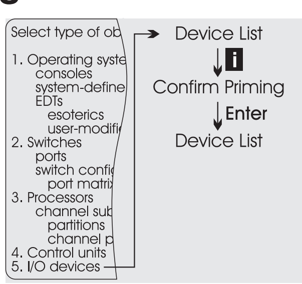
Configuration ID . . : OPSYS01      MVS or z/OS operating system

  ---------Device-------
/ Number   Type         LIBRARY    SHARED     OFFLINE
_ 0001     3278-3                             No
_ 0098     9033                               Yes
_ 00C1     3480         No                    No
_ 01D1     3390                    No         No
_ 01D2     3390                    No         No
_ 01D3     3390                    No         No
_ 01D4     3390                    No         No
_ 01D5     3390                    No         No
_ 01D6     3390                    No         No
_ 01D7     3390                    No         No
_ 01D8     3390                    No         No
```

You can filter the shown devices by device parameters and features using the ***Set Filter*** function. On the Filter I/O Device List, you can specify a value for any displayed parameter/feature you want to use for filtering.

In case you no longer need the parameters/features to be displayed, you use ***Hide device parameters/features*** pull-down choice from the ***Show/Hide*** action bar on the I/O Device List.

Priming device data



You can prime your I/O configuration in a work IODF with the device serial numbers and volume serial numbers (VOLSER) for the active processor. For the prerequisites for this function refer to “Prerequisites” on page 9.

To prime, select the action ***Prime serial number and VOLSER*** from the context menu (or action code **i**) on the I/O Device List.

The Confirm Priming Device Data List shows the selected devices with the sensed data for the device types and serial numbers, and their corresponding definitions in the IODF. For DASD devices, the sensed VOLSER is also shown on this panel.

```
 ---------------------- Confirm Priming Device Data List ----------------------
                                                                   Row 1 of 8
 Command ===> ___________________________________________ Scroll ===> CSR

 Press Enter to confirm priming, or Cancel to leave the list. A blank value
 will not change the IODF definition.

 Device ---------- Type ----------- --- Serial Number --- --- VOLSER ---
 Number actual        defined       sensed     defined    sensed defined
 0AF0   3390-B3C      3390          B9888      B9888      PETHS2 PETHS2
 0AF1   3390-B3C      3390          B9888      B9888      D83NE2 D83NE2
 0AF2   3390-B3C      3390          B9888      B9888      D83WL4 D83WL4
 0AF3   3390-B3C      3390          B9888      B9888      D83WL5 PETOFF  1
 0AF4   3390-B3C      3390          B9916      A9999      PETCAT PETCAT
 0AF5   3390-B3C      3390          B9916      B9916      PETDL2 PETDL2
 0AF6   3390-B3C      3390          B9916                 TSOPAK         2
 0AF7   3390-B3C      3390          B9916      B9916      CMNAF7 CMNAF7
 **************************** Bottom of data *****************************



  F1=Help       F2=Split      F3=Exit       F5=Reset      F7=Backward
  F8=Forward    F9=Swap      F12=Cancel
```

1 The values that are defined in the IODF and that are sensed are different. Press Enter, to overwrite the defined data by the sensed data.

2 No values are defined in the IODF, but the sensed data of the active system is available. To confirm the sensed data, and to define them in the IODF, press Enter.

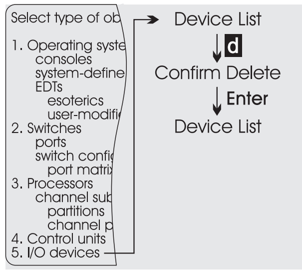
Note: The sensed values can only be blanked out or left unchanged.

Blank out the sensed values, if you don’t want to change the defined IODF values.

To confirm priming, press Enter.

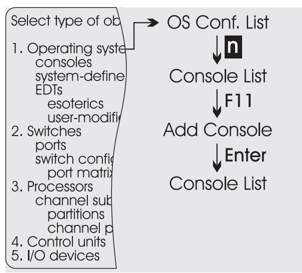
Use the F12=Cancel key, if you don’t want to use the sensed values, and to leave the list.

Deleting devices



You can delete the definition of a device or a device group using the ***Delete*** action from the context menu (or action code **d**). If you delete a device, all connections to the operating system including esoterics and EDTs are also deleted.

Working with operating system consoles



The following procedure describes how to specify which devices MVS can use as NIP consoles and which devices VM can use as VM consoles. Before you can define consoles you must have defined these I/O devices to the operating system.

1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Operating system configurations***. HCD displays the Operating System Configuration List showing all OS configurations currently defined in the IODF.
2. Select an OS configuration and the ***Work with consoles*** action from the context menu (or action code **n**). HCD displays the NIP Console List or VM Console List (depending on the type of the selected operating system).

```
┌─────────────────────────── NIP Console List ──────────────────────────────┐
   Goto  Backup  Query  Help
 ----------------------------------------------------------------------
                                                             Row 1 of 1

 Select one or more consoles, then press Enter. To add, use F11.

 Configuration ID . : OPSYS01      MVS or z/OS operating system

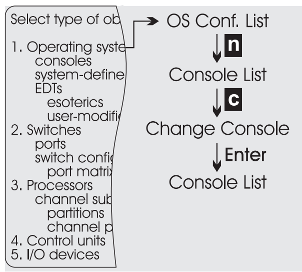
 / Order   Device  Device Type
   Number  Number
 _   1     0001    3278-3
 *************************** BOTTOM OF DATA ****************************
```

3. Use F11=Add to define each console. The following panel is displayed:

```
 ┌─────────────────────── Add NIP Console ───────────────────────┐
 │                                                                │
 │ Specify the following values.                                  │
 │                                                                │
 │ Device number of console . . . . . . ____                      │
 │                                                                │
 │ Order number . . . . . . . . . . . . 1                         │
 │                                                                │
 └────────────────────────────────────────────────────────────────┘
```

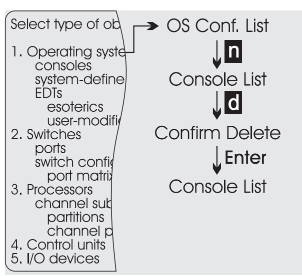
The order number is the sequence the consoles are used by the operating system.

Changing operating system consoles



You can change the order number of an operating system console by just typing over the corresponding column or by using the ***Change*** action from the context menu (or action code c) on the Console List.

Deleting operating system consoles



You can delete the definition of an operating system console using the ***Delete*** action from the context menu (or action code d) on the Console List. The devices are not deleted.

Working on IODFs enabled for multi-user access

When multiple users concurrently use the same IODF, a user's changes are not immediately refreshed in the views of the other users. However, each user has a consistent view of the data either from the initial access to the IODF or after each last update that he had applied to the IODF.

In a few scenarios, this information unit demonstrates how HCD applies these rules when two users, ***UserA*** and ***UserB*** concurrently view or update an IODF:

- "Simultaneously updating and viewing an IODF" on page 159
- "Concurrently updating an IODF" on page 159
- "Immediately reflecting changes during concurrent updates" on page 160.

Simultaneously updating and viewing an IODF

Imagine that both users ***UserA*** and ***UserB*** invoke the ***Channel Subsystem List*** of the same IODF. ***UserA*** wants to delete channel subsystems `CSS 1` and `CSS 3`, and ***UserB*** wants to work with the partitions of `CSS 1`.

```
                UserA:                   |                  UserB:
                                         |
         Channel Subsystem List          |          Channel Subsystem List
                                         |
 Processor ID . . . : BBBX               |  Processor ID . . . : BBBX
                                         |
   CSS Devices in SS0    Devices in SS1  |    CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual|  / ID  Maximum + Actual  Maximum + Actual
                                         |
 _ 0   65280     28      65535     0     |  _ 0   65280     28      65535     0
 d 1   65280     28      65535     0     |  p 1   65280     28      65535     0
 _ 2   65280     0       65535     0     |  _ 2   65280     0       65535     0
 d 3   65280     0       65535     0     |  _ 3   65280     0       65535     0
```

Both users press Enter. While ***UserA*** sees the updated ***Channel Subsystem List***, ***UserB*** sees the partitions of the meanwhile deleted `CSS 1`, because he still views the state of the IODF as loaded from storage. He will get a refreshed view after applying an update on the IODF.

```
                UserA:                   |                  UserB:
                                         |
         Channel Subsystem List          |             Partition List
                                         |
 Processor ID . . . : BBBX               | Processor ID  . . . . : BBBX
                                         | Configuration mode  . : LPAR
   CSS Devices in SS0    Devices in SS1  | Channel Subsystem ID  : 1
 / ID  Maximum + Actual  Maximum + Actual|
                                         | / Partition Name   Number Usage
 _ 0   65280     28      65535     0     | _ PART11           1      CF/OS
 _ 2   65280     0       65535     0     | _ PART12           2      CF/OS
                                         | _ PART13           3      CF/OS
```

Concurrently updating an IODF

Both users ***UserA*** and ***UserB*** start on the ***Channel Subsystem List*** of the same IODF. ***UserA*** invokes action ***Change*** on `CSS 1` and ***UserB*** updates ***Maximum Devices in SS0*** for CSS2 and CSS3 from 65280 to 64512 and additonally invokes action ***Delete*** on the same `CSS 1` maybe a few seconds later.

```
                UserA:                   |                  UserB:
                                         |
         Channel Subsystem List          |          Channel Subsystem List
                                         |
 Processor ID . . . : BBBX               |  Processor ID . . . : BBBX
                                         |
   CSS Devices in SS0    Devices in SS1  |    CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual|  / ID  Maximum + Actual  Maximum + Actual
                                         |
 _ 0   65280     28      65535     0     |  _ 0   65280     28      65535     0
 c 1   65280     28      65535     0     |  d 1   65280     28      65535     0
 _ 2   65280     0       65535     0     |  _ 2   64512     0       65535     0
   3   65280     0       65535     0     |  _ 3   64512     0       65535     0
```

HCD displays panel ***Change Channel Subsystem*** for ***UserA*** while ***UserB*** receives message CBDA340I. When ***UserB*** returns from the ***Message List*** to the ***Channel Subsystem List***, the panel is not refreshed and ***UserB's*** updates are kept on the screen. Thus, ***UserB*** can retry his update request several times until ***UserA*** releases the lock on the IODF.

```
                UserA:                        |                   UserB:
                                              |
        Change Channel Subsystem              |                 Message List
                                              |
                                              |
 Specify or revise the following values.      | Messages are sorted by severity.
                                              | Select one or more, then press Enter.
 Processor ID . . . . . . : BBBX              |
 Channel subsystem ID . . : 1                 | / Sev Msg. ID Message Text
                                              | _ E CBDA340I IODF USERA.IODF00.TEST.WORK
 Description  . . . . . . . ________________  | # is currently being updated
                                              | # by HCD user USERA on system
 Maximum number of devices                    | # SCLM.
   in subchannel set 0  . . 65280  +          |
   in subchannel set 1  . . 65535  +          |
```

Immediately reflecting changes during concurrent updates

Both users ***UserA*** and ***UserB*** start on the ***Channel Subsystem List*** of the same IODF. ***UserA*** invokes action ***Delete*** on CSS 1 and CSS 2, locking the IODF, and ***UserB*** at the same time invokes action ***Change*** on several CSSs.

```
                UserA:                        |                   UserB:
                                              |
         Channel Subsystem List               |          Channel Subsystem List
                                              |
 Processor ID . . . : BBBX                    |  Processor ID . . . : BBBX
                                              |
   CSS Devices in SS0    Devices in SS1       |    CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual     |  / ID  Maximum + Actual  Maximum + Actual
                                              |
 _ 0   65280     28      65535     0          |  _ 0   65280     28      65535     0
 d 1   65280     28      65535     0          |  c 1   65280     28      65535     0
 d 2   65280     0       65535     0          |  c 2   65280     0       65535     0
   3   65280     0       65535     0          |  c 3   65280     0       65535     0
```

Even after ***UserA*** has successfully deleted the two channel subsystems, ***UserB*** sees the ***Channel Subsystem List*** with all channel subsystems, because this is the state of the IODF as loaded from storage. Let us suppose, he wants to change channel subsystems CSS 1, CSS 2 and CSS 3. An appropriate message is displayed for each channel subsystem that is already deleted. When returning to the ***Channel Subsystem List***, ***UserB*** sees the refreshed contents of this panel.

```
                  UserA:                                             UserB:


           Channel Subsystem List                             Message List

 Processor ID . . . : BBBX                           Messages are sorted by severity.
                                                     Select one or more, then press Enter.
   CSS Devices in SS0    Devices in SS1
 / ID  Maximum + Actual  Maximum + Actual            / Sev Msg. ID Message Text
                                                     _ E CBDA188I Channel Subsystem ID 1
 _ 0   65280     28      65535     0                 # does not exist for processor
   3   65280     0       65535     0                   BBBX
                                                     _ E CBDA188I Channel Subsystem ID 2
                                                     # does not exist for processor
                                                       BBBX
```

Viewing information

HCD offers several possibilities to view information that might be helpful when defining or maintaining your configuration data.

Viewing object definitions

To view information about objects that are defined in your configuration, select the ***Define, modify, or view configuration data*** option from the primary task selection panel. From the resulting panel, select the desired object to get the appropriate list, on which you can use ***Work with object*** actions from the context menu that lead to further list panels that display other related objects. You can use these panels to define, modify, and view configuration data. See Figure 41 on page 80 on how to navigate to related list panels of different objects.

Viewing full definition of an object

You can ask HCD to display, for viewing only, the full definition of an object. This might include additional information that is not displayed on the action list panel.

To view object definitions select an object on an action list and use the ***View object definition*** action (or action code **v**).

This following lists offer this possibility:
- Processor List
- Channel Path List
- Control Unit List
- I/O Device List

Viewing additional object lists

Besides the action list panels shown in Figure 41 on page 80, there are list panels, on which you can only view information about objects without being able to change it. You can navigate to these lists using the ***View objects*** actions from the context menu. HCD offers ***View objects*** actions on the following panels:

List Panel	View
Channel Path List	Connected switches
Partition List	Attached channel paths Attached control units Attached devices
Operating System List	Generics
Generics List	Devices

Esoteric List	Devices

Graphical view

HCD offers you the possibility to view a graphical representation of the configuration.

Use the ***Create or view graphical configuration report.*** on the primary task selection panel to view the entire configuration. To view objects in context of their attached objects you can also select an object from an action list panel and use the ***View graphically*** action from the context menu (or action code **h**). The following object lists support this possibility:

- Channel Path List
- Control Unit List
- I/O Device List (only for devices that connect to a control unit)
- Partition List
- Switch List

For more information on how to view a graphical report, refer to “Create or view graphical configuration reports” on page 238.

Viewing logical control units

On a Control Unit List or I/O Device List, you can display the groups of *logical control units* that HCD has created to represent the physical control units defined in a configuration. Logical control units are used by the CSS to schedule the processing of I/O requests.

Viewing coupling facility information

HCD lets you view information for a specific CF channel path. You can view, for example, access and candidate list of selected channel paths and information on the CF control units and devices in a CF channel path connection.

On the CF Channel Path Connectivity List, select a channel path and one of the following actions:

- The ***View source channel path definition*** action displays the View Channel Path Definition panel for the source channel path of the CF connection.
- The ***View destination channel path def.*** action displays the View Channel Path Definition panel for the destination path of the CF connection.
- The ***View CF control unit and devices*** action displays the View CF Control Unit and Devices panel that shows the CF control unit number(s), the starting CF device number(s), and the range of devices defined for a CF connection.

Viewing CTC connections

HCD offers you the possibility to view and verify your CTC connections. You can view existing CTC connections including online diagnostic messages on the following lists:

- Processor List
- Partition List
- Channel Path List
- Control Unit List
- I/O Device List

The ***CTC Connection List*** lets you immediately verify whether your definitions are done correctly.

ESCON channel-to-channel support

An ESCON CTC connection requires a CTC channel at one end of the connection and a CNC or FCV channel at the other end of the connection. The two channels can be considered as communicating directly with each other in a peer-to-peer fashion. Each channel defines the channel at the other end of the CTC connection as an SCTC control unit. This is illustrated in Figure 64.

FICON channel-to-channel support

FCTC support differs from ESCON CTC support not only in the channel types used. The main differences are as follows:

- An FCTC connection is given via a FICON channel path on each side of the FCTC communication line.
- It is possible to have an FCTC connection between the LPARs of the same CEC via a single FICON channel path in a switched environment.

In order to be usable as an FCTC connection channel, a FICON channel path must be defined to an FCTC control unit which is connected to FCTC devices.

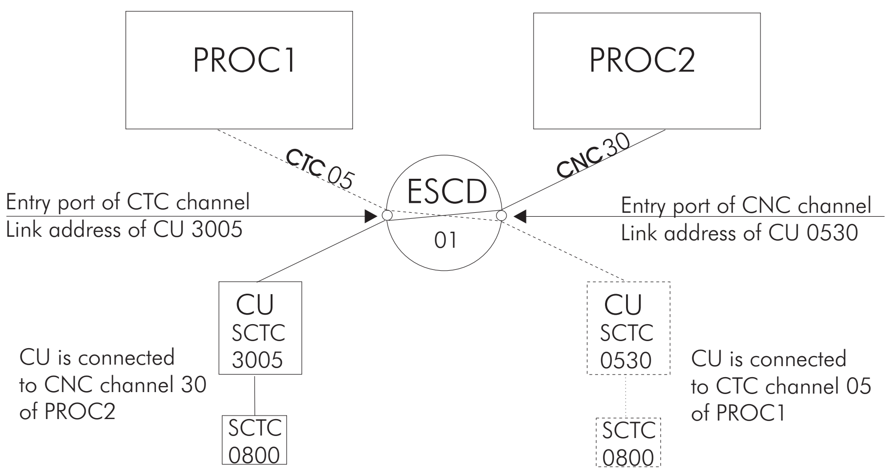


Figure 64. CTC/CNC connection established using a dynamic connection

The entry port of the channel at the other end of the CTC connection corresponds to the link address of the control unit representing the channel.

The CTC devices associated with the control units at both ends of the CTC connection may have different device numbers, but they must have the same unit address. The device type of both devices must be the same (for example, SCTC or BCTC).

Restrictions applying to the CTC Connection List

- HCD can only show CTC connections if the connected processors are defined in one IODF.
- For a switched SCTC connection, the CNC/FCV and CTC channel paths must be connected to the same ESCON director. CTC connections running via chained ESCON directors cannot be determined.
- CTC connections using a stand-alone CTC adapter cannot be shown.
- Point-to-point CTC connections are only recognized if the control units associated to a specific CTC connection have the same serial number defined.

CTC connections with shared channels

If your processor has MIF support you can share your channels among several partitions to save physical connections. The following figure shows you the case when a CNC channel is shared between two partitions. The CTC channel will need a separate control unit definition for each partition sharing the CNC channel. Each of these control unit definitions has the same destination link address but the control unit logical addresses (CUADD) must be different. The control unit logical address must correspond to the image number of the logical partition.

Note: If the target channel path is non-shared, either you must not specify a control unit logical address, or its value must be 0.

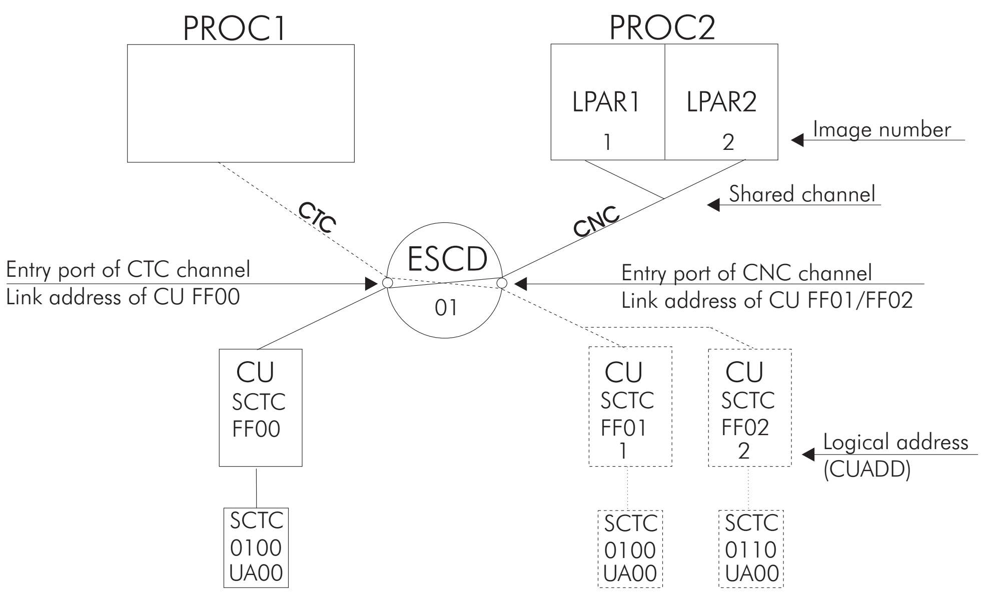


Figure 65. CTC/CNC connection established using shared channels

For further specification rules, refer to the *IOCP User's Guide* for your processor.

How to view CTC connections

You can use action ***View related CTC connections*** (or action code **k**) on the following lists:

- Processor List
- Partition List
- Channel Path List
- Control Unit List
- I/O Device List

A panel similar to the following one is displayed:

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                             CTC Connection List     Row 1 of 14 More:       >

Select CTC connections to view CTC Messages, then press Enter.

  -----------CTC or FC side---------- ---------CNC/FCV or FC side--------
/ Proc.CSSID Part.    Devices CH CU   Proc.CSSID Part.    Devices CH CU   Msg.

_ PROC001A            0500,5  20 1020 PROC001             0100,5  10 1010 G750
_ PROC001A            0690,1  20 0069                                     G752
_ PROC002             0650,1  11 0065 PROC002             0660,1  13 0066 G753
_ PROC002             0680,1  11 0068                                     G752
_ PROC002             0701,1  12 0050 PROC003    PART1    0301,1  10 1012
_ PROC002             0800,5  22 0060 PROC003    PART2    0400,5  11 1013
_ PROC002             0805,1  22 0060 PROC003    PART2    0405,1  11 1013 G751
_ PROC002             0806,3  22 0060 PROC003    PART2    0406,3  11 1013
_ PROC002             2400,1  24 0024                                     G756
_ XMP1.1     PART1    1105,1  21 0105 PROC001             1106,1  10 0106
_ XMP1.1     PART1    1107,1  21 0107 PROC002             1108,1  26 0108 G750
                                      PROC002             0200,2  10 1011 G757
                                      XMP1.1     PART1    0300,1  10 1012 G754
                                      XMP1.1     PART2    0300,2  10 1012 G754
```

This panel shows the definitions of the CNC/FCV side in relation to the definitions of the CTC side, such as processor, partition, channel path, control unit, and device information.

Incomplete CTC definitions: If the CTC connection is not correctly defined, the fields on the CTC Connection List can be incomplete and an error message is shown. For example, G754 in column Msg. refers to message CBDG754I, which indicates that HCD cannot determine the connection, because no control units and devices match to the processor, partition, control unit, and device of the same row.

Displaying more detailed information

Scroll to the right to see more detailed information about the CTC side of the connection, such as channel path mode, switch information, detailed control unit and device information.

```
  Goto  Filter  Backup  Query  Help
-------------------------------------------------------------------------
                       CTC Connection List (CTC/FC)     Row 1 of 14 More: <>

Select CTC connections to view CTC Messages, then press Enter.

           -Partition-- ----Devices-----    -CHPID- Entry Dyn      Link CU
/ Proc.CSSID Name     Num Number   Type OS UA ID Mode SW PO SW  CU   Addr ADD
_ PROC001A                0500,5   BCTC N  00 20 DED  05 F0 05  1020 E120
_ PROC001A                0690,1   SCTC N  00 20 DED  05 F0 05  0069 E728
_ PROC002                 0650,1   SCTC N  00 11 DED  05 E7 05  0065 E840
_ PROC002                 0680,1   SCTC N  00 11 DED  05 E7 05  0068 F0
_ PROC002                 0701,1   SCTC N  01 12 DED  05 D0 05  0050 F4   1
_ PROC002                 0800,5   SCTC N  00 22 DED  05 D7 05  0060 F3   2
_ PROC002                 0805,1   BCTC N  05 22 DED  05 D7 05  0060 F3   2
_ PROC002                 0806,3   SCTC N  06 22 DED  05 D7 05  0060 F3   2
_ PROC002                 2400,1   SCTC N  00 24 DED  04 E0 05  0024 E0
_ XMP1.1     PART1      1 1105,1   SCTC N  00 21 DED  05 F7 05  0105 E1
_ XMP1.1     PART2      2 1107,1   SCTC N  00 21 DED  05 F7 05  0107 F8
```

Scroll once again to the right to see the same detailed information for the CNC/FCV side of the connection.

```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                      CTC Connection List (CNC/FCV/FC)     Row 1 of 14 More: <

Select CTC connections to view CTC Messages, then press Enter.

             -Partition-- ----Devices-----    -CHPID- Entry Dyn      Link CU
/ Proc.CSSID Name     Num Number   Type OS UA ID Mode SW PO SW  CU   Addr ADD

_ PROC001               0100,5   BCTC N  00 10 DED  05 E1 05  1010 F0   0
_
_ PROC002               0660,1   SCTC N  00 13 DED  05 E8 05  0066 E7
_
_ XMP1.1     PART1      1 0301,1   SCTC N  01 10 SHR  05 F4 05  1012 D0
_ XMP1.1     PART2      2 0400,5   SCTC N  00 11 SHR  05 F3 05  1013 D7
_ XMP1.1     PART2      2 0405,1   SCTC N  05 11 SHR  05 F3 05  1013 D7
_ XMP1.1     PART2      2 0406,3   SCTC N  06 11 SHR  05 F3 05  1013 D7
_
_ PROC001               1106,1   SCTC N  00 10 DED  05 E1 05  0106 F7
_ PROC002               1108,1   SCTC N  00 26 DED  05 F8 05  0108 F7   1
_ PROC002               0200,2   SCTC N  00 10 DED            1011 C5
_ XMP1.1     PART1      1 0300,1   SCTC N  00 10 SHR  05 F4 05  1012 D0
_ XMP1.1     PART2      2 0300,2   SCTC N  00 10 SHR  05 F4 05  1012 D0
```

Filtering CTC definitions

To get a better overview of your CTC connections you can filter the list by specifying different filter criteria. Select action bar ***Filter*** and then ***Set filter***. The following panel appears:

```
 ┌────────────────────────── Filter CTC Connections ──────────────────────┐
 │                                                                         │
 │                                                                         │
 │ Specify or revise the following filter criteria and press Enter.       │
 │                                                                         │
 │ Message ID  . . . . _____                                               │
 │ Device type . . . . ____  (SCTC/BCTC/FCTC)                              │
 │ Dynamic switch  . . __  +                                               │
 │                                                                         │
 │ CTC or FC side                    CNC/FCV or FC side                    │
 │ Processor.CSSID . . __________  +  Processor.CSSID . . __________  +    │
 │ Partition . . . . . ________    +  Partition . . . . . ________    +    │
 │ CHPID . . . . . . . __             CHPID . . . . . . . __               │
 │                                                                         │
 │ CU number . . . . . ____         CU number . . . . . ____               │
 │ Starting device no. ____         Starting device no. ____               │
 │ Defined to OS . . . _  (Y/N)     Defined to OS . . . _  (Y/N)           │
 └─────────────────────────────────────────────────────────────────────────┘
```

Printing CTC connection lists

You can also print the list panel using the SAVE command as described in "How to print list panels" on page 245.

Displaying diagnostic messages

Select one or more CTC connections and press the Enter key to display diagnostic messages for the connections.

For each connection, HCD displays one message, even if the connection includes several errors. HCD displays the messages according to the following priority list:

1. CBDG750I — Logical address (CUADD) is specified for CU @1, but CHPID @2 of processor @3 is not defined as shared.
2. CBDG751I — Device type of device @1 connected to processor @2, CHPID @3 does not match with device type of device @4 on the other side.

3. CBDG752I — Channel path type error. CHPID @1 of processor @2 is connected to a CHPID @3 of processor @4 with the same type.
4. CBDG753I — Wrap around connection detected for processor @1 (partition @2) via CHPID @3 and CHPID @4.

A message list may look as follows. The messages are sorted by severity.

```
  Save  Query  Help
------------------------------------------------------------------------
                               Message List                     Row 1 of11
Command ===> __________________________________________ Scroll ===> PAGE

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ E   CBDG750I Logical address (CUADD) is specified for CU 1010,
#              but CHPID 20 of processor PROC001A is not defined as
#              shared.
_ E   CBDG752I Channel path type error. CHPID 20 of processor PROC001A
#              is connected to CHPID 11 of processor PROC002 with the
#              same type.
_ W   CBDG753I Wrap around connection detected for processor PROC002
#              (partition - none -) via CHPID 11 and CHPID 13.
_ I   CBDG756I HCD cannot determine connection. CHPID 24 of processor
#              PROC002 is connected via chained switches.
```

Chapter 7. How to work with switches

Overview

This information unit explains:

- The possibility of switch (ESCON Director or Fibre Channel switch) connections
- The advantages when you define switches with HCD
- How to work with switches (defining, changing, priming, deleting)
- How to work with connections to switches (channel paths, control units, priming switch port names and connections, actions on the Port List)
- How to work with switch configuration data (defining, changing, deleting)
- How to migrate, activate, and save switch configuration data

With the introduction of the ESCON architecture and its supporting hardware, ESCON Directors (switches) became an integral part of the configuration. With the FICON architecture, FC switches are supported.

You can define switches, switch connections and how the switches are physically cabled. A switch configuration, also called port matrix, defines how the various ports of the switch connect to each other. For example, the switch configuration defines whether a port is blocked, has a dedicated connection to another port, or whether dynamic connections to other ports are allowed or prohibited. In other words, the switch configuration defines the inside of a switch.

Possibilities of switch connections

ESCON Directors (ESCDs) enable either dynamic connections or dedicated connections. FC switches allow only the definition of dynamic connections.

HCD supports fabrics containing cascade switching using FICON switches. Such a fabric consists of two or more FICON switches.

Note: Other than for chained ESCON switches where the dynamic switch for a channel path specifies the switch containing the port address that is used as link address, in the FICON case the dynamic switch ID is always the channel path entry switch.

The following four figures illustrate the path types of switch connections for ESCON Directors or FC switches. For FC switches, only the first and the fourth configuration type is supported. Figure 66 on page 170 shows a configuration with a single switch; the entry switch is the dynamic switch. (The dynamic switch in HCD corresponds to the SWITCH keyword of the CHPID macroinstruction from the IOCP point of view.)

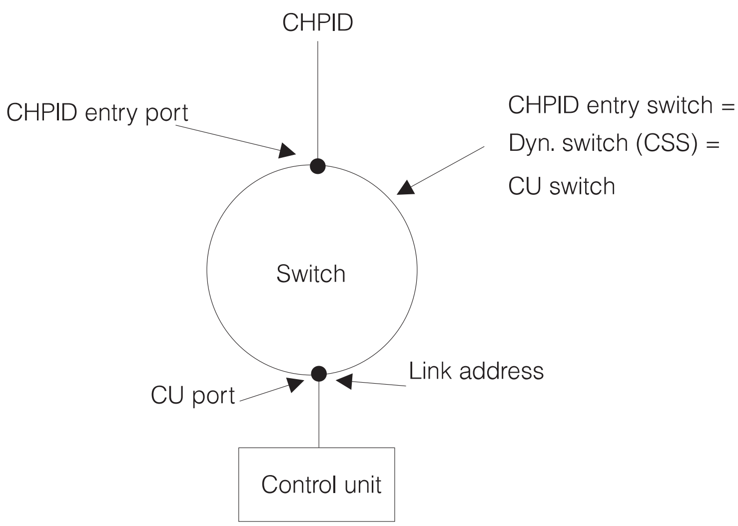


Figure 66. Configuration with one switch

Figure 67 shows a configuration with two switches, where the entry switch is different from the dynamic switch. (The two switches are chained and the entry switch for the channel path has a dedicated connection.)

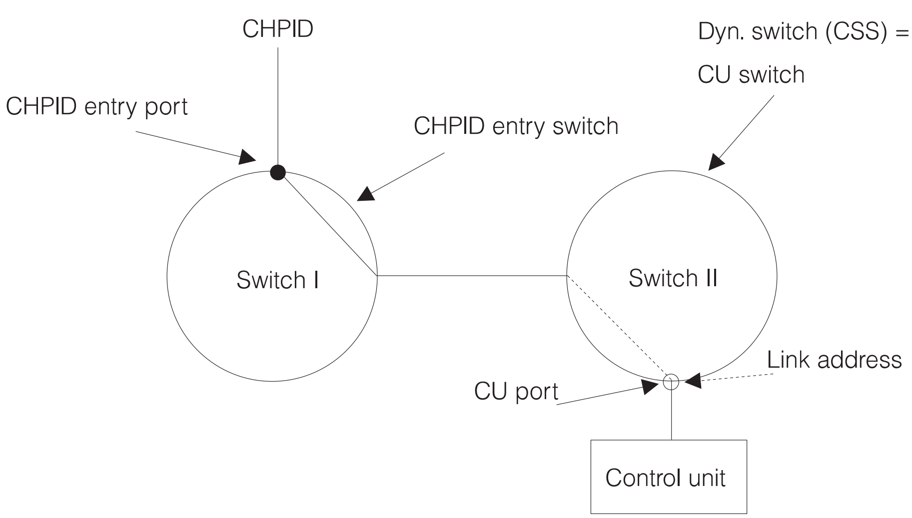


Figure 67. Configuration with two switches (1)

Figure 68 on page 171 shows a configuration with two switches, where the entry switch is the same as the dynamic switch. (The two switches are chained and the CU switch has a dedicated connection.)

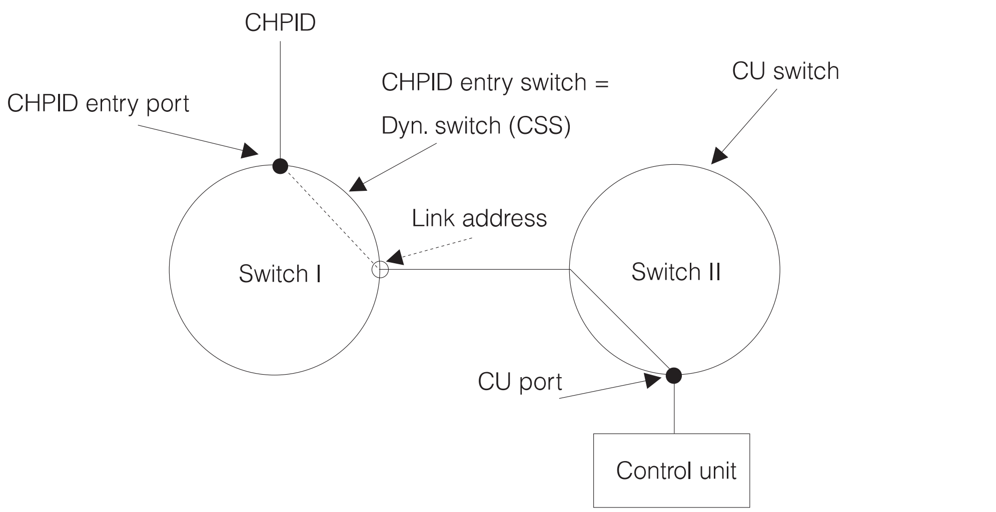


Figure 68. Configuration with two switches (2)

Figure 69 shows a configuration with cascading switches. The fabric in this figure contains two cascading FICON switches. The link address `5904` specifies `59` as switch address and `04` as port address.

Note:
The switch address is unique within a fabric, but may occur also in other cascaded switch fabrics. However, as HCD has no knowledge of which switches are within the same fabric, it is highly recommended to assign unique switch addresses across fabrics, for example, by using the switch IDs as switch addresses.

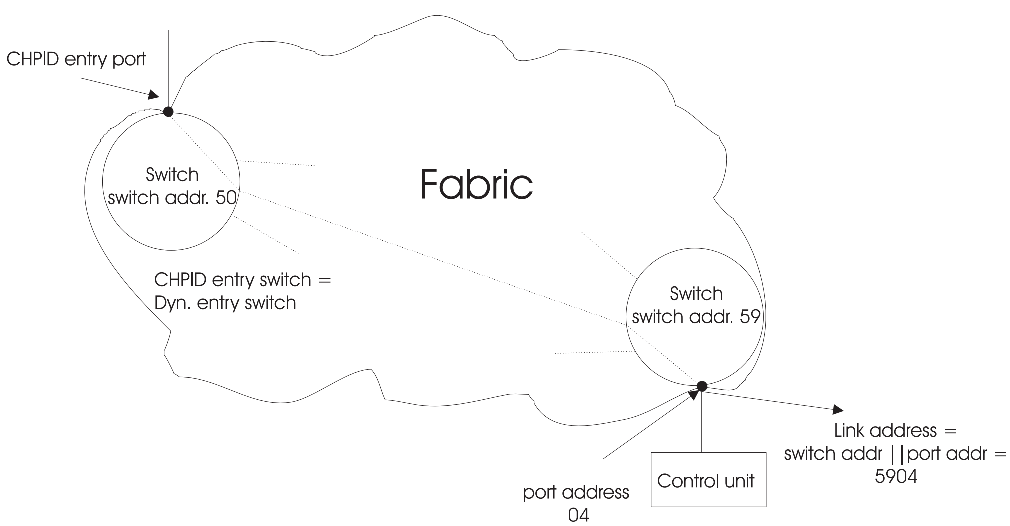


Figure 69. Configuration with two cascading FICON switches

Advantages of switch definitions with HCD

You have the following advantages when you define switches with HCD:

- More rigorous validation of the configuration definition.

  If all switches between the channels and control units are defined, HCD can determine whether a valid path exists between the processor and control unit. For example, HCD can validate that the destination link address specified for a channel path is a valid port on the dynamic switch.
- The possibility to define several switch configurations for each switch.
- The possibility to define and activate switch configurations without leaving HCD (from the same *workplace*).

  If you have defined a switch configuration using HCD, you can activate the switch configuration without leaving HCD and do not need any knowledge about other operating system components that are involved in the activation process.
- The possibility to define a switch as CU, device, and switch as such, to:
  1. Migrate an active switch configuration from a switch, or a saved switch configuration from a switch file, or convert an ISPF table to a HCD switch configuration for later manipulation by HCD.
  2. Send switch configuration data from an IODF to a switch, making it the active port matrix, or save it in a switch file.
- Graphical configuration reports include switch connections.

Note: HCD supports a generic FC switch (type FCS) supporting port addresses 00 to FF. This switch type does not support a switch control unit and switch device and therefore can not be accessed by I/O Operations functions like migrate or activate switch configuration.

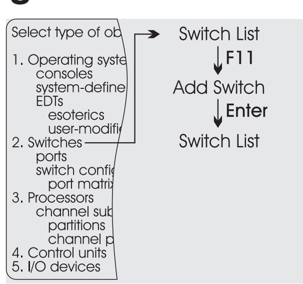
Defining switches

To define switches and their associated ports, you need to
- define switch characteristics,
- define connections to channel paths, control units, and other switches,
- define switch configuration data (port matrix).

Working with switches

In this section, you can learn how to define, change, prime, and delete switches.

Defining switch characteristics



1. On the primary task selection panel, select ***Define, modify, or view configuration data*** and on the resulting panel the object ***Switches***. HCD displays the list of all switches currently defined in the IODF.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                 Switch List         Row 1 of 6 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more switches, then press Enter. To add, use F11.


                                                                CU   Dev
/ ID Type +        Ad Serial-# + Description                    Num. Num.
_ 01 2032          21 10145      Switch 01                      0701 0701 >
_ AA 9032          __ 10146      Switch AA                      001A 001A >
_ AB 9032          __ 10147      Switch AB                      001B 001B >
_ AC 9032          __ 10678      Switch AC                      001C 001C
_ AD 9032          __ 10679      Switch AD                      001D 001D
_ AE 9032-3        __ 20995      Switch AE                      001E 001E
******************************* Bottom of data ********************************


F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Back
F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Inst
F20=Right    F22=Command
```

Figure 70. Switch List (left part)

The Switch List (left part), Figure 70, lists one switch control unit and device. If there is more than one switch control unit and device, the list entry gets an indication ('>'). With the F20=Right key, you can scroll to the right part of the Switch List. Up to five switch control units and devices can be shown. If there are more, an indication is given for the corresponding entry ('Yes' in column 'More?' on the right part of the Switch List). These additional switch control units and devices can be viewed, for example, on the Port List for port FE.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                Switch List                         Row 1 of 6
Command ===> ____________________________________________ Scroll ===> PAGE  <

Select one or more switches, then press Enter. To add, use F11.

                   CU   Dev   CU   Dev   CU   Dev   CU   Dev   CU   Dev   More?
/ ID Type +        #1   #1    #2   #2    #3   #3    #4   #4    #5   #5
-------------------------------------------------------------------------------
_ 01 2032          0701 0701  0702 0702  0703 0703  0704 0704  0705 0705  Yes
_ AA 9032          001A 001A  002A 002A  003A 003A
_ AB 9032          001B 001B  002B 002B  003B 003B
_ AC 9032          001C 001C
_ AD 9032          001D 001D
_ AE 9032-3        001E 001E
******************************* Bottom of data ********************************


  F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
  F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
 F19=Left     F22=Command
```

Figure 71. Switch List (right part)

2. Use the F11=Add key to add a new switch.

```
 ------------------------- Add Switch --------------------------


 Specify or revise the following values.

 Switch ID . . . . . . . . 99  (00-FF)
 Switch type . . . . . . . 9032          +
 Serial number . . . . . . ASW3333333
 Description . . . . . . . First Switch____________________
 Switch address  . . . . . __  (00-FF) for a FICON switch

 Specify the port range to be installed only if a larger range
 than the minimum is desired.

 Installed port range  . . C0  -  FB  +

 Specify either numbers of existing control unit and device, or
 numbers for new control unit(s) and device(s) to be added.

 Switch CU number(s) . . . 0099  ____  ____  ____  ____  +
 Switch device number(s) . 0099  ____  ____  ____  ____

 F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
 F12=Cancel
```

Figure 72. Add Switch

HCD allows you to specify the port range of a switch to be set to installed, if more ports are to be used than the minimum range. Specify the first and last port of the range you want to use. If you do not specify values for the Installed port range field, the hardware status of the minimum range of supported ports is set to installed.

In order to allow consistency checks for the configuration, when adding a new switch, you can optionally define a switch address for a FICON switch.

You can also specify control unit numbers and device numbers for the switch.

On the Add Switch panel you can initially define up to five switch control units and devices for the switch. To define more than five switch control units and devices, or to add additional switch control units and devices later, you must use the control unit and device definition dialogs.

If you specify switch control units that do not yet exist, they are automatically added as new objects to the IODF, and are connected to the switch through the switch control unit port. In this case, you need to specify new switch devices. The switch devices are also automatically added as new objects to the IODF and connected to the switch through the switch control units. However, to complete the configuration path, you must attach the switch control units and switch devices to a processor, and then you can assign the switch devices to an operating system.

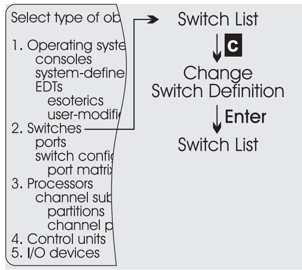
If the switch control units already exist, they are automatically connected to the control unit port on the newly defined switch. In this case, you do not need to specify switch devices. If you do, the switch devices must already exist and be attached to the designated switch control units.

Specified serial numbers or descriptions are also copied to the switch control units and switch device definitions.

3. After you press the Enter key, HCD displays the updated Switch List.
   - Connect the switch control units to the processor (which also connects the switch devices to the processor). To specify additional parameters use the ***Change*** action on the Control Unit List. For details, see “Defining processor attachment data” on page 131.

- Connect the switch devices to the operating system. Use the ***Change*** action on the I/O Device List. For details, see “Changing devices” on page 146.

Changing switch data



To change the following switch characteristics, you can type over the columns on the Switch List, or you can use the ***Change*** action from the context menu (or action code c) on the Switch List:

- Switch type
- Serial number and description

When you change the type, serial number, or description of the switch, the control units, and devices attached to the switch are also updated.

```
 ---------------------- Change Switch Definition ----------------------


  Specify or revise the following values.

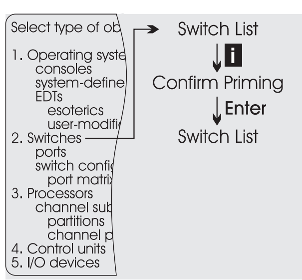
  Switch ID  . . . . . . . . . : 01
  Switch type  . . . . . . . . . 2032          +
  Switch address . . . . . . . . 21            +

  Serial number  . . . . . . . . 10145      +
  Description  . . . . . . . . . Switch 01

   F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
  F12=Cancel
```

Figure 73. Change Switch Definition

Priming switch data



You can prime your I/O configuration in a work IODF with the switch serial number for the active processor. For the prerequisites for this function see “Prerequisites” on page 9

To prime, select the action ***Prime serial number*** from the context menu (or action code i) on the Switch List.

The Confirm Priming Switch List shows the selected switches with the sensed data for the switch types, serial numbers, switch control units, and switch device numbers, and their corresponding definitions in the IODF.

Note: Only one defined switch control unit and one defined switch device is shown even if several have been defined. If the sensed switch control unit and device is one that has been defined, it will be displayed. Otherwise the defined switch control unit and device with the lowest control unit number will be displayed.

An update of the switch serial number also updates the serial number of the corresponding switch control units and switch devices.

The sensed data for the switch serial numbers are shown on the Confirmation panel, and can be accepted, or rejected before being incorporated into the IODF. If a value is blanked out, the defined IODF value is not changed. If you use the F12=Cancel key, none of the sensed values is used.

```
-------------------- Confirm Priming Switch Data List ---------------------
                                                                Row 1 of 2
 Command ===> ___________________________________________ Scroll ===> CSR

 Press Enter to confirm priming, or Cancel to leave the list. A blank value
 will not change the IODF definition.

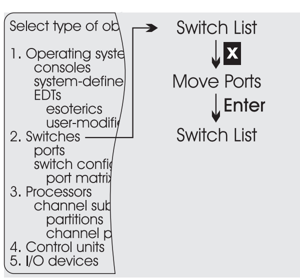
 Sw ---------- Type ----------- --- Serial Number --- CU Number Dev Number
 ID actual        defined       sensed     defined    act  def  act  def
 00 9033-1        9033          10139                 9033 9033 9000 9000
 01 9032-3        9032-3        20290                 9032 9032 9001 9001
 **************************** Bottom of data *****************************



  F1=Help       F2=Split      F3=Exit       F5=Reset      F7=Backward
  F8=Forward    F9=Swap      F12=Cancel
```

Figure 74. Confirm Priming Switch Data List

Moving ports



When selecting ***Move Ports***, HCD offers the possibility of moving control unit, channel path or switch port connections on the same switch or from other switches to the selected target switch.

To perform this action, select the target switch for a port move action on the Switch List (see Figure 70 on page 173). The panel Actions on selected switches appears and the action ***Move Ports*** can be selected. You can also reach this panel directly by typing in the action code **x** next to the appropriate switch in the Switch List menu. This brings up the following panel Move Ports to a Target

Switch.

```
┌──────────────────── Move Ports to a Target Switch ────────────────────┐
|                                                        Row 1 of 256   |
| Command ===> ___________________________________________ Scroll ===> PAGE |
|                                                                       |
| Specify ports to be moved to the specified target.                    |
|                                                                       |
| ------- Source -------  ---- Target ----                              |
|         Port Range              Starting                              |
| Switch + Start + End +  Switch  Port +                                |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
| __       __      __     AA      __                                    |
|                                                                       |
|  F1=Help       F2=Split      F3=Exit       F4=Prompt      F5=Reset    |
|  F7=Backward   F8=Forward    F9=Swap      F12=Cancel     F22=Command  |
└───────────────────────────────────────────────────────────────────────┘
```

Figure 75. Move Ports to a Target Switch

This panel contains data entry fields for the ports to be moved. It is also possible to move a range of ports from a switch to the target switch occupying subsequent port addresses starting with the target port address specified. The target switch field in this panel has been preset and cannot be changed.

Depending on the context, HCD performs the following as part of the ***Move Ports*** action:

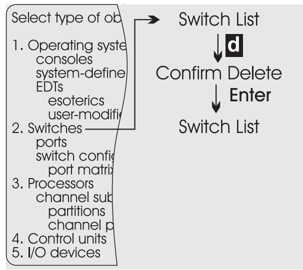
- Copies the attributes of the source port to the target port (and set the target port to installed, if necessary).
- Disconnects all source ports from the connected units.
- Connects all target ports to the units previously connected to the source ports.
- Copies existing port configurations of the source port if the move is on the same switch and port configurations exist. The source port configurations will be set to default, i.e., all dynamic and dedicated connections are reset.
- Changes the dynamic switch of the connected channel path to the target switch if the source switch serves as a dynamic switch and the target switch is different from the source switch.
- Changes the link address to the target port if the source port serves as a link address to a channel path connection for a control unit and is connected to a control unit or another switch.

Note: HCD does not perform any checks on whether the user also moves implied ports as well. For example, if a channel path is moved to another switch, the control units that are connected to the channel path must also be moved. Moving a control unit may imply that connected channel paths must be moved as well. If not all implied ports are moved, the configuration may become invalid and a validation error will be shown either during the ***Move Ports*** action or later during the ***Build Production IODF*** action.

Note: If the target switch has switch configurations defined and the port move occurs between different switches, then the switch configurations must be adapted after the port move action.

The ***Move Ports*** action is especially of value when consolidating switches or installing new switches.

Deleting switches



You can delete the complete definition of a switch or switch configuration by using the ***Delete*** action from the context menu (or action code **d**) on the Switch List or Switch Configuration List. This also deletes the connections from the ports to channel paths, control units, and other switches. The link address and dynamic switch definitions for a channel path are not deleted.

The Confirm Delete Switch panel shows all the switch control units and devices that will be deleted with the switch. If you don't want them to be deleted with the switch, disconnect the control units from port FE of the switch, before you delete the switch.

```
                          Confirm Delete Switch

                                                                  Row 1
Command ===> ___________________________________________ Scroll ===> PAGE

Scroll forward to view the complete list of switches to be deleted, with
switch control units and devices where shown. Press ENTER to confirm
delete request. Press F12 to cancel delete request.

ID Type          Description                       CU Number Device Number
A1 9032                                            0001      0001
                                                   0011      0011
                                                   0111      0111
                                                   1111      1111
***************************** Bottom of data ******************************



 F1=Help       F2=Split      F3=Exit       F7=Backward    F8=Forward
 F9=Swap      F12=Cancel    F22=Command
```

Figure 76. Confirm Delete Switch

Working with connections to switches

In this section, you will learn about how to define connections to switches, for example channel paths, control units, other switches, how to prime switch port data, and what kind of additional actions is offered on the Port List.

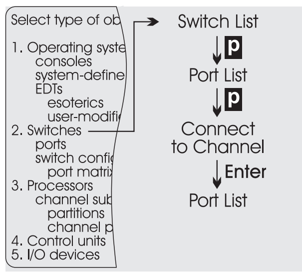
Defining connections to switches

You can connect the following objects to a switch starting from the Switch List:

- Channel paths
- Control Units
- Other switches

You can also define connections from the objects to the switch when defining the object themselves. See Chapter 6, “How to define, modify, or view a configuration,” on page 77 for a description how to define the objects.

Connecting a channel path



The following procedure describes how to define a connection between a channel path and a switch starting from the Switch List.

1. On the Switch List, select the switch and the ***Work with ports*** action from the context menu (or action code **p**). The Port List is displayed.

   Ports which show value `Y` in column `O` indicate that they are occupied by a processor, control unit or switch that is not defined in the accessed IODF.

```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                                Port List                          Row 1 of 61
Command ===> ___________________________________________ Scroll ===> PAGE

Select one or more ports, then press Enter.

Switch ID . . . . . . . : 99   Address :      Switch AB
Switch configuration ID : SWAB

                                  -------------Connection---------------
/ Port H Name +                      Unit ID         Unit Type         O
_ C0   Y ________________________                                      N
_ C1   Y ________________________                                      N
_ C2   Y ________________________                                      N
_ C3   Y ________________________ PR CTC01    CHP 34 9672-R21          N
_ C4   Y ________________________                                      N
_ C5   Y ________________________                                      N
_ C6   Y ________________________ PR MCSSPR01.0 CHP 18 2084-C24
# C6                              PR MCSSPR01.1 CHP 18 2084-C24
_ C7   Y ________________________
_ C8   Y ________________________                                      N
_ C9   Y ________________________                                      N
_ CA   Y ________________________                                      N
 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F12=Cancel   F13=Instruct F22=Command
```

Figure 77. Port List

2. Select a port and the ***Connect to channel path*** action from the context menu (or action code **p**).

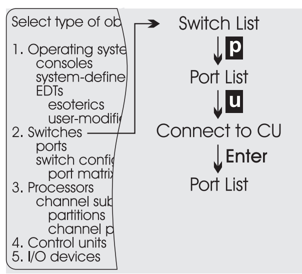
   Occupied ports cannot be connected. However, you may change the Occupied status of a port by overwriting the Occupied indicator.

On the resulting Connect to Channel Path panel specify the target processor ID and channel path ID.

```
┌───────── Connect to Channel Path ─────────┐
│                                           │
│                                           │
│ Specify the following values.             │
│                                           │
│ Switch ID  : 99  Port . . . : C4          │
│                                           │
│ Processor ID . . . . . . ________  +      │
│ Channel Subsystem ID . . _         +      │
│ Channel path ID  . . . . __        +      │
│                                           │
│  F1=Help     F2=Split    F3=Exit          │
│  F4=Prompt   F5=Reset    F9=Swap          │
│ F12=Cancel                                │
└───────────────────────────────────────────┘
```

Note: If you selected a spanned physical channel path as connection target, HCD connects the port to all of the channel's instances across all channel subsystems. You can see the result of your connection action in the Port List (Figure 77 on page 179).

Connecting a control unit



The following procedure describes how to define a connection between a control unit and a switch starting from the Switch List.

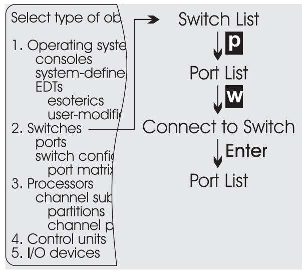
1. On the Switch List, select the switch and the ***Work with ports*** from the context menu (or action code **p**). The Port List is displayed (see Figure 77 on page 179).
2. Select a port and the ***Connect to control unit*** action from the context menu (or action code **u**).

```
┌───────────────────────── Connect to Control Unit ─────────────────────────┐
│                                                                           │
│                                                                           │
│ Specify the following values.                                             │
│                                                                           │
│ Switch ID  . . . . : 99  Port . . . . . . . : C4                          │
│                                                                           │
│ Control unit numbers . . 00E1  ____  ____  ____  ____  ____  ____  ____  +│
│                                                                           │
│                                                                           │
│  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap      │
│ F12=Cancel                                                                │
└───────────────────────────────────────────────────────────────────────────┘
```

You can enter up to eight control unit numbers each time the panel is displayed.

3. Repeat defining connections for all control units connected to the switch.

Connecting another switch



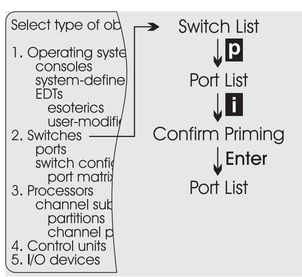
The following procedure describes how to define a connection between a switch and another switch.

1. On the Switch List, select the switch and the ***Work with ports*** action from the context menu (or action code **p**). The Port List is displayed (see Figure 77 on page 179).
2. Select a port and the ***Connect to switch*** action from the context menu (or action code **w**).

```
┌────────── Connect to Switch ──────────┐
│                                        │
│                                        │
│ Specify the following values.          │
│                                        │
│ Switch ID  : 99  Port . . . : C4       │
│                                        │
│ Switch ID  . . . . . 98  +             │
│ Port . . . . . . . . C1  +             │
│                                        │
│  F1=Help     F2=Split    F3=Exit       │
│  F4=Prompt   F5=Reset    F9=Swap       │
│ F12=Cancel                             │
└────────────────────────────────────────┘
```

3. Repeat defining connections for all other switches connected to the selected switch.

Priming switch port data



You can prime your I/O configuration in a work IODF with the switch port names, and connections for the active processor. For the prerequisites for this function refer to “Prerequisites” on page 9.

To prime, select the action ***Prime port name and connections*** from the context menu (or action code **i**) on the Port List.

The Confirm Priming Port Data List lists the selected ports with the sensed data for the port names, and for the connected control units, or switches, or the connections to channel paths of the active processor. Their corresponding definitions in the IODF are shown in the line below the sensed data on the panel.

You get sensed data for connected channel paths only if the processor definition in the IODF contains a serial number that matches the serial number of the active processor.

The sensed port names and connection data can be confirmed before being taken into the IODF. If a value is blanked out, the defined IODF value is not changed. If you use the F12=Cancel, or the F3=Exit key, none of the sensed values is used.

```
┌──────────────────── Confirm Priming Port Data List ─────────────────────┐
                                                            Row 1 of 4
 Command ===> ___________________________________________ Scroll ===> CSR

 Press Enter to confirm priming, or Cancel to leave the list. A blank value
 will not change the IODF definition.

 Switch ID . . : 01
 Port --- Sensed Port Name ---   --------- Sensed Connection --------
      -- Defined Port Name ---   -------- Defined Connection --------
 A1   200A-E                     CU   200A              3990-6        1
      200A-E                     ____________________________________
 A2   400B-CG                    ____________________________________ 2
      400B-CG                    CU   520B              3990-3
 A3   _________________________  CU   360A              9343-DC4      3
      360A-00                    CU   360A              9343-1
 A4   VMA(32)                    ____________________________________ 4
      VMA(32)                    PR   VMABASIC CHPID 32 9672-R61
 ***************************** Bottom of data ******************************
  F1=Help       F2=Split      F3=Exit       F5=Reset      F7=Backward
  F8=Forward    F9=Swap      F12=Cancel
└──────────────────────────────────────────────────────────────────────────┘
```

1 No defined data is available for the port connection on the active system. The sensed and defined port names are the same.

2 The sensed and defined port names are available. The port connection is defined in the IODF, but no sensed data is available on the active system.

3 No sensed port name data is available on the active system. The port connection shows differences of the switch type, but the sensed data is not taken in the IODF.

4 No sensed data is available for the port connection on the active system. The sensed and defined port names are the same.

Additional actions on the port list

Besides connecting channel paths, control units, and other switches to a switch, you can perform additional actions on the Port List. Most of these actions are also possible on the Port Matrix panel, this panel offers an alternative procedure. The following panel shows data after connecting a channel path, a control unit, and another switch as described in the previous sections.

```
  Goto  Options  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                                Port List                       Row 22 of 128
Command ===> ______________________________________________ Scroll ===> CSR

Select one or more ports, then press Enter.

Switch ID . . . . . . . : 71   Address :      Switch 71
Switch configuration ID : SW71

                                 -------------Connection---------------   DED
/ Port H Name +                     Unit ID        Unit Type        O B CON +
_ 92   Y                         SW 03      PO  20 2032             N N _
_ 93   Y                         PR P2084.1  CHP 21 2084-B16        N N _
_ 94   Y                         PR P2084.2  CHP 22 2084-B16        N N _
_ 95   Y SUBC6F-A2                                                  N N _
_ 96   Y SUBC91-A0                                                  N N _
_ 97   Y ________________________                                   N N _
_ 98   Y ________________________                                   N N _
_ 99   Y SUBC6F-C0               CU BA80           3990             N N _
# 99                             CU BD80           3990
_ 9A   Y SUBC91-A2                                                  N N _
_ 9B   Y N40-50                                                     N N _
_ 9C   Y SUBC2D                                                     N N
_ 9D   Y SUBC6F-C2                                                  N N
_ 9E   Y SUBC6F-H0                                                  N N
_ 9F   Y SUBC6F-H2                                                  N N
_ A0   Y JE0-25                  PR CB89     CHP 25 9672-E08        N N
_ A1   Y JE0-26                  PR CB89     CHP 26 9672-E08        N N
```

A disabled marker # in the action entry field indicates that the field is nonselectable and the whole row is disabled for processing. This occurs if more than one object is attached to one port, for example, for spanned channels or when multiple control units are connected to the same port. Except for the first object attached to the port, all other objects are flagged with the # sign. For example, if the port is connected to more than one unit, a disconnect action specified in the selectable row of that port will lead to the display of another panel where you can select the unit(s) to be disconnected.

Changing ports to installed or uninstalled

The H column indicates whether the ports are installed (Y for Yes) or not (N for No). If you did not specify a range of ports to be set to installed while adding a switch, HCD automatically sets the minimum range of ports to installed at switch definition time.

You can set the port to installed or uninstalled by just typing over the Y or N value in the H column.

Changing ports to occupied or not occupied

The O column indicates whether a port is occupied (Y for Yes) or not (N for No) by a system external to the IODF.

You can change the port to Occupied or Not Occupied by just typing over the Y or N value in the O column.

Establishing dedicated connections and blocking ports

If no switch configurations are defined for a switch, the B and Ded Con columns for blocked indicator and port of dedicated connection are not shown. If switch configurations are defined, data of the first switch configuration (in alphabetical order) is displayed. To display this data for other switch configurations, use ***Select other switch configurations*** from the ***Option*** action bar choice.

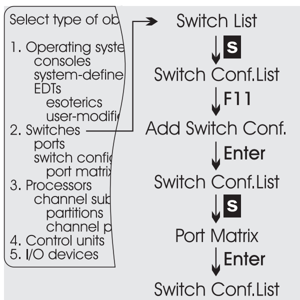
You can change the blocked indicator and dedicated connections for the switch configuration displayed in the panel header by just typing over the values in the appropriate column. See also “Establishing dedicated connections” on page 185 and “Blocking ports” on page 185 for detailed explanations.

Note: You cannot establish dedicated connections for an FC switch.

Working with switch configurations

In this section you can learn about defining switch configuration data, changing the switch configuration IDs, and deleting switch configurations.

Defining switch configuration data



After defining the switch, you can define the switch configuration, that is the ″inside″ of the switch.

1. On the Switch List, select the switch and the ***Work with switch configurations*** action from the context menu (or action code **S**). HCD displays the Switch Configuration List containing all currently defined configurations for that particular switch.

```
  Goto  Backup  Query  Help
----------------------------------------------------------------------------
                         Switch Configuration List                Row 1 of 1

Select one or more switch configurations, then press Enter. To add, use F11.

Switch ID  . . . . : 99         First switch

  Switch       Default
/ Config. ID   Connection + Description
_ NIGHT        Allow        ________________________________
```

2. Use F11=Add to add a new switch configuration. The data-entry fields are shown below, with sample data:

```
 ┌──────────────── Add or Repeat Switch Configuration ────────────────┐
 │                                                                    │
 │                                                                    │
 │ Specify or revise the following values.                            │
 │                                                                    │
 │ Switch ID . . . . . . . : 99                                       │
 │                                                                    │
 │ Switch configuration ID . BASIC___                                 │
 │                                                                    │
 │ Description . . . . . . . ________________________________         │
 │                                                                    │
 │ Default connection  . . . _1  1.  Allow                            │
 │                               2.  Prohibit                         │
```

The `Default connection` field sets the default connection for all ports, either allowed or prohibited. Individual port connections can be reset on the Port Matrix panel described in the next step.

3. On the Switch Configuration List, select the switch configuration and the ***Work with port matrix*** action from the context menu (or action code **s**). HCD displays the Port Matrix panel showing all ports currently installed on the switch.

```
  Goto  Backup  Query  Help
----------------------------------------------------------------------------
                         Port Matrix            Row 1 of 28 More:      >

Command ===> __________________________________________ Scroll ===> PAGE

Select one or more ports, then press Enter.

Switch ID  . . . . . . . . : 99
Switch configuration ID  . : BASIC      Default connection : Allow

                                   Ded   --Dynamic Connection Ports Ex--
/ Port Name +                    B  Con + 0 1 2 3 4 5 6 7 8 9 A B C D E F
_ E0   ________________________ N  __    \ * * * * * * * * * * * * * * *
_ E1   ________________________ N  __    * \ * * * * * * * * * * * * * *
_ E2   ________________________ N  __    * * \ * * * * * * * * * * * * *
_ E3   ________________________ N  __    * * * \ * * * * * * * * * * * *
_ E4   ________________________ N  __    * * * * \ * * * * * * * * * * *
```

Scroll to the right to view further ports.

Establishing dedicated connections

You can establish a dedicated connection between two ports by specifying the number of a port to which a dedicated connection is defined in the `Ded Con` column. After pressing the Enter key HCD completes the definition by mirroring the definition. For example, if you specify a dedicated connected in the row of port E0 to port E4, HCD establishes the same dedicated connection in the row of E4 to port E0.

A dedicated connection acts like a physically cabled connection between two ports. Establishing a dedicated connection is not the same as prohibiting all but one connection to a port. Dedicated connections are required to support communication through an ESCD with an ESCON Converter (ESCC), and to support chained ESCDs.

If you maintain switch configurations with HCD, you must define the required dedicated connections before you connect a CVC or CBY channel path to a switch port.

If you have alternate required dedicated actions in a configuration (for example, for backup purposes), you must define alternate switch configurations.

Blocking ports

You can block or unblock a port by just specifying a `Y` for Yes or `N` for No in the `B` column.

Dynamic connection ports

In our example the default switch connection is set to allowed. To prohibit a switch connection from, for example, EA to FA, scroll down until you see port EA and scroll right until you see port FA. Then type over the `*` symbol with a `p` below the heading `Dynamic Connection Ports`. After pressing the Enter key HCD automatically mirrors the entries on the diagonal of the matrix. That means, HCD applies the same entry not only to the matrix element EA/FA but also to FA/EA.

To ensure a correct mirroring of the entries, press the Enter key each time you changed one complete row.

The following symbols can be shown below the heading `Dynamic Connection Ports`:

A Indicates that the dynamic connection is allowed.

P Indicates that the dynamic connection is prohibited.

***** Indicates that the dynamic connection is set to the default connection attribute (shown in the instruction area on the top of the panel).

**** Indicates the intersection of a port's column and row. (This is only shown for the matrix of an ESCON switch since the dynamic connection of an ESCD port to itself is prohibited and cannot be changed. A FICON switch, however, supports the definition of such a loopback port.)

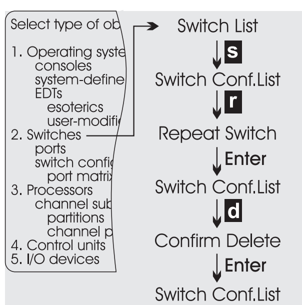
- Indicates that one of the dynamic connection ports is not installed or supported.

To allow you a more comfortable scrolling in the matrix, use the FIND command. For example, type:

```
FIND EA, FA
```

to find the row of port EA and the column of port FA.

Changing the switch configuration ID



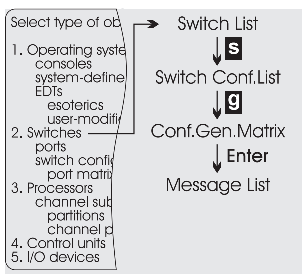
To change the ID of a switch configuration, perform the following steps:

1. On the Switch List, select the switch and select the ***Work with switch configuration*** action from the context menu (or action code **s**). HCD displays the Switch Configuration List.
2. On the Switch Configuration List select the switch configuration and the ***Repeat (copy) switch configurations*** action from the context menu (or action code **r**). The Repeat Switch Configuration panel is displayed.

```
 ┌─────────────── Add or Repeat Switch Configuration ────────────────┐
 │                                                                   │
 │                                                                   │
 │ Specify or revise the following values.                           │
 │                                                                   │
 │ Switch ID . . . . . . . : 99                                      │
 │                                                                   │
 │ Switch configuration ID . ________                                │
 │                                                                   │
 │ Description . . . . . . . ________________________________        │
 │                                                                   │
 │ Default connection  . . . 1   1.  Allow                           │
 │                               2.  Prohibit                        │
 │                                                                   │
 │  F1=Help    F2=Split   F3=Exit    F5=Reset   F9=Swap   F12=Cancel │
 └───────────────────────────────────────────────────────────────────┘
```

3. Specify the new identifier for the switch configuration and press the Enter key. HCD displays the Switch Configuration List now showing the new switch configuration.
4. Delete the old switch configuration by selecting the switch configuration and the ***Delete*** action from the context menu (or action code d). HCD displays a confirmation panel before showing the updated Switch Configuration List.

Generating a switch matrix



When selecting ***Generate Matrix***, HCD will define the content of the switch matrix according to the logical paths defined and the existing matrix will be replaced.

This is useful, if channel path - control unit connections have been added or changed and you want to define a switch configuration which considers all defined logical paths running through the selected switch.

To generate a matrix, perform the following steps:

1. On the Switch List select the switch and select the ***Work with switch configuration*** action from the context menu (or action code s). HCD displays the Switch Configuration List.
2. On the Switch Configuration List select a configuration (or action code g). HCD will issue an informational message requiring you to confirm your action. The successful generation of the matrix is confirmed by HCD.

When generating the switch configuration, all defined logical paths will be analyzed by HCD. In the case of chained connections, all possible paths of chaining switches will be determined by their respective switch configurations. Therefore, it is necessary, that you select a switch configuration for each chained switch, for which more than one switch matrix has been defined. In this case, the following panel

```
                   Select Active Switch Configurations              Row 1 of 2
Command ===> ___________________________________________ Scroll ===> PAGE

For each switch select one to be used as context to generate a switch
matrix.


Switch ID: 01 Configuration ID: SC1

/ Switch  Configuration Description
_ 02      SC1
_ 02      SC2
******************************* Bottom of data *************************
```

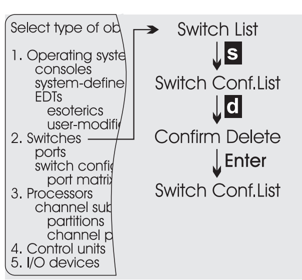
will be displayed allowing selection of the related switch configurations which are considered for the ***Generate matrix*** action.

The following rules are applied when generating a matrix:

- The default connection for the switch configuration will be set to prohibited.
- A logical definition between a channel path using the switch as a dynamic switch and a control unit will lead to a dynamically allowed connection between the channel path entry port and the port serving as the link address.
- A logical definition between a channel path without a dynamic switch and a control unit, or connections via a chaining switch, will lead to a dedicated connection.

  HCD will define a dedicated connection in all the cases where there is only one connection possibility left between the control unit and the channel path entry port. For dedicated connections, HCD considers only those ports, which have not yet been used for dynamic connections. In the case of chained connections, the selected switch configurations of chaining switches are used to determine the possible paths.
- Connections between ports connected to a channel path type, which make a specific port configuration necessary, will be set accordingly. For example, connections between ports serving as entry ports for FCV channels will be defined as explicitly dynamically prohibited.
- In addition to generating the matrix, HCD issues informational messages for all cases in which a path was not completely defined or where different paths conflict with each other. If HCD is not able to determine port connections unambiguously, it will leave those definitions to the user.

Deleting switch configurations



To delete a switch configuration, perform the following steps:

1. On the Switch List, select the switch and select the ***Work with switch configuration*** action from the context menu (or action code **s**). HCD displays the Switch Configuration List.

2. On the Switch Configuration List select the switch configuration and the ***Delete*** action from the context menu (or action code **d**). The Confirm Delete Switch Configuration panel is displayed.

```
---------------- Confirm Delete Switch Configuration ----------------
                                                          Row 1 of 1
 Command ===> _________________________________ Scroll ===> PAGE

 Scroll forward to view the complete list of switch
 configurations to be deleted. Press ENTER to confirm delete
 request. Press F12 to cancel delete request.

 Switch ID . . . . . . . : 03

 Switch Config. ID  Description
 SWCON1
 *********************** Bottom of data ************************
```

3. Press the Enter key to confirm deletion of the switch configuration, or use the F12=Cancel key to cancel the delete request.
4. The updated Switch Configuration List is displayed.

Migrating existing switch configurations

HCD allows to migrate a switch configuration from three sources into the IODF:

- An ISPF table containing a switch configuration as stored by I/O Operations
- An active switch
- A saved switch file

Prerequisites

To migrate from an ISPF table, the I/O Operations ISPF table data set name escm.SINGITBL has to be concatenated in the table library chain in your HCD start-up procedure, where “escm” is the high-level qualifier for your I/O Operations installation, or any other ISPF table data set containing ISPF tables saved by I/O Operations.

For additional information, see “Prerequisites” on page 9.

Migration steps

1. On the primary task selection panel select ***Migrate configuration data***.
2. On the resulting panel select ***Migrate switch configuration data***.

```
--------------- Migrate Switch Configuration Data ---------------


  Migrate switch configuration definitions to:

  Switch ID . . . . . . . . . . . . 98      +
  Switch configuration ID . . . . . A98BC___ +


  From one of the following:

  __  1.  ISPF table
      2.  Active Director
      3.  Saved Director file
```

Specify the switch ID and the switch configuration ID of the empty switch configuration in the IODF to which you want to migrate the data.

If you have not previously defined the switch and the switch configuration, a panel appears that lets you define them (see "Defining switches" on page 172).

Select the source from which you want to migrate the switch configuration.

3. A panel appears on which you can define the source:
   - From ISPF tables:
     – Specify the name of the ISPF table that contains the configuration.
   - From an active director:
     – Specify the device number of the switch.
   - From a saved director file:
     – Specify the name of the switch file.
     – Specify the device number of the switch from which the switch file is to be taken.

   The following panel is displayed when you are migrating from a saved switch file.

```
┌─────── Migrate from Saved Director File ────────┐
│                                                 │
│                                                 │
│  Specify the following values.                  │
│                                                 │
│  Director file name . . . . ________            │
│  Director device number . . ____                │
│                                                 │
└─────────────────────────────────────────────────┘
```

Note: The source of the switch configuration as specified in the switch device number field does not have to be the switch as specified in the Switch ID field on the Migrate Switch Configuration Data panel. It is possible to take a switch configuration from any switch and save it with HCD for another switch. However, the description of each port connection is saved with the switch configuration, and has to be updated to reflect the real channel path and control unit connections of the target switch.

Changing port names

In HCD, port names are saved with the ports, because the port names reflect the connections of a port. When migrating switch configurations with different port names to HCD, the IODF reflects the port names defined in the switch configuration that were migrated last.

Changing hardware status of a port

If the migration source contains ports set to installed and the existing IODF contains the same ports set to uninstalled, the hardware status after the migration depends on the kind of source:

Migration Source	Hardware Status of Ports after Migration
Active switch	Changed to installed
Saved director file	Uninstalled, migrated values ignored
ISPF table	Uninstalled, migrated values ignored

Activating switch configuration data

You can activate a switch configuration, which has been defined or changed with HCD, for a switch. Thus, change and maintenance in a configuration controlled by I/O Operations is simplified by the possibility to use the same user interface.

Prerequisites

- The IODF has to be a production IODF.
- A switch control unit must be defined for each switch.
- A switch device must be defined for each switch control unit.
- The switch control unit must have at least one channel path connected using the switch.
- For activation and saving, an ESCON Manager lock of another user must not exist.

For additional information, see "Prerequisites" on page 9.

Activation steps

1. On the primary task selection panel, select ***Activate or process configuration data*** and from the resulting panel, select ***Activate switch configuration***. The Activate Switch Configuration panel is displayed.

```
┌─────────────── Activate Switch Configuration ──────────────────────────┐
│                                                                         │
│ Specify the following values, and select how to handle an existing ESCON│
│ Manager lock.                                                           │
│                                                                         │
│ IODF name  . . . . . . . . : 'BPAN.IODF01'                              │
│                                                                         │
│ Switch ID  . . . . . . . . . ____+                                      │
│ Switch configuration ID  . . BASIC     +                                │
│                                                                         │
│ ESCON Manager lock . . 1  1.  Break another user's ESCON Manager lock   │
│                           2.  Preserve another user's ESCON Manager lock│
│                                                                         │
└─────────────────────────────────────────────────────────────────────────┘
```

2. You may choose between two different kinds of switch activation:

Single switch activation

For single switch activation, use the Activate Switch Configuration panel to:

- Specify the switch ID and the switch configuration ID that is to be written to the switch.
- Select how to handle an existing ESCON Manager lock if it is in use by another user.

  I/O Operations uses a locking mechanism to serialize connectivity changes across multiple users and systems. This lock allows only one user (or program) to control I/O Operations command processing at a time. If more than one user at your installation is given the ability to enter I/O Operations commands, they must synchronize their usage of I/O Operations to avoid delays or contention for I/O Operations resources.

Multiple switch activation

For multiple switch activation, use the Activate Switch Configuration panel to:

- Specify only the switch configuration ID and no Switch ID. A panel is displayed showing all switches that have a configuration under the specified name.

```
 ┌─────────────────────── Switch Activation List ──────────────────────┐
 │                                                           Row 1 of 2 │
 │ Command ===> ________________________________________ Scroll ===> PAGE │
 │                                                                      │
 │ Select one or more switches for activation.                          │
 │                                                                      │
 │ Switch configuration ID  . . : BASIC                                 │
 │                                                                      │
 │                                                 CU    Dev            │
 │ / ID Type         Description                   Num.  Num.  More?    │
 │ _ 98 9033         First switch                  0098  0098           │
 │ _ 99 9033         Second switch                 0099  0099           │
 │ **************************** Bottom of data **************************** │
 │                                                                      │
 └──────────────────────────────────────────────────────────────────────┘
```

Switches that are not connected to any switch device are marked with a disabled marker # in the action column, and cannot be selected for activation. The panel shows 'YES' in the 'More?' column if there are more than one control unit and one device. If there is only one control unit and one device, the 'More?' column is left blank. HCD uses the switch devices that are connected to the active system.

- Select the switches that will be activated simultaneously.

  When you have finished your selection, press the Enter key. A confirm panel is displayed. On this panel you have to confirm if you want the active switch configuration of all switches shown in the list to be updated.

  Note: In case a switch activation fails, no switch will be activated, the rule is "none or all".

  For activating switch configuration data, refer to *IBM Tivoli System Automation for z/OS Planning and Installation*.

Saving switch configuration data

Use the Save switch configuration data function to save an existing switch configuration definition in a switch file. For information on prerequisites to save a switch configuration, see "Activating switch configuration data" on page 191.

1. On the primary task selection panel, select ***Activate or process configuration data***, and from the resulting panel, select ***Save switch configuration***. The Save Switch Configuration Data panel is displayed.

```
Save Switch Configuration Data

Specify the following values.

Save switch configuration:
Switch ID  . . . . . . . . . . 65  +
Switch configuration ID  . . . FICON65   +

In Director file:
File name  . . . . . . . . . . CONF65
File description . . . . . . . as of 11/2000

Select how to handle any existing:

ESCON Manager lock . . 2   1.  Break another user's ESCON Manager lock
                           2.  Preserve another user's ESCON Manager lock

Director file  . . . . 2   1.  Overwrite
                           2.  Do not overwrite
```

2. Use the Save Switch Configuration Data panel to:
   - Specify the switch ID and the switch configuration ID for the configuration data that is to be saved in the switch file
   - Specify the name of the switch file used to store the switch configuration data
   - Select how to handle an existing ESCON Manager lock
   - Indicate whether to overwrite an existing switch file with the file name you specified.

Chapter 8. How to activate or process configuration data

Overview

This information unit describes how to:
- Build a production IODF
- Build an IOCDS
- Build S/390 microprocessor IOCDSs
- Manage S/390 microprocessor IPL attributes
- Build an IOCP input data set
- Create JES3 Initialization Stream Checker data
- Build an OS configuration data set
- Verify an I/O configuration
- Activate a configuration dynamically
- Activate a configuration sysplex wide
- Build a CONFIGxx member
- Process the Display M=CONFIG(xx) command
- Switch IOCDS for next POR
- Specify an IODF for IPL

Before the channel subsystem and the operating system can use the configuration that you have defined with HCD, you must build a production IODF from the work IODF.

With the production IODF, you can perform the following tasks in preparation for IPL or dynamic activation.
- Build an input/output configuration data set (IOCDS) from the production IODF for processors not configured in an S/390 microprocessor cluster. The configuration can then be used by the channel subsystem.
- Build IOCDSs of central processor complexes (CPCs) configured in an S/390 microprocessor cluster.
- Manage IPL attributes of central processor complexes (CPCs) configured in an S/390 microprocessor cluster.
- Build an input data set for the input/output configuration program (IOCP) from the production IODF.
- Create data for input to the JES3 Initialization Stream Checker. This checker program ensures that the data used by MVS is consistent with the data used by JES3. (This task can also be done with a work IODF.)
- Build an OS configuration data set from the production IODF. For VM this is an HCPRIO input data set.
- Verify the configuration described in an IODF against a system.
- Activate the configuration dynamically using the activate function (locally or sysplex wide).
- Build a CONFIGxx member for a system from the I/O definitions in an IODF.
- Compare the information in the CONFIGxx member of a system of the sysplex with the existing configuration on that system.
- Switch the IOCDS for the next POR

Finally, you can use HCD to:

- Specify which IODF is to be used for IPL.

Build a production IODF

Although HCD validates configuration data as it is entered, a complete validation may not be performed, because data may not be defined at this time. Therefore, a ″post-validation″ is performed at ″Build Production IODF″ time. This validation might issue messages you have to deal with, according to their severity. The production IODF is not created if any errors with a severity higher than ’warning’ are produced.

During the validation HCD invokes the IOCP program to perform checking of the channel packaging rules. Therefore, note that the correct version of the IOCP program must be accessible.

Depending on what is defined in the configuration, the work IODF must contain a definition for at least one operating system, *or* one processor, *or* one switch.

- For an MVS operating system, the IODF must contain at least one EDT and one device.

  For a VM operating system, the IODF must contain at least one device as console.
- For a processor, the IODF must contain a definition for at least one channel path, one control unit, and one device. If only receiving CF channel paths are defined for a processor, the control unit and device definitions can be omitted.

Note

A production IODF must have a single extent. If the production IODF has multiple extents, the IPL process results in a WAIT state (wait state code ’0B1’, reason code ’002’). HCD issues error message CBDA009I if a production IODF cannot be built in a single extent.

You can use production IODFs with multiple extents for dynamic activation only. In this case, HCD warns you with message CBDA009I that an IPL with this IODF is not possible, but dynamic activation continues.

To build a production IODF, perform the following steps:

1. On the HCD entry panel, select ***Activate or process configuration data***.

```
 Activate or Process Configuration Data

Select one of the following tasks.

__  1.  Build production I/O definition file
    2.  Build IOCDS
    3.  Build IOCP input data set
    4.  Create JES3 initialization stream data
    5.  View active configuration
    6.  Activate or verify configuration
        dynamically
    7.  Activate configuration sysplex-wide
    8.  Activate switch configuration
    9.  Save switch configuration
    10. Build I/O configuration statements
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file

 F1=Help     F2=Split    F3=Exit     F9=Swap
F12=Cancel
```

Figure 78. Activate or Process Configuration Data

2. From the resulting panel, select ***Build production I/O definition file***. HCD validates the configuration data in the work IODF. If the work IODF is valid, then a production IODF can successfully be built.

   For work IODFs containing XMP processor definitions, before you can build a production IODF, the correct PCHIDs must be defined in the work IODF. You can use the CHPID Mapping Tool to achieve the task to either insert missing PCHIDs or to update PCHIDs in a work IODF. However, inserting or updating PCHIDs into an IODF using the CHPID Mapping Tool is only possible with a so-called ***validated work IODF*** that you can get in one of two ways:

   a. Use the task ***Build validated work I/O definition file***. This task validates a work IODF for correctness and completion, and may issue messages that describe incomplete or erroneous logical definitions. Missing PCHID values are not flagged as errors. If errors occur, correct them an restart this task. As soon as no more errors occur, the output from this task is a validated work IODF.

   b. If you tried to build a production IODF without being aware of one or more missing PCHIDs for XMP processors, but the work IODF satisfies all other validation rules, then the output from ***Build production I/O definition file***, too, is a validated work IODF. A message will show all CHPIDs for which the required PCHIDs are missing.

   With a validated work IODF, you can use the CHPID Mapping Tool to accomplish the task to update or insert required PCHIDs. Input to this tool is an IOCP input data set. To get this input, now use the task ***Build IOCP input data set*** from the panel shown in Figure 78. This leads you to the ***Build IOCP Input Data Set*** panel shown in Figure 86 on page 208. Because the input to the CHPID Mapping Tool must be a stand-alone IOCP, in this panel, specify the appropriate option as shown:

   ```
   Input to Stand-alone IOCP?  Yes  (Yes or No)
   ```

   How to proceed using the CHPID Mapping Tool to get PCHIDs inserted or updated in the validated work IODF, see “How to interact with the CHPID Mapping Tool” on page 213. As soon as all PCHIDs are correct in the validated work IODF, the production IODF can be built.

3. If you initially requested activity logging, a panel like the one shown in “Activity logging and change logging” on page 54 is displayed. Enter the

activity logging details your installation requires. The Build Production I/O Definition File panel is displayed.

```
┌─────────────── Build Production I/O Definition File ───────────────┐
│                                                                    │
│                                                                    │
│ Specify the following values, and choose how to continue.          │
│                                                                    │
│ Work IODF name . . . : 'DOCU.IODF01.WORK'                          │
│                                                                    │
│ Production IODF name . 'DOCU.IODF01'                               │
│ Volume serial number . DATA01  +                                   │
│                                                                    │
│ Continue using as current IODF:                                    │
│ 2   1.  The work IODF in use at present                            │
│     2.  The new production IODF specified above                    │
│                                                                    │
│                                                                    │
│                                                                    │
│  F1=Help    F2=Split   F3=Exit    F4=Prompt  F9=Swap   F12=Cancel  │
└────────────────────────────────────────────────────────────────────┘
```

Figure 79. Build Production I/O Definition File

The selection of option `Continue using as current IODF` controls which IODF is in access after the production IODF has been built. In addition, if you select option 1, `The work IODF in use as present`, the content of the currently built production IODF is copied to the work IODF. This ensures that the work IODF contains the latest configuration tokens of the IODF, and you can continue to use the work IODF for further updates. If you select option 2, `The new production IODF specified above`, the content of the production IODF is not mapped into the work IODF. In that case, you should start from the newly built production IODF when performing further changes to the I/O configuration.

4. Specify the name and volume serial number (if applicable) for the production IODF. "IODF naming convention" on page 35 describes the syntax of a production IODF name. If you choose a name without complying to the prescribed syntax of a production IODF name, that IODF can not be used for the IPL and dynamic activate. Moreover, to perform a dynamic activate, the high-level qualifier of the production IODF has to be the same as the one of the IODF used for the previous IPL or dynamic activate.

   If the data set name for the production IODF does not adhere to the naming convention for a production IODF, the Confirm Production IODF Name panel is displayed, and you must confirm the IODF name.

```
┌──────────────── Confirm Production IODF Name ────────────────┐
│                                                              │
│                                                              │
│ The data set name you specified does not follow the naming   │
│ convention for production IODFs.  You will not be able to IPL│
│ or ACTIVATE a system configuration from an IODF with this data│
│ set name.                                                    │
│                                                              │
│ Confirm the specified IODF name . . 1_  1.  Yes              │
│                                         2.  No               │
│                                                              │
│  F1=Help      F2=Split     F3=Exit      F9=Swap     F12=Cancel│
└──────────────────────────────────────────────────────────────┘
```

Figure 80. Confirm Production IODF Name

If you use the same name for the new IODF as for an existing IODF, you can replace the existing IODF. In that case, the Confirm Delete I/O Definition panel is shown. Select `yes`, to confirm deletion of the IODF. Be careful, not to delete the active IODF. If you have specified the name of the active IODF, another confirmation panel is shown that warns you once more about the effect of the chosen name.

```
┌────────────── Confirm Delete I/O Definition File ──────────────┐
│                                                                │
│                                                                │
│ To confirm delete request, select Yes. To cancel delete request,│
│ select No.                                                     │
│                                                                │
│ Delete request confirmed . . . __  1.  Yes                     │
│                                    2.  No                      │
│                                                                │
│ Creation date  . . : 1997-06-10                                │
│ Last update  . . . : 1997-09-10  14:19                         │
│ Volume . . . . . . : SMS012                                    │
│                                                                │
│ Description  . . . : IODF for raised floor 710                 │
│                      For systems D0, D2, D4 and D6             │
│                      incl. sensed data and mig. SW data        │
│                                                                │
│                                                                │
│  F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel         │
└────────────────────────────────────────────────────────────────┘
```

Figure 81. Confirm Delete I/O Definition File

5. After pressing Enter, the Define Descriptor Fields panel appears.

```
┌───────────────── Define Descriptor Fields ─────────────────┐
│                                                            │
│                                                            │
│ Specify or revise the following values.                    │
│                                                            │
│ Production IODF name  . : 'DOCU.IODF01'                    │
│                                                            │
│ Descriptor field 1  . . . DOCU                             │
│ Descriptor field 2  . . . IODF01                           │
│                                                            │
│  F1=Help   F2=Split   F3=Exit   F5=Reset   F9=Swap   F12=Cancel│
└────────────────────────────────────────────────────────────┘
```

Figure 82. Define Descriptor Fields

Specify the `descriptor field 1`, `2`, or leave the default values. The descriptor fields describe the IODF and will be part of the HSA token. **Attention:** If you specify asterisks (**), equals (==), pluses (++), or minuses (−−) for the IODF suffix in LOADxx, never change the default descriptor field values, because z/OS uses these values to find the current IODF during IPL. Take this relationship also into consideration, if you copy the IODF to a different data set name. For further details refer to *z/OS HCD Planning*. After the production IODF is built, HCD displays a message.

6. If the work IODF has an activity log file defined for the work IODF, it is copied. After the production IODF has been built, HCD informs you that the production IODF has been created.

You can also create a production IODF using the HCD batch facility (for details see "Build a Production IODF" on page 314).

Note:
If the work IODF has an associated MCF, the MCF data set is copied and associated to the production IODF.

Build an IOCDS

When a production IODF has been created, you can build an IOCDS (it can be built only from a production IODF). Processors may have varying numbers of IOCDSs. A particular IOCDS is used at POR time to make the configuration data known to the CSS.

The following procedure is only recommended for processors that do *not* have an SNA address defined, including processors configured in an S/390 microprocessor cluster. For processors in an S/390 microprocessor cluster *with* an SNA address defined, use the procedure described under "Build S/390 microprocessor IOCDSs" on page 203.

While building IOCDSs HCD internally calls the IOCP program. Therefore, note that HCD must be installed in an APF-authorized library.

1. On the primary task selection panel, specify the name of a production IODF and select ***Activate or process configuration data***.
2. From the resulting panel select ***Build IOCDS***. HCD displays the Processor List panel.
3. On the Processor List panel, select the processor and press the Enter key. HCD displays the IOCDS List panel.
   The IOCDS list shows those IOCDSs that are built using the currently accessed production IODF.

```
                          IOCDS List
  Goto  Backup  Query  Help
 ---------------------------------------------------------------
                                                     Row 1 of 4

 Select one or more IOCDSs, then press Enter.

 Processor ID . . : P101

                            --Last IOCDS Update--
 / IOCDS  Name     Format  Date         Time
 _ A0
 _ A1     IODF05   BASIC   2003-01-28   14:27:38
 _ A2     IODF03   BASIC   2003-02-21   16:41:19
 _ A3
```

Figure 83. IOCDS List

4. Whenever the IOCDS list is invoked, HCD tries to get actual IOCDS data (e.g. date and time of last update) for processors with SNA addresses directly from the support element (SE) and displays it.
   IODF data is shown only if the SE does not provide information or where an SNA address is not defined.
   A production IODF is updated with data retrieved from the SE if discrepancies between that data and the stored IODF data are detected.
5. On the IOCDS List panel, select the IOCDSs that you want to update and select ***Update IOCDS*** from the context menu (or action code **u**). HCD displays the Build IOCDS panel.

```
 ---------------------------- Build IOCDS ----------------------------

 Specify or revise the following values.

 IODF name . . . . . . . . . : 'SYS1.IODF02'
 Processor ID  . . . . . . . : PROC2        IOCDS  : A0

 Title1  . _______________________________________________________
 Title2  : SYS1.IODF02 - 1999-12-12 14:52

 Dualwrite  . . . . . . . . . . . . . . No         Remote Write   No
 Switch IOCDS for next POR  . . . . . . No
 Write IOCDS in preparation of upgrade  No

 Job statement information
 //WIOCDS  JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
 //*
 //*
  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    F12=Cancel
```

On this panel, you can:

- Into the `Title1` field enter identification information you want to be written on the first header line of the IOCP input data set. The first eight characters are used as IOCDS name. This input is used as the MSG1 parameter value of the IOCP ID statement. The batch job passes the MSG1 parameter to the IOCP input data set via the HCDCNTL DD statement (see Figure 128 on page 318 and Figure 129 on page 319).
- Specify the `Dualwrite` option that describes whether the IOCDS is to be updated on both sides of a physically partitioned processor.
- Specify whether you want to perform a remote or local write of an IOCDS for a processor that has a SNA address defined. The `Remote Write` option is initialized with ’Yes’ if a SNA address is defined to the selected processor. In such a case, HCD initiates a remote IOCDS build and write to the support element with the designated SNA address. If the option is changed to ’No’, a local IOCDS build is performed.
- Specify the `Switch IOCDS for next POR` option, that means whether you want to make this IOCDS the active one for the next power-on reset (POR).
- Specify whether to `Write IOCDS in preparation of upgrade`. This specifies whether an IOCDS is to be written regardless of processor type. This is useful to prepare for a processor upgrade.

  If `Yes` is specified, an IOCDS for the selected processor is written regardless of the processor type. For a list of processors that support writing an IOCDS, in preparation for a processor upgrade, or for which such an IOCDS can be written, see “Supported Hardware Report” on page 400.

  Note: If, as a result of a processor upgrade, an IOCDS download is not possible you can, after having built the production IODF, create an IOCP input data set that can be used with the stand-alone IOCP to generate an IOCDS for use with POR.
- Change the job statement information to meet the installation needs. Note that a batch job to build an IOCDS must run on the processor on which the

IOCDS is to be updated. (See "Job statement information used in panels" on page 75 for a description of the job control information that you need to specify when you build an IOCDS.)

In a multiprocessor JES environment, be sure to specify the JES command and/or job class to ensure that the job runs on the correct processor(s).

The recommended region size is 2 MBytes more than the IOCP needs. For the region size required by IOCP, refer to the *IOCP User's Guide* for your processor.

6. When an IOCDS is built, a record is written for the processor configuration. If you build a new IODF from an existing IODF, the records are copied to the new IODF. When you build IOCDSs from this new IODF, the IOCDSs from the old IODF are also shown on the IOCDS list. Because the batch job requires exclusive use of the production IODF for processors that have *no* SNA address specified, you have to either leave the HCD session or change the currently accessed IODF to run the submitted job.

You can also invoke the ***Build IOCDS*** task in batch mode, see "Build an IOCDS or an IOCP input data set" on page 316.

Notes:

1. Unlike writing an IOCDS using the IOCP program, the HCD process generates no IOCP report when using the ***Build IOCDS*** function.
2. When a processor has been upgraded in the IODF, the old IOCDS status data in the IODF is deleted.

Using this procedure for processors with an SNA address:

If you use this procedure for processors in an S/390 microprocessor cluster *with* an SNA address defined, HCD does the following:

- HCD writes the IOCDS for that processor to the support element with the designated SNA address (remote IOCDS build).
- If you run the job under MVS/ESA SP Version 5, OS/390, or z/OS, HCD writes the IOCDS for that processor to the support element with the designated SNA address.

To run the batch job, you do not have to leave the HCD session. If the processor has defined an SNA address, HCD assumes that it is part of an S/390 microprocessor cluster. In this case, the job can immediately start without the need to free the currently accessed IODF.

HCD tries to update the IOCDS record but is not able to because the IODF is still allocated by the HCD dialog. This results in an error message on the console log. To avoid this error message, HCD offers the profile option of bypassing the IODF information update (see "Bypass IODF information update" on page 29).

Build S/390 microprocessor IOCDSs

The following procedure describes how to build an IOCDS for processors in an S/390 microprocessor cluster *with* an SNA address defined.

To build IOCDSs within an S/390 microprocessor cluster:

- The SNA address has to be defined for a CPC configured in an S/390 microprocessor cluster

- Specific RACF authority has to be attained (for details on required access authority, refer to "Security-related considerations" on page 339).
- The operating system must not be running as a guest under VM.

Perform the following steps:

1. On the primary task selection panel, select ***Activate or process configuration data*** and from the resulting panel select ***Build and manage S/390 microprocessor IOCDSs and IPL attributes***. The S/390 Microprocessor Cluster List panel is displayed:
   This panel shows all CPCs configured in an S/390 microprocessor cluster. They

```
  Goto    Query    Help
------------------------------------------------------------------------
          S/390 Microprocessor Cluster List              Row 1 of 9

Select one or more CPCs, then press Enter.

  --------------CPC---------------  IODF
/  SNA Address         Type    Model  Processor ID
_ NET00001.CPC01       9672    E08    CPC01
_ NET00001.CPC02       9672    E08    CPC02
_ NET00001.CPC03       9672    E08    CPC03
_ NET00001.CPC04       9672    E08    CPC04
_ NET00001.CPC05       9672    E08    CPC05
_ NET00001.CPC06       9672    E08    CPC06   ..
_ NET00001.CPC07       9672    E08    CPC07
# NET00001.CPC08       9672    E08
# NET00001.CPC09       ____    ___    _____
```

Figure 84. S/390 Microprocessor Cluster List

   are identified by the SNA address of their support element and displayed together with their Type and Model as well as the Processor ID in the IODF. The SNA address has been specified in the processor definition task for the IODF processor definitions and enables the relation to the configured CPCs.

   A disabled sign (#) in the action entry field can be due to:

   - SNA address not defined in the IODF. In this case, the IODF Processor ID shows no value. Either define the SNA address for a corresponding processor in the accessed IODF or use another IODF.
   - SE (support element) of CPC did not respond. In this case, the CPC Type and Model fields show no values.

   A processor ID followed by two dots (..) indicates that this SNA address has been defined for several processors in the IODF. The first processor ID (in alphabetical order) with the SNA address is displayed. If you want to apply any of the group actions on another processor, use ***Select other processor configuration*** from the context menu (or action code **p**).

2. On the S/390 Microprocessor Cluster List panel, select the CPCs for which you want to build and manage the IOCDSs and ***Work with IOCDSs*** from the context menu (or action code **s**). HCD displays the IOCDS List panel (shown with sample data):

```
Goto  Query  Help
 ------------------------------------------------------------------------------
                                  IOCDS List         Row 1 of 8 More:  >

 Select one or a group of IOCDSs, then press Enter.
                                        -----Token Match-----  Write
 / IOCDS     Name     Type    Status    IOCDS/HSA IOCDS/Proc.  Protect
 _ A0.CPC01  AQIOCDS1 LPAR    POR       Yes       Yes          Yes-POR
 _ A0.CPC02  AQIOCDS1 ESA390  POR       No        Yes          Yes-POR
 _ A0.CPC03  AQIOCDS1 ESA390  POR       No        Yes          Yes-POR
 _ A1.CPC01  AQIOCDS2 LPAR    Alternate No        No           No
 _ A1.CPC02  AQIOCDS2 ESA390  Alternate Yes       No           Yes
 _ A1.CPC03  AQIOCDS2 ESA390  Alternate No        No           No
 _ A2.CPC01                   Invalid
 _ A2.CPC02                   Invalid
```

Figure 85. IOCDS List

On the IOCDS List panel all applicable IOCDSs of the selected CPCs are displayed and arranged in ascending order by IOCDS names (starting, for example, with *A0*-IOCDSs, *A1*-IOCDSs). This list enables you to apply the IOCDS functions as group actions against one or several IOCDSs for all selected processors.

The data displayed is retrieved directly from the support elements. If, however, the support element does not answer, HCD displays the data saved in the IODF and issues a message accordingly.

A production IODF will be updated with data retrieved from the support element if discrepancies between that data and the stored IODF data are detected. A work IODF will remain unchanged.

The `Type` field contains one of the following types of power-on reset modes to be used with the I/O configuration defined in the IOCDS: S/370, ESA/390, or LPAR.

The `Status` field indicates the status of the IOCDS:

Alternate not to be used at the next POR
POR to be used at the next POR
Invalid IOCDS is opened for update

The `Token Match-IOCDS/HSA` field indicates whether the IOCDS token matches the current HSA token. If `Yes` is shown, it means that the IOCDS has been built by HCD, and that it matches the current I/O configuration - either because this IOCDS was used for the last POR, or the matching configuration has been activated dynamically.

The `Token Match-IOCDS/Proc.` field indicates whether the IOCDS token matches the processor token in the IODF, currently used in the HCD dialog. If `Yes` is shown, the IOCDS has been built from the IODF currently used in the HCD dialog.

3. On the IOCDS List panel, you can select the following actions from the context menu:
   - Use the ***Update IOCDS*** action (or action code **u**) to build or update the selected IOCDSs with the I/O configuration data from the currently accessed production IODF. See step 4 on page 206 on how to proceed.
   - Use the ***Switch IOCDS*** action (or action code **s**) to mark an IOCDS as the IOCDS that is used for the next POR. The `Status` field will be set accordingly.

     You can only switch to an IOCDS that has an IOCDS/HSA token match or to an IOCDS of a processor that is not activated ('POR-required' status).

- Use the ***Enable write protection*** or ***Disable write protection*** action (or action codes `e` and `w`) to allow or prohibit updating the selected IOCDSs of the designated CPCs. The Write Protect field will be set accordingly.

Use the F20=Right key to move the work area to the right to see information such as date and time of the last IOCDS update and the IOCDS configuration token.

4. If you select the ***Update IOCDS*** action, HCD displays the Build IOCDSs panel.

```
                         Build IOCDS                      Row 1 of 3

Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS1.IODF02'

Title1 . ________________________________________________________________
Title2 : SYS1.IODF02 - 1999-12-12 14:52

                              Write IOCDS in
IOCDS        Switch IOCDS  preparation of upgrade
A0.CPC01     No            No
A0.CPC02     No            No
A0.CPC03     Yes           No
```

On this panel you can:

- Enter identification information you want to be written on the first header line of the IOCP input data set in the `Title1` field.
- Specify the `Switch IOCDS` option, if you want to make this IOCDS the active one for the next power-on reset (POR).
- Specify whether to `Write IOCDS in preparation of upgrade`. This specifies whether an IOCDS is to be written regardless of processor type. This is useful to prepare for a processor upgrade.

  If `Yes` is specified, an IOCDS for the selected processor is written regardless of the processor type. For a list of processors that support writing an IOCDS, in preparation for a processor upgrade, or for which such an IOCDS can be written, see "Supported Hardware Report" on page 400.

  Note: If, as a result of a processor upgrade, an IOCDS download is not possible you can, after having built the production IODF, create an IOCP input data set that can be used with the stand-alone IOCP to generate an IOCDS for use with POR.

5. After pressing the Enter key on the Build IOCDSs panel, the Job Statement Information panel is displayed. Specify the information for the batch job that HCD generates to build the IOCDSs.

   The recommended region size is 2 MBytes more than the IOCP needs. For the region size required by IOCP, refer to the *IOCP User's Guide* for your processor.

Manage S/390 microprocessor IPL attributes

For IPL operations for CPCs configured in an S/390 microprocessor cluster, you can:

- Display the IPLADDR and IPLPARM attribute values of the last and for the next IPL.
- Modify IPLADDR and IPLPARM attribute values to be used for next IPL.

Perform the following steps:

1. On the primary task selection panel, select ***Activate or process configuration data*** and from the resulting panel select ***Build and manage S/390 microprocessor IOCDSs and IPL attributes***. The S/390 Microprocessor Cluster List panel is displayed (see Figure 84 on page 204).
2. On the S/390 Microprocessor Cluster List panel select the CPCs for which you want to view and modify IPL attributes.
3. Select the ***Work with IPL attributes*** action from the context menu (or action code **i**). HCD displays the IPL Attribute List panel.

```
 ------------------- IPL Attribute List ----------------------------
                                                   Row 1 of 5 More: >

 Update the values to be used for the next IPL and press ENTER. To view
 the values used for the last IPL, scroll to the right.

                                     ----------Next IPLPARM ------------
 Processor Partition  Next IPLADDR  IODF    LOADxx  Prompt/Msg  Nucleus
 ID        Name       IPL Device    Device  Suffix  Option      Suffix

 CPC01     MVS1       0D00          0D00    12      M           0
 CPC01     MVS2       0D00          0D00    37      M           0
 CPC01     MVS3       0D00          0D00    56      M           0
 CPC01     CF01       0D00          ____    __      _           _
 CPC04     ________   0A00          0A00    54      _           1
  ************************* BOTTOM OF DATA ****************************
```

   The IPL Attribute List panel displays the IPLADDR and IPLPARM attribute values for all selected processor definitions and their partitions (if defined in LPAR mode) that are obtained from the support element of the associated CPCs.

4. On the IPL Attribute List panel view or modify by typing over the attribute values for IPLADDR and IPLPARM.

   Use the F20=Right key to move the work area to the right to view the IPL attributes used for the last IPL.

   The `Next IPLADDR` column shows the LOAD address and specifies the number of the IPL device used for next IPL.

   The `Next IPLPARM` column shows the LOAD parameter used for MVS and is a concatenation of the following attributes: IODF Device, LOADxx Suffix, Prompt/Message Option, and Nucleus Suffix. The `Next IPLADDR` and/or the `Next IPLPARM` value for the next IPL are taken, when 'Use dynamically changed IPL address' and/or 'Use dynamically changed IPL parameter' are selected on a LOAD profile that is used to initiate an IPL, or to activate an operating system. This enables you to change the values of IPLADDR and IPLPARM without updating the profile.

Build an IOCP input data set

Sometimes it is necessary to build an IOCP input data set:

- If you have to use the stand-alone IOCP program, which does not support direct access to the production IODF.
- If you want to create a backup on tape in case you need to recover the contents of the IOCDS in the service processor.
- If you need an IOCP input data set as input to the CHPID Mapping Tool in order map CHPIDs to PCHIDs for XMP processors.
- If you need an IOCP input data set for a processor on which there is no HCD running (e.g. a new processor). Also, if you upgrade a processor to a model that results in a new IOCP SYSTEM value and the processor does not support an IOCDS write in preparation for a processor upgrade, you have to run the stand-alone IOCP program.

How to build an IOCP data set

1. On the primary task selection panel, specify the name of a production IODF and select ***Activate or process configuration data***.
2. On the resulting panel select ***Build IOCP input data set***. HCD displays the Available Processors panel.
3. On the Available Processors panel, select the processor for which you want to build the IOCP input data set. HCD displays the Build IOCP Input Data Set panel.

```
 ----------------------- Build IOCP Input Data Set -----------------------

 Specify or revise the following values.

 IODF name . . . . . . . . . : 'BOKA.IODF08'
 Processor ID  . . . . . . . : CF01
 Title1 : ________________________________________________________________
 Title2 : BOKA.IODF08 - 1999-07-02 15:42

 IOCP input data set
 ________________________________________________________
 Input to Stand-alone IOCP?  Yes  (Yes or No)

 Job statement information
 //WIOCP   JOB (5765),'BOKA',NOTIFY=BOKA,CLASS=A,MSGCLASS=X,REGION=5M
 //JOBLIB     DD   DSN=HCDTEST.IZPIOCP.FALC,DISP=SHR
 //GO.HCDPROF DD   DSN=HCDTEST.PROFILE(MIGENH51),DISP=SHR
 //*
```

Figure 86. Build IOCP Input Data Set

4. On this panel you can:
   - Enter the identification information you want to be written on the first header line of the IOCP input data set in the `Title1` field.
   - Specify the name of the IOCP input data set. The IOCP input data set will automatically be allocated (record length 80, record format fixed block). If the data set already exists, you will be asked to confirm replacing it with the new one.
   - Specify whether to build the IOCP data set for stand-alone IOCP.

     Yes
     This is the default. The generated IOCP statements can be used as input to the stand-alone IOCP program or to the CHPID Mapping Tool.

Note: You may not be able to use such a generated IOCP input data set for the migration function of HCD because, for example, the unit name of control units and device types can be truncated due to IOCP restrictions.

No

The IOCP input data set is built using the IOCP changes described in "IOCP enhancements" and generating the extended migration parameters and statement (if the profile statement MIGRATE_EXTENDED is set to YES) as described in "IOCP input data sets using extended migration" on page 210. Note that if you try to process these IOCP statements with the stand-alone IOCP program, you may run into problems, because the program may not accept the generated syntax.

- Change the job statement information to meet the installation needs. With JCL overwrite statements you can modify the EXEC procedure that is invoked. You can, for example, specify the HCD profile using the job step name GO. (See "Job statement information used in panels" on page 75 for a description of the job control information that you need to specify when you build an IOCP input data set.) Ensure that the batch job runs in a region with at least 4 MBytes.

TOK=value

Configuration programs use this keyword to forward information to the CPC which is required to enable the dynamic I/O configuration capability of any resulting IOCDS. This keyword is not intended for direct user input. The contents needs not relate to the target processor. It just must match the token in the IOCDS/HSA and the currently active IODF.

You can also invoke this task in batch mode. See "Build an IOCDS or an IOCP input data set" on page 316.

Note:

You should never change an IOCP input file generated by HCD and use it to write an IOCDS. If changes are necessary, use HCD to regenerate the IOCP input.

IOCP enhancements

The generated IOCP data set contains control unit and device types of 8 characters and a device model of up to 4 characters. Such an IOCP input data set can be processed by IOCP (with APAR OW13343) and remigrated to HCD without the need to correct the control unit and device types that exceed the 5 character UNIT and 2 character MODEL value limitation.

It also now contains an all-character readable token which allows the user to preserve the dynamic capability when performing a stand-alone IOCP run on a S/390 microprocessor cluster CPC using IOCP input from diskette.

Important Note:

It may not be possible to remigrate an IOCP input data set generated by HCD back into the IODF. The reasons are:

- HCD uses the High Level Assembler program for parsing the IOCP statements. The High Level Assembler earlier than V1.5 is restricted to 255 characters for any keyword value. IOCP statements, however, may contain keywords with a value greater than 255 characters. High Level Assembler V1.5 removes this restriction.
- HCD keeps additional data for a processor configuration that is not contained in an IOCP input data set. This data may be used for validation and, therefore, missing at the migrate step leading to validation errors. For example, the partition usage is defaulted to CF/OS. For a shared CF peer channel, this may lead to a validation error, because only a CF partition may be specified in the access or candidate list.
- Since the IOCP data are only a subset of the processor configuration data, you may lose this additional configuration data if you update a processor configuration from an IOCP input data set.

For updating the IODF via I/O configuration statements, it is recommended to use the extended I/O configuration statements of HCD instead of an IOCP input data set (see "IOCP input data sets using extended migration").

IOCP input data sets using extended migration

As described in "Updating parts of a configuration by migrating input data sets" on page 292, HCD introduces an extended migration to allow you to define your complete configuration without using the ISPF front end dialog.

The extended migration allows you to, for example, define a switch with its ports or define serial numbers and descriptions for devices and control units by editing your input data sets and migrating them into HCD.

Analogously, when building an IOCP input data set from an IODF, information is generated that describes the additional parameters of the configuration objects (if the prerequisites under "Prerequisites to exploit the extended migration" on page 211 are met). Within the generated IOCP input data set, the additional parameters and control statements are shown as comments with special HCD tags so that they can be processed by the IOCP program. When re-migrating such an IOCP input data set to HCD, the tagged comments are identified by HCD and migrated correspondingly.

If you want to use the input data set for both, IOCP processing and HCD migration, the new records must apply to the following rules, so that they can be processed by both programs:

- The new parameters start with the string `*$HCDC$` in column 1.
- The new SWITCH statement starts with the string `*$HCD$` in column 1.
- The IOCP statement does not have any comment.
- The additional HCD tagged records follow immediately the last record of the corresponding IOCP statement.
- The first keyword starts at column 16.

- The last operand is not followed by a comma.
- There is no comment to the right of the operand.

Prerequisites to exploit the extended migration

To generate the additional keywords during IOCP data set build, note the following prerequisites:

- Specify the following entry in the HCD profile:

  ```
  MIGRATE_EXTENDED = YES
  ```

  When you specify `MIGRATE_EXTENDED = NO` (which is default), the additional keywords are not generated during IOCP build. In addition, when remigrating the IOCP input data sets, the migration function ignores the commented '*$HCDC$' and '*HCD' tags.

  The HCD profile is explained in "Defining an HCD profile" on page 25.
- When building IOCP input data sets, you have to set the option `Input to Stand-alone IOCP` to `No` on the Build IOCP Input Data Set panel. See "Build an IOCP input data set" on page 208 for a description of the new option.

Example of an IOCP input data set

Figure 87 on page 212 shows you an example of a generated IOCP input data set with the new parameters. Note that each new parameter starts with an `*$HCDC$` in column 1. The new switch control statement starts with `*$HCD$` in column 1.

```
         ID    MSG1='IOCDSNAM',MSG2='BOKA.IODF03 - 95-07-21 16:00',     *
               TOK=('TWO',00000001900096721600570400952O2F00000000,0000*
               0000,'95-07-21','16:00:57','BOKA','IODF03')
*$HCDC$        DESC='Cluster(099) test floor'
*$HCDC$        SERIAL='1044009672'
*$HCDC$        SNAADDR=(USIBMSC,TWO)
         RESOURCE PARTITION=((CF001,3),(MVSSMAL,2),(PRIME,1))
*$HCDC$        DESCL=('Coupling facility','MVS 5.2.0 System1','Producti*
               on CF image')
         CHPID PATH=(10),PARTITION=((CF001),(CF001)),TYPE=CFR
*$HCDC$        DESC='Receiver'
         CHPID PATH=(13),PARTITION=((PRIME),(PRIME)),TYPE=CFS
*$HCDC$        TPATH=(TWO,10,FFFE,FFFE)
*$HCDC$        DESC='Sender'
         CHPID PATH=(20),PARTITION=((MVSSMAL),(MVSSMAL)),SWITCH=AB,    *
               TYPE=CNC
*$HCDC$        SWPORT=((AA,C0))
*$HCDC$        DESC='Channel for DASD'
         CHPID PATH=(21),PARTITION=((MVSSMAL),(MVSSMAL)),TYPE=CNC
*$HCDC$        DESC='Channel for DASD'
         CHPID PATH=(25),PARTITION=((PRIME),(PRIME)),TYPE=CNC
*$HCDC$        SWPORT=((AB,80))
*$HCDC$        DESC='Switch connection'
         CHPID PATH=(26),PARTITION=((MVSSMAL),(MVSSMAL)),TYPE=CNC
*$HCDC$        SWPORT=((AA,C5))
*$HCDC$        DESC='Switch connection'
         CNTLUNIT CUNUMBR=0005,PATH=(25),UNITADD=((00,001)),UNIT=9032-3
*$HCDC$        SWPORT=((AB,FE))
*$HCDC$        SERIAL='1021-CU511'
*$HCDC$        DESC='SWITCH AB'
         CNTLUNIT CUNUMBR=0006,PATH=(26),UNITADD=((00,001)),UNIT=9033
*$HCDC$        SWPORT=((AA,FE))
*$HCDC$        SERIAL='1021-CU510'
*$HCDC$        DESC='SWITCH AA'
         CNTLUNIT CUNUMBR=000F,PATH=(20,21),UNITADD=((08,008)),        *
               LINK=(A1,A2),CUADD=3,UNIT=3995-151
*$HCDC$        SWPORT=((AA,C3),(AB,82))
*$HCDC$        SERIAL='5512003330'
*$HCDC$        DESC='DASD on Q4-B3'
         CNTLUNIT CUNUMBR=FFFE,PATH=(13),UNIT=CFS
         IODEVICE ADDRESS=(080,004),MODEL=151,UNITADD=08,              *
               CUNUMBR=(000F),STADET=Y,UNIT=3995
         IODEVICE ADDRESS=110,MODEL=3,UNITADD=00,CUNUMBR=(0005),       *
               STADET=Y,UNIT=9032
*$HCDC$        SERIAL='1021-CU511'
*$HCDC$        DESC='SWITCH AB'
         IODEVICE ADDRESS=120,UNITADD=00,CUNUMBR=(0006),STADET=Y,      *
               UNIT=9033
*$HCDC$        SERIAL='1021-CU510'
*$HCDC$        DESC='SWITCH AA'
         IODEVICE ADDRESS=(FFFE,002),CUNUMBR=(FFFE),UNIT=CFS
*$HCD$   SWITCH   SWID=AA,SERIAL='1021-CU510',DESC='SWITCH AA',        *
               PORT=((C0,CE),(FE,FE)),SWPORT=((CA,AB,C6)),UNIT=9033
*$HCD$   SWITCH   SWID=AB,SERIAL='1021-CU511',DESC='SWITCH AB',        *
               PORT=((80,F0),(FE,FE)),SWPORT=((C6,AA,CA)),MODEL=3,     *
               UNIT=9032
```

Figure 87. Example of an input data set for migration enhancements

Using the IOCP data set as input for the CHPID Mapping Tool

HCD will allow generating an IOCP deck that does not contain any or all necessary PCHID values. You can use this IOCP deck as input to the CHPID Mapping Tool in order to have PCHIDs inserted or updated. The CHPID Mapping

Tool then generates a new IOCP input deck containing the assigned PCHID values. You can then migrate the updated PCHIDs into a validated work IODF (see also "How to interact with the CHPID Mapping Tool").

How to interact with the CHPID Mapping Tool

Correct PCHIDs are required in the configuration for XMP processors before you can successfully build a production IODF. The task of adding or updating required PCHID information for a work IODF for XMP processors is eased by an interaction between HCD and the CHPID Mapping Tool (CMT). Prerequisite for this task is a so-called ***validated work IODF*** that you can get in one of two ways described in "Build a production IODF" on page 196.

You can download the CHPID Mapping Tool from the Internet. It runs on a workstation.

Process overview

Input to the CMT is the hardware configuration file (CFReport [1]) of your machine and a valid IOCP input file (with missing or obsolete PCHIDs).

Output from the CMT is again an IOCP input file that now has all missing or updated PCHID values filled in. Upload this IOCP input file and re-import it into the validated work IODF using the HCD primary task ***Migrate configuration data***.

Via this migration task, it is possible to update a validated work IODF with the PCHID values that have been written by the CMT into the IOCP input file. Other changes on the validated work IODF are not possible without loosing the status of a validated work IODF. A PCHID migration is only possible to a validated work IODF. Since PCHID migration changes the IODF, the IODF status is reset to 'not validated'. All functions that allow read-access to a work IODF are also possible for a validated work IODF. Activate functions are not possible, except for building an IOCP deck that can be used as input to the CMT. Only after all PCHIDs have been inserted into the validated work IODF, you can successfully build a production IODF.

How to insert or update PCHIDs

Here are the detailed steps you need to perform to insert or update PCHIDs in a validated work IODF.

1. Create a validated work IODF with one of the two methods described in "Build a production IODF" on page 196. Your validated work IODF may lack at least one PCHID that you need to insert or may contain obsolete PCHIDs that you want to update.
2. Go back to the ***Activate or Process Configuration Data*** panel shown in Figure 78 on page 197 and use task ***Build IOCP input data set*** to export the I/O configuration from the validated work IODF to an IOCP data set (with PCHIDs still missing or obsolete). The hardware configuration token is passed with the IOCP statements (TOK keyword). This token is used to assure that during the process of assigning PCHID values the contents of the IODF is not changed.

   Download this IOCP data set to the workstation where the CMT is running.

1. When a machine is ordered, the output of the order process is a binary file that represents the physical description of the final machine. One of the components of that file is the type and physical location, including the Physical Channel Identifier (PCHID) value assigned to that location, of all the I/O features in the final machine. This file is called a CFReport.

3. Use the CHPID Mapping Tool with the downloaded IOCP data set. For information on how to use the CHPID Mapping Tool, refer to the online help and the related documentation.

   The output of a successful CMT run is again an IOCP data set which contains the original I/O definitions together with inserted and/or updated PCHID values. The original hardware configuration token is still contained in the generated statements.
4. Upload the new IOCP data set to the host and use the HCD primary task ***Migrate configuration data*** to import the PCHIDs from the updated IOCP data set into the validated work IODF. During this task, you select

   migrate option ---> 3. PCHIDs

   from Figure 118 on page 270 in "Migrating input data sets using the HCD dialog" on page 269.

   When importing these statements into the validated work IODF via the migration process for PCHID migration, HCD verifies that the token passed with the IOCP statements match the token stored in the IODF. If this is the case, and if the logical I/O definition described by the imported IOCP statements does not differ from the IODF data, HCD writes the PCHID values into the IODF. If the token does not match, for example, because the IODF has been updated in the meantime, a PCHID migration will not be performed. In this case you must start the process from the beginning.

   Note: The IOCP input data set may contain keyword values which exceed the 255 character limitation of the assembler program used by HCD for parsing the IOCP statements. This may be the case for the PARTITION (PART) keywords on the RESOURCE statement and on the CHPID statements for spanned channel paths. The affected I/O configuration statements must be deleted in order to perform a successful PCHID migration. However, note that the High Level Assembler V1.5 removes the 255 character limitation.
5. If a PCHID migration has been successfully done, you can invoke the ***Build Production IODF*** task (again). HCD now builds a production IODF that contains all the data that is required to write the I/O configuration data set (IOCDS) via the IOCP program to the Support Element (SE) of the machine, ready to be used for the next IML.

Note: If for any reasons for an XMP processor you want to define a channel that is not physically installed on the machine yet, you can use the method of over-defining a channel path as described in "Over-defining channel paths on an XMP processor" on page 118. Thus you can avoid to let the CHPID Mapping Tool run into an error, because it cannot find the PCHID.

To support the algorithm of mapping the logical CHPID definitions to physical channels, a CMT user can specify priorities to the control units (CU priorities). It is possible to preserve these values across different invocations of the CMT. For this purpose, the CMT passes the CU priorities as special comments to HCD. HCD takes these comment lines and stores them in the IODF attached to the corresponding processor. When generating an IOCP input file for the CMT, HCD includes these comments into the generated statements. HCD does not make these comments visible in the HCD dialog or in the reports.

Create JES3 initialization stream checker data

Because JES3 does not access the IODF directly, it has to be checked whether JES3 I/O and MVS I/O definitions are the same. It is essential that these definitions are consistent. Each time you run this task, the JES3 initialization stream checker data is stored in a data set, thus allowing JES3 to check the above mentioned definitions and to detect inconsistencies among them.

You can start the task from a work IODF as well as from a production IODF. However, it is recommended to use a production IODF to ensure that the same information is used for IPL.

1. On the primary task selection panel, select ***Activate or process configuration data***.
2. On the resulting panel select ***Create JES3 initialization stream data***. HCD displays the Create JES3 INISH Stream Checker Data panel.

```
┌────────── Create JES3 INISH Stream Checker Data ───────────────┐
│                                                                 │
│                                                                 │
│ Specify or revise the following values.                         │
│                                                                 │
│ JES3 initialization stream checker data set name                │
│ ________________________________________________________        │
│                                                                 │
│ MVS configuration ID . . . . . OPSYS01   +                      │
│ EDT identifier . . . . . . . . A1  +                            │
└─────────────────────────────────────────────────────────────────┘
```

3. Specify the required values.

   The output data set will automatically be allocated (record length 80, record format fixed block). Depending on whether you specify the data set name as sequential or partitioned, the data set will be either sequential or partitioned. It is recommended to specify a partitioned data set (PDS), because this is required by the JES3 initialization stream checker.

   If the data set already exists, you will be asked to confirm replacing it with the new one.

You can also invoke this task in batch mode. See “Build I/O configuration statements” on page 320 for a description of the job control information that you need to specify when you build JES3 initialization stream checker data.

Build I/O configuration statements

You can use HCD to create an I/O configuration data set containing either:

- an OS configuration
- a processor configuration, or
- a switch configuration.

1. On the primary task selection panel, select ***Activate or process configuration data***.
2. From the resulting panel select ***Build I/O configuration statements***. HCD displays the Build I/O Configuration Statements panel.

```
 ─────────────── Build I/O Configuration Statements ───────────────

 Specify or revise the following values.

 IODF name  . . . . . : 'DOCU.IODFA0.WORK'

 Configuration type . . 2   1.  Processor
                            2.  Operating System
                            3.  Switch

 Configuration ID . . . ________  +
 Output data set  . . . ____________________________________________


  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
 F12=Cancel
```

3. Specify one of the available configuration types.
4. Specify the identifier of the configuration to be used and a name for an output data set to contain the configuration statements according to the specified configuration type. The data set will be automatically allocated (record length 80, record format fixed block).

   Specifying an asterisk ('*') as configuration ID will generate all configurations of the specific type to the output I/O configuration data set.

   If the data set already exists, you will be asked to confirm replacing it with the new one.

You can also invoke this task in batch mode. See "Build I/O configuration statements" on page 320 for a description of the job control information that you need to specify.

Verify a configuration

HCD allows you to check the definitions in your IODF against the actual configuration as sensed from the active system. See "Prerequisites" on page 9 for the prerequisites for the verify function.

The verify function results in a list of all sensed paths in comparison to the defined paths. Using a filter, this usually extensive list can be reduced to the data of interest. The list can be saved and/or printed. The verification can also be carried out as a batch job resulting in an I/O Path Report (see the example 398 in section "Print configuration reports" on page 324).

Verifying a configuration against the local system

1. To verify the I/O configuration of the local system select ***Activate or process configuration data*** from the primary task level. From the resulting panel select ***Activate or verify configuration dynamically.*** The Activate or Verify Configuration panel is displayed.

   Note: For the verify function on the Activate or Verify Configuration panel to be available, the processor configuration from which the active IOCDS was built must match the configuration in the IODF used for IPL (token match).
2. Select the ***Verify active configuration against system*** task to compare the system against the active IODF. Select the ***Verify target configuration against system*** task to compare the system against the accessed IODF. The Identify

System I/O Configuration panel is displayed.

```
┌─────────────── Identify System I/O Configuration ───────────────┐
│                                                                  │
│                                                                  │
│ Specify or revise the following values. Press ENTER to          │
│ continue.                                                        │
│                                                                  │
│ IODF to be used . . . . : IODFST.IODF4F                          │
│    Processor ID . . . . . FR38LPAR  +                            │
│    Partition name . . . . F38H      +                            │
│    OS configuration ID  . B710      +                            │
│                                                                  │
│ I/O Cluster name  . . . . ________  + (only for Build CONFIGxx) │
│                                                                  │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘
```

Figure 88. Identify System I/O Configuration

3. Specify the processor ID and OS configuration ID. If the specified processor is in LPAR mode, you must also specify a partition name.

Verifying a configuration against a system in the sysplex

1. Select ***Activate or process configuration data*** from the primary task level. From the resulting panel select ***Activate configuration sysplex-wide.*** The Active Sysplex Member List is displayed, listing all active systems of the Sysplex as stored in the sysplex couple data set of the system.
2. After selecting the system to be verified a context menu with two verification actions is displayed. Select the ***Verify active configuration against system*** task (action code **k**) to compare the system against the active IODF. Select the ***Verify target configuration against system*** task (action code **l**) to compare the system against the accessed IODF.

   The Identify System I/O Configuration panel is displayed (see Figure 88).
3. Specify the processor ID and OS configuration ID. If the specified processor is in LPAR mode, you must also enter a partition name.

The I/O path list

The I/O Path List is the output of the verify function available on the Active Sysplex Member List and the Activate or Verify Configuration Dynamically panel (see "Verifying a configuration against the local system" on page 216 and "Verifying a configuration against a system in the sysplex"). The list compares the configuration in the accessed or the active IODF with the actual configuration as sensed from the system.

The report extends over two pages and can be scrolled horizontally.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------
                              I/O Path List        Row 1 of 473 More: >
Command ===> _______________________________________________ Scroll ===> PAGE

Accessed IODF: IODFST.IODF11
Active IODF  : IODFST.IODF11                          System . : CB88
Processor  . : CB88       Partition :                 OS config: B710

-----I/O Path----- ----------Sensed Data--------- ----IODF Data-------- D
CHP   CU   DEV     STAT CHT   CUTYPE   DEVTYPE  O CHT CUTYPE   DEVTYPE
10    FFFE FFFE,2       CFS   9674-C04 CFS        CFS CFS      CFS      C
11    FFFD FFFC,2       CFS   9674-C04 CFS        CFS CFS      CFS      C
12    FFFE FFF6,2       CFS   9674-C04 CFS        CFS CFS      CFS      C
13    FFFD FFF2,2       CFS   9674-C04 CFS        CFS CFS      CFS      C
20    0040 0040,32      CVC_P ****     ****                             *
21    EFD2 EFD2,4       CNC_S 9672-E02 9672-CTC   CNC SCTC     SCTC
21    EFD2 EFD6         CNC_S 9672-E02 9672-CTB   CNC SCTC     BCTC
21    EFE2 EFE2,4       CNC_S 9672-E02 9672-CTC   CNC SCTC     SCTC
21    EFE2 EFE6         CNC_S 9672-E02 9672-CTB   CNC SCTC     BCTC
21    FF74 FF74         CNC_S 9032-2   9032-2     CNC 9032     9032
22    0A00 0A00,64      CNC_S ****     ****     Y CNC 3990     3380     *
22    0A80 0A80,2       CNC_S 3990-6   3390-A38 Y CNC 3990     3390
22    0A80 0A82         CNC_S 3990-6   3390-A38   CNC 3990     3390
22    0A80 0A83         CNC_S 3990-6   3390-A38 Y CNC 3990     3390
22    0A80 0A84         CNC_S 3990-6   3390-A38   CNC 3990     3390
 F1=Help      F2=Split     F3=Exit      F7=Backward  F8=Forward   F9=Swap
F10=Actions  F12=Cancel   F20=Right    F22=Command
```

For each channel path sensed and/or defined in the accessed IODF the list contains a row showing the I/O path and the sensed and defined channel path, control unit, and device information. If a switch is included in the path, the right page shows the corresponding switch information.

Any discrepancies between the defined and the sensed data are indicated in column `D` on the right. For channel paths for which column `D` is blank, the defined and sensed data are consistent. The following values may appear:

Symbol
Meaning

`*` Defined and sensed I/O paths differ

`C` Defined only to processor but not to OS

`O` Defined only to OS but without a path to the processor

`@` A combination of * and C

On the display column `D` is highlighted.

Columns `STAT` and `O` indicate the status of the I/O path and the connected device, respectively. An empty field means that the corresponding I/O path or device is online. Offline I/O paths are marked with OFFL and offline devices with Y. If the system is unable to sense the status of an I/O path, it is marked UNKN.

Asterisks (*) in the CHT (channel type), CUTYPE (control unit type), or DEVTYPE (device type) columns indicate that I/O paths are returned but the values for the corresponding types are blank or invalid.

For certain configurations the I/O path list, although restricted to one processor or partition, can be extensive. Using the `Filter` action you can reduce the list to the entries of interest.

You can save the displayed list by entering SAVE in the command line on the I/O Path List panel.

Note: The LOCATE command is not available for the I/O path list.

Activate a configuration dynamically

The system programmer (or other authorized persons) can use the option ***Activate or verify configuration dynamically*** or the ACTIVATE operator command to make changes to a running configuration. That is, the possibility is offered to change from a currently active configuration to some other configuration that is to be made active without the need to POR or IPL the system again.

When activating a configuration dynamically, HCD compares the currently active IODF with the IODF that is to be activated and then processes the difference.

For the IODF that is to be activated, HCD uses the production IODF that is currently in use with the dialog. Use the same high-level qualifier for the currently active IODF and the IODF to be activated.

z/OS HCD Planning gives a detailed description of how to dynamically activate a configuration. It describes the prerequisites for a dynamic activation, explains when hardware and software changes or software-only changes are allowed, and describes the actions necessary to change your I/O configuration dynamically. The following sections describe how to use the HCD dialog for this purpose.

Before activating a configuration dynamically, you may want to view information about the IODF that has been used for IPL or the last dynamic activation.

View active configuration

HCD allows you to view the name and status of the IODF that has been used for IPL or for last dynamic activation. The operating system configuration and EDT identifier and, if applicable, the configuration token, which is currently active in the HSA (hardware system area), are shown. Use the ***View active configuration*** function for an overview of the actual status for dynamic activation, indicating whether hardware and software changes are allowed.

1. On the primary task selection panel, select ***Activate or process configuration data*** and then ***View active configuration***.

   The View Active Configuration panel with sample data is shown below:

```
┌──────────────────── View Active Configuration ─────────────────────┐
│                                                                      │
│                                                                      │
│ Currently active IODF . . : SYS1.IODF01                              │
│    Creation date  . . . . : 1995-08-18                               │
│    Volume serial number . : SYSPAG                                   │
│                                                                      │
│ Configuration ID  . . . . : MVSVM       MVS Testsystem on VM         │
│ EDT ID  . . . . . . . . . : 00                                       │
│                                                                      │
│ HSA token . . . . . . . . : LMIF9672 96-08-02 13:22:50 SYS1     IODF50│
│                                                                      │
│ Activation scope:                                                    │
│ Hardware changes allowed .: Yes                                      │
│ Software changes allowed .: Yes                                      │
│                                                                      │
│ ENTER to view details on the activation scope.                       │
└──────────────────────────────────────────────────────────────────────┘
```

2. Press the Enter key to display detailed information on limitation(s) to the activation scope. A Message List panel is displayed containing the messages about the reasons for the restrictions.

How to activate if hardware and software changes are allowed

The following procedure describes how to activate a configuration dynamically if both hardware and software changes are allowed. Refer to *z/OS HCD Planning* on information when both hardware and software configuration changes are allowed and when only software configuration changes are allowed.

1. On the primary task selection panel, select ***Activate or process configuration data***, and from the resulting panel select ***Activate or verify configuration dynamically***. HCD displays the Activate or Verify Configuration panel.

```
---------------- Activate or Verify Configuration ----------------


 The currently active IODF matches the hardware I/O
 configuration.  Both hardware and software definitions may be
 changed. Select one of the following tasks.

 __  1.  Activate new hardware and software configuration.
     2.  Activate software configuration only. Validate
         hardware changes. Process changes to Coupling
         Facility elements.
     3.  Activate software configuration only.
     4.  Verify active configuration against system.
     5.  Verify target configuration against system.
     6.  Build CONFIGxx member.

  F1=Help      F2=Split     F3=Exit      F9=Swap     F12=Cancel
```

2. Select what you want to activate. The following figure assumes that you selected task `1. Activate new hardware and software configuration`. The panels when you select the other tasks are similar.

```
------------- Activate New Hardware and Software Configuration -------------

 Specify or revise the values for the IODF activation.

 Currently active IODF . : SYS1.IODF01
    Processor ID . . . . : PROC1
    Configuration ID . . : OPSYS01
    EDT ID . . . . . . . : A1

 IODF to be activated  . : SYS1.IODF02
    Processor ID . . . . . PROC1     +
    Configuration ID . . . OPSYS01   +
    EDT ID . . . . . . . . A1  +

 Test only  . . . . . . . . . . . . . . . . . . . .  Yes  (Yes or No)
 Allow hardware deletes (FORCE, FORCE=DEVICE) . . .  No   (Yes or No)
 Delete partition access to CHPIDs unconditionally
 (FORCE=CANDIDATE)  . . . . . . . . . . . . . . . .  No   (Yes or No)
 Write IOCDS  . . . . . . . . . . . . . . . . . . .  No   (Yes or No)
 Switch IOCDS for next POR  . . . . . . . . . . . .  No   (Yes or No)
```

Figure 89. Activate New Configuration: Hardware and Software Changes

The panel contains information about the currently active IODF.

If your processor runs in BASIC mode, the option `Allow hardware deletes` and the option `Delete partition access to CHPIDs unconditionally` are not displayed.

3. On the Activate New Hardware and Software Configuration panel you can change the fields that relate to the IODF that is to be activated, and you can specify options as applicable to your requirements. It is recommended that you first specify to test an activation before you dynamically activate a configuration.

   `Allow hardware deletes` option:

   If logical partitions have been defined for the currently active configuration, you can specify whether you want to allow hardware deletes.

   `Yes` means that the hardware deletes become effective for all partitions.

   `No` (the default) means that, if the changes include requests for deleting hardware, the activation is rejected.

   Note that hardware delete can also be indirectly performed as a result of other changes, for example, a change of a channel path consist of a deletion and an addition of a channel.

   A configuration change is rejected if it includes a hardware delete for an I/O component that is online to the logical partition from which you are making the change, even if you have entered `Yes` in the `Allow hardware deletes` option field. Therefore, you should vary offline any affected I/O component in all logical partitions. For example, when changing a channel path from unshared to shared, you must allow hardware deletes, and you must configure the channel path offline and vary offline the associated I/O devices before you activate the configuration. See *z/OS HCD Planning* for details about preventing disruption when changing the characteristics of I/O components.

   `Delete partition access to CHPIDs unconditionally` option:

   You can also specify how this activation should treat any deletion of a partition from the access or candidate list of a channel path. In the field `Delete partition access to CHPIDs unconditionally` (FORCE=CANDIDATE), enter either `Yes` or `No`. If you specify `Yes`, the access to the channel path will be revoked even if the channel is configured online to the partition; the channel will be configured off-line to the partition, and active I/O operations might be disrupted. If you specify `No` (the default), the activation will be rejected if it includes a deletion of partition access to a channel path that is configured online to that partition.

   Note: You cannot unconditionally delete the partition that is invoking the activate request from the candidate or access list of a channel path if the channel path is currently configured online.

4. If the dynamic activation completed successfully, HCD displays a message.

Configure channel path online to the partition

When activating a configuration in which a partition is added to the access list of a channel path, you must configure the channel path online to the partition using either the MVS CONFIG command or the processor console CHPID command. PR/SM will configure the channel path to the partition at subsequent activations only after you configure it using the commands above at least once.

When a particular IOCDS is used in a POR for the first time after it has been written, the definitions in that IOCDS are used to determine the assignment of channel paths to logical partitions according to the channel path access lists that are defined. All previous information about channel configurations associated with this IOCDS is discarded. The exception to this rule is when a newly written IOCDS is first used as part of a dynamic I/O change to the system. For example, the new IOCDS is used as a result of a ***Switch IOCDS for next POR*** or the new IOCDS is the target of the ACTIOCDS= parameter of the MVS ACTIVATE command. When a new IOCDS is used in this manner, the current state of channel configurations is preserved and immediately associated with the newly written IOCDS.

See *z/OS MVS System Commands* for information about the MVS CONFIG command and see the applicable *Processor Resource/Systems Manager Planning Guide* for information about the CHPID command and for a description of automatic configuration of channel paths to partitions.

If dynamic activation fails

If the activation is rejected, HCD displays a panel that lists the messages and reasons for a failure. From the displayed message list, you can request further information. The message list can also be displayed by using the command SHOWMSG ACTIVATE on any panel that has a command line (except on help panels).

In some cases a dynamic activation may fail and HCD recommends recovery. HCD displays a panel where you can specify whether you want to recover:

- If you confirm recovery by specifying `Yes`, HCD performs *hardware-only changes*.

  You can specify to recover in two ways:

  – To resume activation of the target IODF. That is, HCD tries to continue with the activation.

  – To reset the configuration to the source IODF. That is, HCD activates the configuration that existed before the failure occurred.

- If you do not confirm recovery by specifying `No`, HCD allows you to continue with *software-only changes*. Hardware changes are activated up to the point where the failure occurred.

Detection of illegal split/merge of LCU: If a request for activating a new configuration causes a logical control unit (LCU) to be split or merged illegally, HCD rejects the request. HCD considers an LCU to be:

- Illegally split if a physical control unit (PCU) is removed from the LCU that has devices remaining connected to it.
- Illegally merged if a physical control unit is added to an LCU that has devices connected to it.

HCD detects every split/merge during activation and informs you by message. The message tells between which PCU and which device the split/merge occurred; it also explains how to correct the condition.

For more information on how to recover after a system failure, refer to *z/OS HCD Planning*.

How to activate if software-only changes are allowed

The following procedure describes how to activate a configuration dynamically if only software changes are allowed. Refer to *z/OS HCD Planning* on information when both hardware and software configuration changes are allowed and when only software configuration changes are allowed.

1. On the primary task selection panel, select ***Activate or process configuration data***, and from the resulting panel select ***Activate configuration dynamically***. HCD displays the following panel:

```
 ─────────────── Activate Software Configuration Only ───────────────


 Only software changes are allowed.

 Specify or revise the values for IODF activation.

 Currently active IODF . : SYS1.IODF31
    Configuration ID . . : MVSVM       MVS Testsystems on VM
    EDT ID . . . . . . . : 00

 IODF to be activated  . : SYS1.IODF31
    Configuration ID . . . MVSVM     +
    EDT ID . . . . . . . . 00  +

 Test only . . . . . . . . Yes    (Yes or No)
```

The panel contains information about the currently active IODF.

2. On the Activate Software Configuration Only panel, you can change the fields that relate to the IODF that is to be activated. It is recommended that you first test an activation before you actually dynamically activate a configuration.
3. If the dynamic activation completed successfully, HCD displays a message.

If dynamic activation fails

If the activation is rejected, HCD displays a panel that lists the message(s) and reasons for a failure. From the displayed message list, you can request further information. The message list can also be displayed by using the command SHOWMSG ACTIVATE on any panel that has a command line (except on help panels).

Activate a configuration sysplex-wide

HCD offers you a single point of control for systems in a sysplex. You can now dynamically activate the hardware and software configuration changes for each system in a sysplex from any other system in the same sysplex. You can:
- Display active sysplex members
- Activate Software Configuration Changes Only
- Activate Software and Hardware Configuration Changes
- Switch IOCDS for the next POR

z/OS HCD Planning gives a detailed description of how to dynamically activate a configuration. It describes the prerequisites for a dynamic activation, explains when hardware and software changes or software-only changes are allowed, and describes the actions necessary to change your I/O configuration dynamically. The following sections describe how to use the HCD dialog for dynamically activating systems in a sysplex.

Displaying active sysplex members

Before you can make any change to a configuration in a sysplex, you must display the active sysplex member list. From this list you then select different actions.

1. On the primary task selection panel, select ***Activate or process configuration data***, and from the resulting panel select ***Activate configuration sysplex-wide***. HCD displays the Active Sysplex Member List.

```
  Goto  Query  Help
------------------------------------------------------------------------------
                          Active Sysplex Member List                Row 1 of 23
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more systems, then press Enter. To refresh the Activate/Verify
Status, press Enter without selections made.

IODF to be activated: HCDI.IODF00.WORK
Active sysplex  . . : SYSPLEX1

  System   Processor Partition Active          Config.  EDT Act./Verify
/ Name     ID        Name      IODF            ID       ID  Status
_ SYSTEMA  PROCA     PARTA     HCDI.IODF00     MVSA     0A
_ SYSTEMB  PROCB               HCDI.IODF00     MVSB     0B
# SYSTEMC
_ SYSTEMD                      HCDI.IODF00     MVSD     0D
_ SYSTEME  PROCE               HCDI.IODF00     MVSE     0E
_ SYSTEMF  PROCF     PARTF     HCDI.IODF00     MVSF     0F
_ SYSTEM0  PROC0     PART0     HCDI.IODF00     MVS0     00
_ SYSTEM1  PROC1               HCDI.IODF00     MVS1     01
_ SYSTEM2  PROC2               SYS6.IODF05     MVS2     02
_ SYSTEM3  PROC3               SYS6.IODF05     MVS3     03
_ SYSTEM4  PROC4     PART4     HCDI.IODF00     MVS4     04
_ SYSTEM5                      HCDI.IODF00     MVS5     05
_ SYSTEM6  PROC6     PART6     HCDI.IODF00     MVS6     06
# SYSTEM7
_ SYSTEM8  PROC8     PART8     HCDI.IODF00     MVS8     08
_ SYSTEM9  PROC9               HCDI.IODF00     MVS9     09
```

Figure 90. Activate Sysplex Member List

You can see the system names, and the processor IDs and partition names associated with the system names. You can also see the IODF to be activated, the name of the sysplex, the active IODFs, the configuration IDs and EDT IDs used for IPL, and the Activate status, which is empty initially.

HCD requests the information from the sysplex couple data set and the HSA of every CPC and displays it in a formatted list.

Refreshing the Active Sysplex Member List:

The Active Sysplex Member list will be refreshed whenever you press the Enter key. If a system joins the sysplex, it will be added to the list in alphabetical order. If a system leaves the sysplex, it will be deleted from the list.

Empty Processor ID:

The entry in the Processor ID column is empty when the operating system runs as a VM guest.

This does not mean that you cannot initiate an activation request for that system. It means that you have to specify the correct processor ID later on by yourself, as required.

2. Select a system name and specify ***View the configuration status*** from the context menu (or select action code **v**) to see the following information:
   - information about the currently active hardware configuration token stored in the HSA
   - information about the free space in the HSA.

Activate software configuration changes only

The following procedure describes how to change the software configuration for one or more systems in a sysplex.

1. Select one or more systems from the Active Sysplex Member list (see Figure 90) and the ***Activate software configuration only*** action from the context menu (or

action code **o**). The Activate Software Configuration Only panel is displayed.

```
 ------------------- Activate Software Configuration Only -------------------
                                                                  Row 1 of 4

 Specify or revise the values for activation, then press Enter.

 IODF to be activated: BBEI.IODF0A

 System   Processor Partition Config.  EDT  Valid. Test  Active
 Name     ID +      Name      ID +     ID + HW Ch. Only  IODF
 SYSTEMA  PROCA     PARTA     MVSA     0A   Yes    Yes   BBEI.IODF00
 SYSTEMB  PROCB               MVSB     0B   No     Yes   BBEI.IODF00
 SYSTEMF  PROCF     PARTF     MVSF     0F   Yes    Yes   BBEI.IODF00
 SYSTEM0  PROC0     PART0     MVS0     00   Yes    Yes   BBEI.IODF00
 ***************************** Bottom of data ******************************
```

Figure 91. Activate Software Configuration Only

All systems you have selected are shown together with the associated processor IDs.

Empty Processor ID:

If the *Processor ID* field is empty, prompt for the processor IDs and select the actual one.

Empty Configuration or EDT ID:

If the *Config. ID* and the *EDT ID* fields are empty, it is an indication that the ID of the currently active configuration is not defined in the IODF to be activated. Prompt for the new ID. Updating the *processor ID*, the *Config. ID* or the *EDT ID* fields might be required if your IODF to be activated contains IDs different from those displayed as default IDs.

2. On the Activate Software Configuration Only panel, update the fields of one or more systems. It is recommended that you first test an activation before you actually dynamically activate a configuration.
3. If the hardware token matches, the ***Valid. HW Ch.*** option is set to 'Yes'. It is recommended to validate hardware changes when performing a software change. This is required when the configuration change contains coupling facility control units or devices.
4. After pressing the Enter key, the Active Sysplex Member list is displayed again, but now the Active Status column shows the status *In progress*. If you refresh the list occasionally, you can see that one system after the other completes the activation request. This is indicated by the status *Messages*.
5. Select a system and the ***View activate messages*** action from the context menu (or action code **m**). The messages returned from that system as the result of the activation request are displayed.

```
┌─────────────────────────────── Message List ──────────────────────────────┐
│  Save  Query  Help                                                         │
│ -------------------------------------------------------------------------- │
│                                                                 Row 1 of 4 │
│                                                                            │
│ Select one or more messages, then press Enter. To refresh the list, press  │
│ ENTER without selections made. To reply to a WTOR message, use the REPLY   │
│ command.                                                                   │
│                                                                            │
│ System name: SC52                                                          │
│                                                                            │
│ / Message Text                                                             │
│ _  IOS500I ACTIVATE RESULTS 084                                            │
│ #  ACTIVATE COMPLETED SUCCESSFULLY                                         │
│ #  NOTE = 0100,SOFTWARE-ONLY CHANGE                                        │
│ #   COMPID=SC1C3                                                           │
│ ***************************** Bottom of data ******************************│
│                                                                            │
```

Figure 92. Message panel with ACTIVATE messages

6. If you do not need the messages any longer, you can delete them by using the option ***Delete activate messages*** (or action code **d**).

If dynamic activation fails

If the activation is rejected, HCD displays a panel that lists the messages and reasons for a failure.

To get more information you also use the ***View configuration status*** option (or action code **v**). This option provides you the same information as when entering the command D IOS,CONFIG(ALL) at the system console.

```
┌──────────────────────────────── Message List ─────────────────────────────────┐
│  Save  Query  Help                                                            │
│ ---------------------------------------------------------------------------- │
│                                                                 Row 1 of 12   │
│                                                                               │
│ View configuration status of selected systems.                                │
│                                                                               │
│ Message Text                                                                  │
│  IOS506I 06.49.55 I/O CONFIG DATA 378                                         │
│  ACTIVE IODF DATA SET = SYS6.IODF29                                           │
│  CONFIGURATION ID = L06RMVS1       EDT ID = 01                                │
│  TOKEN:  PROCESSOR DATE     TIME     DESCRIPTION                              │
│   SOURCE: P101     95-05-09 15:34:56 SYS6     IODF29                          │
│           48 PHYSICAL CONTROL UNITS                                           │
│          547 SUBCHANNELS FOR SHARED CHANNEL PATHS                             │
│          548 SUBCHANNELS FOR UNSHARED CHANNEL PATHS                           │
│           23 LOGICAL CONTROL UNITS FOR SHARED CHANNEL PATHS                   │
│           23 LOGICAL CONTROL UNITS FOR UNSHARED CHANNEL                       │
│           PATHS                                                               │
│                                                                               │
```

Figure 93. View Configuration Status

HCD offers you two possibilities after an activation failed:

- Select ***Resume activation of target configuration*** (or action code **t**) to force the activation of the system.
- Select ***Reset source configuration*** (or action code **r**) to reset the original configuration.

Activate software and hardware configuration changes

The following procedure describes how to change the software and hardware configuration for one or more systems in a sysplex.

1. Select one or more systems from the Active Sysplex Member list and the ***Activate software and hardware configuration*** action from the context menu (or action code **a**). The Activate Hardware and Software Configuration panel is displayed.

```
┌─────────────── Activate Hardware and Software Configuration ──────────────┐
│                                                 Row 1 of 4 More:      >   │
│                                                                           │
│ Specify or revise the values for activation, then press Enter.            │
│                                                                           │
│ IODF to be activated: BBEI.IODF0A                                         │
│                                                                           │
│ System   Processor Partition Config.  EDT  -FORCE Option- Switch  Test    │
│ Name     ID +      Name      ID +     ID + DEVICE CANDID. IOCDS + Only    │
│ SYSTEME  PROCE               MVSE     0E   No     No      __      Yes     │
│ SYSTEMF  PROCF     PARTF     MVSF     0F   No     No      __      Yes     │
│ SYSTEM0  PROC0     PART0     MVS0     00   No     No      __      Yes     │
│ SYSTEM1  PROC1               MVS1     01   No     No      __      Yes     │
│ **************************** Bottom of data ***************************** │
└───────────────────────────────────────────────────────────────────────────┘
```

Figure 94. Activate Hardware and Software Configuration

The systems you have selected are shown together with the associated processor IDs.

Empty Processor ID:

If the `Processor ID` field is empty, prompt for the processor IDs and select the actual one.

Empty Configuration or EDT ID:

If the `Config. ID` and the `EDT ID` fields are empty, it is an indication that the ID of the currently active configuration is not defined in the IODF to be activated. Prompt for the new ID. Updating the `Processor ID`, the `Config. ID` or the `EDT ID` fields might be required if your IODF to be activated contains IDs different from those displayed as default IDs.

Switch IOCDS:

In the `Switch IOCDS` column, you can define the IOCDS name used for the next POR.

2. On the Activate Hardware and Software Configuration panel, update the fields of one or more systems. It is recommended that you first test an activation before you dynamically activate a configuration.

   If you plan to delete a device for a specific system, specify *Yes* in the *FORCE DEVICE* field of that system. If you plan to remove a partition from the access or candidate list of a channel path belonging to a specific system, specify *Yes* in the *FORCE CANDID.* field of that system.
3. After updating the panel, press the Enter key. The Active Sysplex Member list will be displayed again, but now the *Active IODF* fields have changed for the affected systems and now contain the name of the IODF to be activated. If you have defined different processor IDs, configuration IDs or EDT IDs, and you have activated their configurations, these fields also have been changed.
4. Select a system and the ***View activate messages*** action from the context menu (or action code **m**). The messages returned from that system as the result of the activation request are displayed.
5. If you do not need the messages any longer, you can delete them by using the option ***Delete activate messages*** (or action code **d**).

If Dynamic Activation Fails

Refer to “If dynamic activation fails” on page 226 for information on how to proceed, if your activation has been rejected.

Switch IOCDS for the next POR

In addition to dynamically activating a sysplex, you can also specify the IOCDSs to be used for the next POR from the Active Sysplex Member List.

Refer to “Switch IOCDS for systems in a sysplex” on page 232 for a description of how to switch the IOCDS for the next POR.

Build CONFIGxx member

After dynamic changes have been made to a system it is recommended to update the corresponding CONFIGxx member to reflect these changes. HCD provides a function to build a CONFIGxx member containing the CHP, DEVICE, and SWITCH statements of the local system or of the selected system in a sysplex.

A CONFIGxx member can be built by:

- Selecting the ***Build CONFIGxx member*** action from the Activate or Verify Configuration panel (for the local system)
- Selecting the ***Build CONFIGxx member*** action from the Active Sysplex Member panel (for a system in a sysplex)

- Using a batch utility (see “Build I/O configuration statements” on page 320 for details)

After selecting ***Build CONFIGxx member***, the Identify System I/O Configuration panel is displayed (see Figure 88 on page 217). After selecting a system, and an I/O cluster name for managed channel paths, the Restrict Ports Eligible for Dynamic CHPID Management panel is displayed if the configuration contains managed channel paths for the selected I/O cluster. This panel shows all control units known by the selected system and manageable by DCM and their switch ports set to eligible for DCM (indicated by a ’Y’). You can specify ports as ineligible for DCM by overtyping ’Y’ with ’N’.

```
----------- Restrict Ports Eligible for Dynamic CHPID Management -----------
                                                              Row 1 of 39
Command ===> ___________________________________________ Scroll ===> CSR

Type 'N' to restrict ports related to managed CHPIDs from being used by
dynamic CHPID management.

Processor ID: FR38LPAR  Partition: F38H      OS Configuration ID: B710
I/O Cluster name: UTCPLX38

         ---------- Last digit of port address --------
SW.Port  0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
65.4     _  _  N  _  _  _  _  _  _  _  _  _  _  _  _  _
65.B     _  _  _  _  _  _  Y  _  _  _  _  _  Y  Y  Y  _
66.4     _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _  _
66.B     _  _  _  _  _  _  Y  _  _  _  _  _  Y  Y  Y  _
67.A     _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _  _
67.B     _  _  _  _  _  _  Y  _  _  _  _  _  Y  Y  Y  _
68.A     _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _  _
68.B     _  _  _  _  _  _  Y  _  _  _  _  _  Y  Y  Y  _
6D.C     _  _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _
6D.D     _  _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _
6E.C     _  _  _  Y  _  _  _  _  _  _  _  _  _  _  _  _
```

Figure 95. Restrict Ports Eligible for Dynamic CHPID Management

The Build CONFIGxx Member panel is then displayed.

```
---------------------------- Build CONFIGxx Member ----------------------------


Specify or revise the values for the CONFIGxx member. Press ENTER to
continue.

Partitioned data set name . 'SYS1.PARMLIB'
Suffix of CONFIGxx member . __

Volume serial number  . . . ______  + (if data set not cataloged)
 F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
F12=Cancel
```

Figure 96. Build CONFIGxx Member

The initial value for the partitioned data set name is ’SYS1.PARMLIB’.

If the specified CONFIGxx member already exists, the Confirm Update CONFIGxx Member panel is displayed.

```
 ────────────── Confirm Update CONFIGxx Member ───────────────


 Specify or revise the values for the CONFIGxx member.
 Press ENTER to continue.

 Backup CONFIGxx member  . . . . CONFBK01

 Update I/O statements . . . . . 1  1. Update member
                                    2. Replace member

  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap
 F12=Cancel
```

Figure 97. Confirm Update CONFIGxx Member

If you select `Update member`, the CHP, DEVICE, and SWITCH statements are replaced and all other statements remain unchanged. If you select `Replace member`, the content of the CONFIGxx member will be CHP, DEVICE, and SWITCH statements exclusively. All other statements formerly present in the member will be removed.

The following illustrates sample generated statements:

```
* CHP, DEV AND SWITCH STATEMENTS GENERATED BY
* BUILD CONFIGXX UPDATE  REQUEST
* 2001-01-09  13:56:28    IODF: BOKA.IODF38
* PROCESSOR: FR38LPAR  PARTITION: F38H      OS CONFIGURATION ID: B710
* I/O CLUSTER: UTCPLX38
CHP (00,01,04),ONLINE
CHP (05),ONLINE,MANAGED
CHP (06,07,08,09,0A,0B,0C,0D,0E,10),ONLINE
CHP (11),ONLINE,MANAGED
.....
DEVICE (0B00-0B1F),(1C),ONLINE
DEVICE (1400-143F),(0C,22,33),ONLINE
DEVICE (1440-147F),(10,1C,44),ONLINE
....
SWITCH (B565,42),NODCM
SWITCH (B565,B6,BC-BE),DCM
```

The default name for the backup member is CONFBKxx. If the name is blanked out, no backup is saved.

You can also invoke this task in batch mode. See "Build I/O configuration statements" on page 320 for a description of the job control information that you need to specify when building a CONFIGxx member.

Process 'Display M=CONFIG(xx)' command

HCD provides a dialog function to compare the information in the CONFIGxx member for the system in a sysplex with the hardware configuration. The comparison is carried out at the target system and any responses are displayed in a message list.

You can invoke the function from the Active Sysplex Member list by selecting the action ***Process DISPLAY M=CONFIG(xx) command.*** This displays the Process Display M=CONFIG(xx) Command panel.

```
Process DISPLAY M=CONFIG(xx) Command

The DISPLAY M=CONFIG(xx) command is executed on the selected target
system. Specify or revise the suffix for the CONFIGxx member of
SYS1.PARMLIB. Press ENTER to continue.

System . . . . . . . . : SYSTEMA

Suffix of CONFIGxx member . . __



F1=Help    F2=Split   F3=Exit    F5=Reset   F9=Swap   F12=Cancel
```

Figure 98. Process Display M=CONFIG(xx) Command

Here, the suffix for the member to be used must be specified.

The results of this action are displayed in the HCD message panel.

Switch IOCDS for next POR

HCD allows you to specify an IOCDS that will be used for the next POR either while building IOCDSs or as a separate action without the need to build an IOCDS. Depending on the environment you are working, you have to use different panels to switch the IOCDS:

- Switch IOCDS for processor without SNA address defined
- Switch IOCDS for a processor in an S/390 microprocessor cluster with SNA address defined
- Switch IOCDS for systems in a sysplex

Switch IOCDS for processor without SNA address

The following procedure is only recommended for processors that do *not* have an SNA address defined. For a detailed description of the following dialog sequence, refer to "Build an IOCDS" on page 201.

1. On the primary task selection panel, specify the name of a production IODF and select ***Activate or process configuration data***.
2. From the resulting panel select ***Build IOCDS***. HCD displays the Processor List panel.
3. On the Processor List panel, select the processor and press the Enter key. HCD displays the IOCDS List panel (see Figure 83 on page 201).
4. On the IOCDS List panel, select the IOCDSs you want to use for next POR and select ***Switch IOCDS*** from the context menu (or action code **S**).

If the HSA token is available, the HSA token is compared with the processor token. If the HSA token matches the processor token, the ***Switch IOCDS*** action is performed. A warning message is issued, if the date in the IOCDS update record is an earlier date than the date of the last CSS update. If the HSA token does not match the processor token in the IODF, the action ***Switch IOCDS*** is not performed.

If the HSA token is not available, the serial number of the processor defined in the IODF is compared with the serial number of the active processor. If the serial numbers cannot be found, the types of the processors are compared. If the processor definition in the IODF matches the active processor, the action ***Switch IOCDS*** is performed, otherwise the procedure is not performed.

Switch IOCDS for processors in an S/390 microprocessor cluster with SNA address defined

The following procedure describes how to build an IOCDS for processors in an S/390 microprocessor cluster *with* an SNA address defined. For a detailed description of the following dialog sequence, refer to "Build S/390 microprocessor IOCDSs" on page 203.

1. On the primary task selection panel, select ***Activate or process configuration data*** and from the resulting panel select ***Build and manage S/390 microprocessor IOCDSs and IPL attributes***. The S/390 Microprocessor Cluster List panel is displayed (see Figure 84 on page 204).
2. On the S/390 Microprocessor Cluster List panel, select the CPCs for which you want to switch the IOCDSs and ***Work with IOCDSs*** from the context menu (or action code **s**). HCD displays the IOCDS List panel (see Figure 85 on page 205).
3. Use the ***Switch IOCDS*** action (or action code **s**) to mark an IOCDS as the IOCDS that is used for next POR. The `Status` field will be set accordingly.

   You can only switch to an IOCDS that has an IOCDS/HSA token match or to an IOCDS of a processor that is not activated ('POR-required' status).

Switch IOCDS for systems in a sysplex

In addition to dynamically activating a sysplex, you can also specify the IOCDSs to be used for the next POR.

1. Select one or more systems from the Active Sysplex Member list (see Figure 90 on page 224) and the ***Switch IOCDS for next POR*** action from the context menu (or action code **s**). The Switch IOCDS panel is displayed.

```
 ---------------------------- Switch IOCDS -----------------------------
                                                            Row 1 of 4
 Command ===> _________________________________________ Scroll ===> PAGE

 Specify the IOCDS(es) for next POR, then press Enter.

 System   Processor Config.  EDT Switch   Active
 Name     ID        ID       ID  IOCDS +  IODF
 SYSTEMA  PROCA     MVSA     0A  __       BBEI.IODF00
 SYSTEMB  PROCB     MVSB     0B  __       BBEI.IODF00
 SYSTEMF  PROCF     MVSF     0F  __       BBEI.IODF00
 SYSTEM0  PROC0     MVS0     00  __       BBEI.IODF00
 **************************** Bottom of data *****************************
```

2. In the column Switch IOCDS, specify the IOCDS that is to be used for the next POR and press the Enter key.

Specify an IODF for IPL

z/OS HCD Planning gives a detailed description of how to specify an I/O configuration at IPL. This topic summarizes the main aspects you have to consider when specifying an IODF for IPL.

Note:

A production IODF must have a single extent. If the production IODF has multiple extents, the IPL process results in a WAIT state (wait state code ’0B1’, reason code ’002’). HCD issues error message CBDA009I if a production IODF cannot be built in a single extent.

IODF processing at IPL

When you perform an IPL, the production IODF that defines the configuration to the system is selected and used.

On the LOAD parameter, you specify the device containing the IODF for IPL and the identifier for the LOADxx member. In the LOADxx member of SYSn.IPLPARM or SYS1.PARMLIB, you identify the IODF by the IODF statement. The IODF statement consists of an IODF *prefix* and an IODF *suffix*.

- The IODF prefix is an 8-byte high-level qualifier of the IODF data set name. For example, BPAN is the IODF prefix for the IODF data set BPAN.IODF01.
- the IODF suffix is the two-digit hexadecimal number that is part of the IODF name. For example, 01 is the IODF suffix for IODF01. If you do not specify a suffix, the system searches for an IODF sequentially in a numerically ascending order starting with the IODF suffix 00. If you specify ** as the suffix, the system uses the descriptor fields to find the current IODF.

During IPL, the system uses the LOADxx member that it finds first when searching in the following order:

1. The system first searches the IODF volume for SYS0.IPLPARM through SYS9.IPLPARM, in that order.
2. If it does not find a SYSn.IPLPARM, it searches the IODF volume for a SYS1.PARMLIB.
3. If it does not find SYS1.PARMLIB on the IODF device, it searches for SYS1.PARMLIB on the IPL device.
4. If it does not find a SYS1.PARMLIB on the IPL device, a coded non-restartable wait state is loaded (WAIT code X'0B1').

For a detailed description of this process refer to *z/OS HCD Planning*.

Chapter 9. How to print and compare configuration data

Overview

This information unit describes how to:
- Print configuration reports (channel subsystem, switch, OS configuration data, and CTC connections)
- Print a report of the I/O paths of the actual system compared to the defined I/O configuration
- Print a report of the supported hardware or an I/O definition reference
- Create or view a graphical report of the I/O configuration
- Compare functions (IODFs and CSS/operating system views)
- Print List Panels
- View and print the activity log

Print configuration reports

You can use HCD to generate several types of reports about the configuration data in an IODF:
- Channel Subsystem (CSS) Report
- Switch Report
- Operating System (OS) Report
- CTC Connection Report
- I/O Path Report
- Supported Hardware Report
- I/O Definition Reference

In the HCD profile definition, you have the option of printing textual reports in upper case only or defining the number of lines per page (see “Options for text reports” on page 28).

Examples of these reports are shown in “Appendix B. Configuration reports” on page 377.

Channel Subsystem Report

The Channel Subsystem Report contains all configuration data that is used by the channel subsystem. If the IODF contains data for more than one processor or logical partition, you can limit the report to the data for one processor or partition. If you limit the report to one partition, it will generate information only for channel paths, which have the partition in the access list. Channel paths that have that partition in a candidate list will not be taken into consideration.

You can select four types of reports:
- **CSS summary reports** include summary reports about:
  - Processors
  - Channel subsystems
  - Partitions
  - IOCDSs
  - Channel paths
  - Control units
  - Devices

The processor and partition reports are not printed if you limit the CSS summary reports to the data for one processor or partition.

- **Channel path detail reports** include reports about:
  - Channel paths
  - CF channel path connectivity
- **Control unit detail report**
- **Device detail report**

Switch Report

The Switch Report contains details about the switch definition, its configurations and the port definitions.

If the IODF contains data for more than one switch, you can limit the report to the data for one switch and the configurations for this switch. In this case, you do not get a switch summary report.

Operating System Report

The Operating System Report contains the configuration data that is used by z/OS or VM/ESA. If the IODF contains data for more than one operating system, you can limit the report to the data for one operating system. You can select three types of reports:

1. The OS device report includes reports about operating systems and OS devices.

   The operating system summary report is not printed if you limit the OS device report to the data for one operating system.
2. OS console report
3. EDT report (MVS-type only)

CTC Connection Report

The CTC Connection Report contains CTC connections of your configuration that are defined through a switch. In case of incorrect definitions, the report also contains a list of messages with diagnostic information.

If the IODF contains more than one processor or logical partition, you can limit the report to the data for one processor or partition.

I/O Path Report

The I/O Path report shows the physically sensed I/O paths (with physical types) of the active system compared with the logical definitions of the paths (also the object types) of a specific IODF.

On the Limit Reports panel (Figure 100 on page 238) the active configuration to sense the configuration from, can be specified by indicating a SYSPLEX and/or SYSTEM name. If nothing is specified, the data is taken from the local system.

For more information, see “Job statement information used in panels” on page 75.

See “Prerequisites” on page 9 for the prerequisites for the I/O Path report.

Supported Hardware Report

The Supported Hardware Report contains information about the processors, control units, and devices supported in your installation. This report can only be generated using the batch facility as described in "Print configuration reports" on page 324.

This report is generated directly from the UIMs. Therefore, it reflects the latest UIM levels installed.

I/O Definition Reference

The I/O Definition Reference contains a description of the parameters to define the device to the Channel Subsystem, and a description of the parameters and features to define the device to the operating system.

This report is generated directly from the UIMs. Therefore, it reflects the latest UIM levels installed.

This report can only be generated using the batch facility as described in "Print configuration reports" on page 324.

How to print a textual report

1. On the primary task selection panel, select ***Print or compare configuration data***.
2. On the resulting Print and Compare Configuration Data panel, select ***Print configuration reports***. HCD then displays the following panel:

```
 ---------------------- Print Configuration Reports ----------------------


 Select the types of report you want, and specify the values below.

 IODF name  : 'DOCU.IODF01'

 Types of report                  Limit report(s)
 _  CSS report                    1   1.  Yes
 _  Switch report                     2.  No
 _  OS report
 _  CTC connection report
 _  I/O path report

 Job statement information
 //         JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
 //*
 //*

  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    F12=Cancel
```

Figure 99. Print Configuration Reports

3. Enter the required data.

   When you select a CSS or OS report an additional panel appears on which you can select one or more report types.

   If a data set is pre-allocated the logical record size must be 133. You can allocate the report output data set HCDRPT using the job step name GO.

4. When you select to limit the reports, possible for CSS, Switch, OS and CTC connection reports, the Limit Reports panel appears that allows you to specify a processor ID, partition name, OS configuration ID and a switch ID. When you select an I/O Path report, the Limit Reports panel always appears. This is because limiting an I/O Path report is required. Default values for the processor ID, the partition name (for an LPAR processor) and the OS configuration ID are then already filled in. These values are based on the active configuration. The system name identifies the system of a sysplex for that the I/O Path report is to be generated. The default is the local system. The sysplex name specifies the sysplex of the system for that the I/O Path report is to be generated. If you specify the sysplex, you must also specify the system name. If you do not specify the sysplex, the system name is the VTAM application name of the host that the I/O Path report is to be generated for. If you selected to print more than one report type, the limitations specified on the Limit Reports panel apply to all of them.

   When limiting a CSS report to a single partition, the report will show channel paths, control units and devices attached by the access list as well as those attached by the candidate list.

```
 ----------------------- Limit Reports -----------------------


  To limit the reports, specify the following criteria related
  to the IODF in access.

                                   Applicable for:
  Processor ID . . . . ________  +  CSS, CTC, I/O path reports
  Partition name . . . ________  +  CSS, CTC, I/O path report
  OS configuration ID  ________  +  OS, I/O path report
  Switch ID  . . . . . __        +  switch report

  Specify the sysplex and system name to gather the actual
  configuration from.  (Blanks default to the local system.)

  Sysplex name . . . . ________     I/O path report
  System name  . . . . ________     I/O path report

   F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset
   F9=Swap    F12=Cancel
```

Figure 100. Limit Reports

The submitted job only starts if the IODF is accessed in read mode. If it is accessed in update mode, the job waits until you access another IODF or exit HCD.

You can also print reports using the batch mode. See "Print configuration reports" on page 324 for a description of the job control information that you need to specify when printing a report.

Create or view graphical configuration reports

HCD offers you to print and view a graphical representation of the I/O configuration based on the definitions in the IODF. The reports can be either stored in a data set for printing on an AFP printer (such IBM 3820 or IBM 3800) or via GDDM later on, or displayed on an IBM 3270 terminal with graphical capability.

The graphical report function allows you to print or view five types of reports:

- The **LCU report** shows all logical control units defined for one processor.

- The **CU report** takes a control unit as focal point and shows the connections to the processors and the devices of the IODF. On request, it shows the switches as well.
- The **CHPID report** shows the defined channel paths for a processor and the switches, control units, and devices attached to the CHPID.
- The **Switch report** takes a switch (ESCON director) as focal point and shows the processors, chained switches, and control units with devices attached to the switch.
- The **CF connection report** takes a coupling facility as focal point and shows all connections that exist between the coupling facility and the other processors defined in the IODF.

Prerequisites

For printing

To process the reports for printing you need one of the following:
- BookMaster Release 3.0 or higher
- DCF/GML Release 4.0
- GDDM Version 2.1 or later

To print the reports you need an AFP printer, such as IBM 3820 or IBM 3800 (not required for GDDM).

To store the output in GDF format, you have to use a terminal with a screen size of 80 columns, for example a 3278-2.

In the HCD profile, specify whether the output of this function can be processed with BookMaster, DCF, GML, or GDF (keyword GCR_FORMAT). BookMaster is the default. To use DCF or GML format, specify a mono- space font using the keyword GCR_FONT. For example, specify `GCR_FONT = X0GT20` (Gothic Text 20-pitch) for a 3820 printer. For more information about the HCD profile, refer to "Defining an HCD profile" on page 25.

For viewing

To view the report on an IBM 3270 terminal with graphical capability, GDDM must be installed on your system. Refer to "Setting up HCD" on page 21 on how to setup the GDDM support.

Use a terminal with a screen size of 80 columns, for example a 3278-2. This display function does not work on terminals (or terminal emulations) with a screen size of 132 columns. HCD uses ISPF to create the GDDM display, which means that terminals running in partition mode or terminals with multiple screen widths, including 3290 and the 3278 Mod 5, are not supported for graphics interface mode.

In the HCD profile, you can specify the colors used for displaying the graphic (see "Defining an HCD profile" on page 25). If you change the default colors, make sure that foreground and background color match.

How to create a graphical configuration report

To print or view a configuration, use ***Create or view graphical configuration report.*** on the primary task selection panel. The dialog is described in "Using the 'Create or View Graphical Configuration Report' option" on page 240.

To view objects in context of their attached objects you can also select an object from an object list panel and use the ***View graphically*** action from the context menu (or action code **h**). The following object lists support this possibility:
- Channel path list
- Control unit list
- I/O device list (only for devices that connect to a control unit)
- Partition list
- Switch list

For example, from the Switch List panel, you can view a switch together with all objects that are attached to the switch. This can help you, for example, to immediately verify your definitions while defining your configuration.

Using the 'Create or View Graphical Configuration Report' option

1. Select ***Create or view graphical configuration report.*** on the primary task selection panel.
2. The Create or View Graphical Configuration Report panel appears.

```
┌────────────── Create or View Graphical Configuration Report ──────────────┐
│                                                                            │
│                                                                            │
│ Select the type of report you want, and specify the values below.         │
│                                                                            │
│ IODF name . . . . . . : 'BPAN.IODF00.WORK'                                │
│                                                                            │
│ Type of report  . . . . 2_  1.  LCU report                                │
│                             2.  CU report                                  │
│                             3.  CHPID report                               │
│                             4.  Switch report                              │
│                             5.  CF connection report                       │
│                                                                            │
│ Processor ID  . . . . . ________  + (for an LCU or a CHPID report)        │
│ Partition name  . . . . ________  + (to limit an LCU or a CHPID report)   │
│                                                                            │
│ Output data set . . . . 'BPAN.IODF00.PRINT'                               │
│                                                                            │
│ Output  . . . . . . . . 1   1.  Write to output data set                  │
│                             2.  View                                       │
└────────────────────────────────────────────────────────────────────────────┘
```

`Type of report`: Select the type of report you want to create.

`Processor ID` and `Partition name`: Enter the required data for an LCU or a CHPID report.

`Output`: Select whether you want to write the output to an output data set for printing or to display the output on your terminal.

`Output data set`: For BookMaster, GML, or DCF processing, the output data set must be a sequential data set or a member of a partitioned data set. If the PDS or the sequential data set does not exist, it will automatically be allocated (record length 200, record format fixed blocked).

For creating output for GDF, specify a member of a partitioned data set. If the data set does not exist, it will automatically be allocated (record length 400, record format fixed blocked). If the data set already exists, it is overwritten with the new data, you are not asked to confirm replacement. The output is written into different members, one for each segment (see "Printing the output" on page 241 for a definition what a segment is). The member names are up to eight characters long. They are derived from taking up to seven characters from the member name specified in the output data set field and adding a number. For instance, if the name was specified as `'BPAN.IODF00.PRINT(SWITCHES)'`, the member names would be `SWITCH01, SWITCH02, ... SWITCH10`, and so on.

3. When pressing the Enter key, the Define Report Layout panel appears. The following example shows the panel for a CU report.

```
┌─────────────────────────── Define Report Layout ───────────────────────┐
│                                                                         │
│                                                                         │
│ Specify the values below for report type: CU                            │
│                                                                         │
│ Include index  . . . 1_  1.  Yes     Include partitions . 1_  1.  Yes   │
│                          2.  No                               2.  No    │
│                                                                         │
│                                      Only for a CU or CHPID report:     │
│ Include CTC, CF CUs. 1_  1.  Yes     Include switches . . 1_  1.  Yes   │
│                          2.  No                               2.  No    │
│                                                                         │
│ Show CU  . . . . . . 1_  1.  Serial number                              │
│                          2.  Description                                │
│                                                                         │
│ To limit a CU report, specify only one of the following:                │
│ Range  . . . . . . . ____  -  ____                                      │
│ Type . . . . . . . . _____________  +                                   │
│ Group  . . . . . . . ________  +                                        │
└─────────────────────────────────────────────────────────────────────────┘
```

Select what you want to include in the graphical report. To limit the control units to be shown in a CU report, you can specify either the range, type, or group (for example, DASD) of the control units.

4. After pressing the Enter key the report is written to an output data set or shown on the terminal. See "Printing the output" and "Viewing the output" on page 242 on how to proceed.

You can also create graphical reports using the batch mode. See "Create a graphical configuration report" on page 327 for a description of the job control information that you need to specify when printing a report.

Printing the output

1. Process the output data set using BookMaster, DCF, GML, or GDF. While processing it is recommended that you specify the following parameters:

   Indexing
   To print the index you selected on the Define Report Layout panel specify INDEX for BookMaster and GML processing

   Full page
   To use the full page for the report SYSVAR S is to be set to 1 for DCF processing. Note that in many installations offset is used as default.

   Rotate printout
   Specify a parameter to print the report in landscape format, that means to rotate the printout by 90 degree.

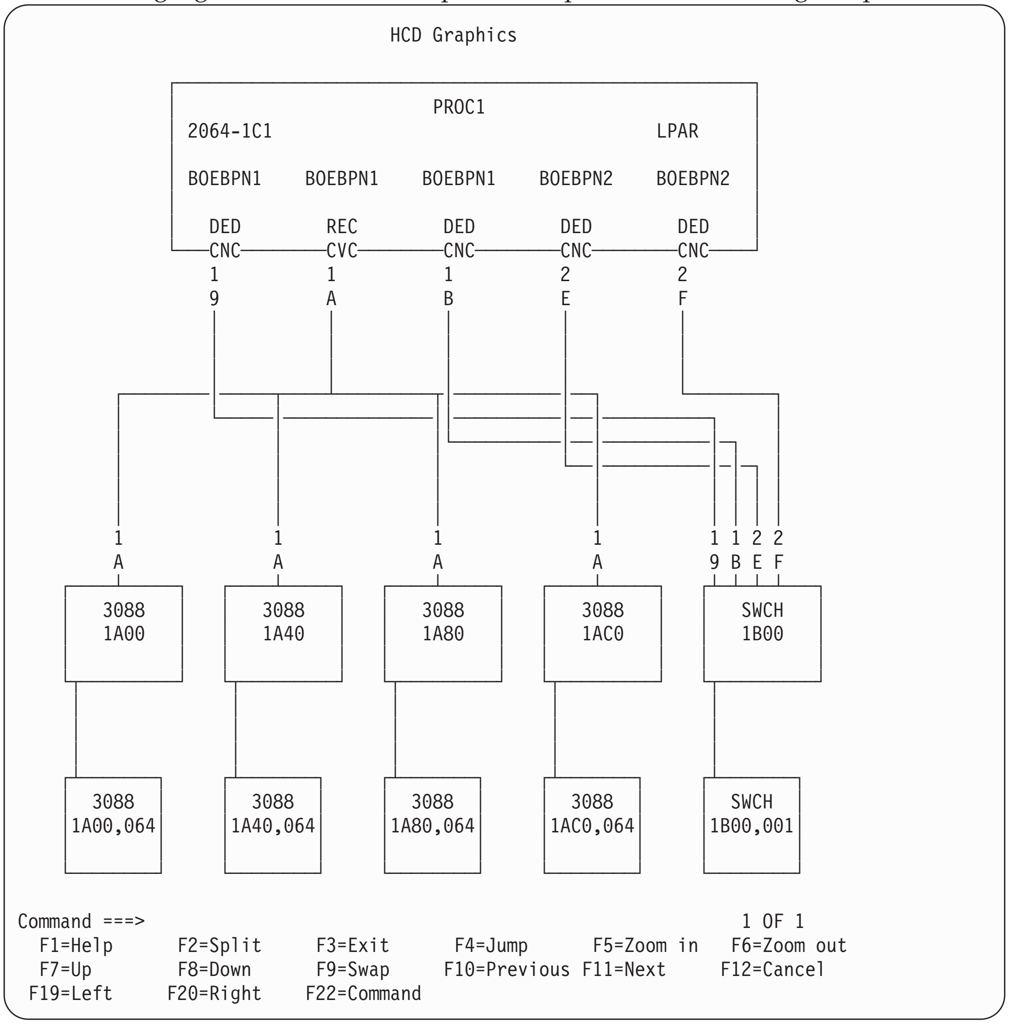
2. Print the report.

HCD tries to display a report on one page. If a report is too large for one page, HCD divides the report into segments and shows each segment on an extra page. If a CU report, for example, shows more than 8 control units, HCD shows the control units of the same type in one segment on an extra page. If a segment is too large for one page, HCD continues the segment on the next page. You can specify the `GCR_COMPACT=YES` keyword in the HCD profile to see more objects on one page.

For an example of a report, see "Graphical configuration reports" on page 434.

Viewing the output

The following figure shows an example of the panel when viewing a report.



HCD tries to display the entire configuration on one panel. If a report is too large for one panel, HCD divides the report into segments and shows each segment on an extra panel. If a CU report, for example, shows more than 8 control units, HCD shows the control units of the same type in one segment on an extra panel. You can move from segment to segment by using the Next and Previous function keys.

If a segment is too large for the panel, you can scroll upwards, downwards, to the left and to the right.

The following list describes specific function keys while viewing a graphical report.

F4=Jump
: You can use this function only when you have displayed the graphical report using the task ***Create or view graphical configuration report*** on the primary task selection panel. It displays the action list of the HCD dialog that contains the object you selected with the cursor. Any change made to the configuration on the action list will not be reflected in the graphical report when you return to it. Use the REFRESH command to reflect the changes made to the objects currently shown on the display (see “Refresh Command” on page 244).

F5=Zoom in
: Makes the graphical display bigger, so you can see the details of an object. The position of the cursor identifies the lower left corner of the part you want to enlarge. If the cursor in not positioned, HCD takes the center of the currently displayed report.

F6=Zoom out
: Makes the graphical display smaller, so you can see more of a report on one panel.

F7=Up
: Scrolls upwards.

F8=Down
: Scrolls downwards.

F10=Previous
: Moves to the previous segment of a report, if any.

F11=Next
: Moves to the next segment of a report, if any.

F19=Left
: Scrolls to the left.

F20=Right
: Scrolls to the right.

Save command

You can use the SAVE command to store a graphical configuration displayed on your screen in a member of a partitioned data set (PDS) in GDF format for printing with GDDM.

Before you use this command, the partitioned data set has to be allocated to ddname ADMGDF. The records of this PDS must have a record length of 400.

Specify SAVE (or just SA) and the member name, into which you want to save the data, on the command line. The syntax of the SAVE command is as follows:

SAVE Command

```
►►──┬─SAVE─┬──member_name──────────────────────────────────►◄
    └─SA───┘
```

member_name
: specifies the name of the member to contain the graphical configuration you want to print. Use a different name for each SAVE command, otherwise the data will be overwritten. The name may be up to eight characters long.

Locate Command

You can use the LOCATE command to center and highlight a specific object of the report. When you locate a partition, channel paths, or coupling facility partition, the connections to the object are highlighted instead of the object itself.

Specify LOCATE (or just L) and the object you want to locate in the command line. For objects that are associated with another object (for example, CHPIDs that are associated with a processor), you have to specify this object as well.

Locating multiple objects with the same ID: The LOCATE command first searches for an object in the currently displayed panel. If the object is not found it starts with the first segment and continues to the right until an object has been found. To find the other objects with the same ID, use the + and − parameter of the LOCATE command. The + parameter searches for the next object to the right, the − parameter to the left.

The syntax of the LOCATE command is as follows:

LOCATE command

```
►►──┬─LOCATE─┬──┬─CF──processor ID────────────────────────┬──┬─────┬──────────────►◄
    └─L──────┘  └─┬─CHPID──processor ID─┬──object id─┘  ├─ + ─┤
                  ├─CU──────────────────┤                 └─ − ─┘
                  ├─DEV─────────────────┤
                  ├─PART──processor ID──┤
                  ├─PR──────────────────┤
                  └─SW──────────────────┘
```

CF Coupling Facility
CHPID
Channel path
CU Control unit
DEV Device
PART Partition
PR Processor
SW Switch

Example: To locate CHPID 27 of processor SYSA, type

```
L CHPID SYSA 27
```

Refresh Command

When you jump to an action list using F4=Jump and change objects in this list, use the REFRESH command on return to the graphical display to refresh the graphic with the changes made.

REFRESH applies to all objects that were currently shown on the graphical report when pressing the F4=Jump key, that is, added objects or those, for which you changed the ID, will not appear in the refreshed graphic.

Valid abbreviation of the REFRESH command is RE.

How to print list panels

You can use the SAVE command to save the data that is currently displayed on HCD list panels into a data set. The data set can be used for printing.

You can also save and print lists that are filtered. If you use the ***Set Filter*** option from the ***Filter*** action bar choice, you can, for example, print all channels of a processor that are not connected to a control unit.

The SAVE command is available on the following list panels:

- Operating system configuration List
  - EDT List
  - Esoteric List
  - Esoteric/Device List
  - Generic
  - Generic/Device List
  - Console List
- Switch List
  - Port List
  - Switch Configuration List
  - Port Matrix
- Processor List
  - Channel Subsystem List
  - Channel Path List
  - Partition List
- Control Unit List
- I/O Device List
- Configuration Package List
  - Configuration Package Object List
- CTC Connection List
- I/O Path List

On these list panels, perform the following steps:

1. Enter the command

   ```
   SAVE
   ```

2. The Save List panel appears:

   ```
   ------------------------------ Save List ------------------------------

   Specify the following values.

   Output data set  ____________________________________________________

   Additional remarks (for example, the filter criteria)
   ______________________________________________________________________
   ______________________________________________________________________
   ```

   The output data set can be a sequential data set or a member of a partitioned data set. If the data set does not exist, it will be automatically allocated (record length 300, record format fixed block). The name of the data set is saved for the next HCD session.

   In addition you can specify two lines of optional comments that will be shown under the header of your report.

3. A result of a printed data set may look like the following example. Note that the column headers are the same as shown on the panel itself.

```
BOKA.IODF52.WORK - 2002-12-16  14:00 - Channel Path List 1

with DCM 2

Processor : MC38LPAR  Channel Subsystem ID : 0 3
                                Partitions : 1=F38B      2=F38C      3=F38D      4=F38E      5=F38F
                                             6=F38G      7=F38H      8=CFQ1      9=CFQ2      A=F38A
                                             B=          C=          D=          E=          F=

                DynEntry Entry +         I/O Cluster                                ----------Partitions 0x -----   PCHID
CHPID Type Mode Switch + Sw Port Con Mngd Name       Description                    1 2 3 4 5 6 7 8 9 A B C D E F   AID/P 4
-----------------------------------------------------------------------------------------------------------------------------
00    CNC  SHR  __       00 20   _   No   ________   _______________________                                        ___


00    CBP  SHR  __       __ __   Y   No   ________   CFQ1 ICB SENDER CHANNEL        a a a a a a a _ _ a _ _ _ _ _   ___
01    CBP  DED  __       __ __   Y   No   ________   CFQ1 ICB RECEIVER CHANNEL      _ _ _ _ _ _ _ a _ _ _ _ _ _ _   ___
02    CBP  SHR  __       __ __   Y   No   ________   CFQ1 ICB SENDER CHANNEL        a a a a a a a _ _ a _ _ _ _ _   ___
03    CBP  DED  __       __ __   Y   No   ________   CFQ1 ICB RECEIVER CHANNEL      _ _ _ _ _ _ _ a _ _ _ _ _ _ _   ___
04    CNC  SHR  6D       6D FB   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
05    CNC  SHR  6E       6E FB   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
06    CNC  SHR  6F       6F B3   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
07    CNC  SHR  6F       6F C7   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
08    CNC  SHR  70       70 B3   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
09    CNC  SHR  70       70 C7   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0A    CNC  SHR  77       77 EB   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0B    CNC  SHR  77       77 31   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0C    CNC  SHR  89       89 D6   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0D    CNC  SHR  89       89 43   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0E    CNC  SHR  71       71 73   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
0F    CVC  DED  __       __ __   _   No   ________   console for F38C               _ a _ _ _ _ _ _ _ _ _ _ _ _ _   ___
10    CNC  SHR  65       65 A9   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
11    CNC  SHR  66       66 A9   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
12    CNC  SHR  67       67 A9   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
13    CNC  SHR  68       68 A9   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
14    CNC  SHR  6D       6D F7   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
15    CNC  SHR  6E       6E F7   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
16    CNC  SHR  6F       6F AF   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
17    CNC  SHR  6F       6F CB   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
18    CNC  SHR  70       70 AF   _   Yes  UTCPLX38   _______________________________ * * * * * * * _ _ * _ _ _ _ _   ___
19    CNC  SHR  70       70 CB   _   No   ________   _______________________________ a a a a a a a _ _ a _ _ _ _ _   ___
```

Figure 101. Example of a printed List Panel

1 Header with IODF name, date, time, list name

2 Optional comments specified on Save List panel

3 Identifier of higher-level object, for example the processor name (and channel subsystem ID if applicable) when you print the channel path list

4 Column headers as shown on the panel itself

HCD compare functions

HCD offers functions to compare IODFs and device definitions for a selected CSS or operating system and to report the differences:

- "Compare IODFs"
- "Compare CSS / operating system views" on page 250

Compare IODFs

You can use the ***Compare IODFs*** function to compare two IODFs and report the differences between them. For greater clarity, you can limit the compare reports to certain perspectives of the IODF:

- The ***Processor Compare Report*** shows differences in the properties of channel subsystems, partitions, CHPIDs, control units, and devices.

- The ***Switch Compare Report*** shows differences in the properties of switches and switch configurations.
- The ***OS Configuration Compare Report*** shows differences in device parameters, in features, in EDTs, in esoterics, in generics defined for EDTs, and consoles.

To compare IODFs, do the following:

1. Select ***Print or compare configuration data*** on the primary task selection panel .
2. On the Print or Compare Configuration Data panel, select ***Compare IODFs***. The following panel is displayed:

```
┌─────────────────────────────── Compare IODFs ───────────────────────────────┐
│                                                                              │
│ Select the compare reports you want, and specify the following values.      │
│                                                                              │
│ New IODF name : 'DOCU.IODF01'                                                │
│ Old IODF name . ____________________________________  +                      │
│                                                                              │
│ Select compare reports                   Limit ?                             │
│              _  Processor                  _  Yes                            │
│              _  Switch                     _  Yes                            │
│              _  Operating system           _  Yes                            │
│                                                                              │
│ Job statement information                                                    │
│ //         JOB (ACCOUNT),'NAME'                                              │
│ //*                                                                          │
│ //*                                                                          │
│ //*                                                                          │
│ //*                                                                          │
│ //*                                                                          │
│                                                                              │
│  F1=Help     F2=Split  F3=Exit  F4=Prompt   F5=Reset    F9=Swap              │
│ F12=Cancel                                                                   │
└──────────────────────────────────────────────────────────────────────────────┘
```

Figure 102. Compare IODFs

On this panel, select one or more compare report(s). In addition, you can set the limit option. When the limit option is set, the related limiting panels will come up.

On the ***Limit Processor Compare Reports*** panel, you can limit the processor compare reports by selecting one or more of the specific compare reports. You can limit the reports by specifying values for a processor or either by specifying values for a channel subsystem or a partition. It is possible to compare an SMP processor to a channel subsystem of an XMP processor. If you want to limit by processor, you must specify the processor IDs for both IODFs. If you limit the processor compare report by partition name, you receive the following results:

- The report will contain the channel subsystem in which the partition is defined.
- Channel path compare will only contain channel paths which have the limiting partition in their access or candidate list.
- Control unit compare will only include the control units related to channel paths which have the limiting partition in their access or candidate list.
- Device compare will only include the devices connected via channel paths which have the limiting partition in their access or candidate list.

```
┌────────────── Limit Processor Compare Reports ──────────────┐
|                                                              |
| Select one or more of the processor compare reports.        |
|                                                              |
|  _  Processor Compare                                        |
|  _  Channel Subsystem Compare                                |
|  _  Partition Compare                                        |
|  _  Channel Path Compare                                     |
|  _  Control Unit Attachment Compare                          |
|  _  Device Attachment Compare                                |
|  _  Control Unit Compare                                     |
|  _  Device Compare                                           |
|                                                              |
| To limit the reports, specify the following values.         |
|                                                              |
|                         New IODF         Old IODF           |
| Processor ID . . . . . . ________  +      ________  +        |
| Channel Subsystem ID     _  +             _  +               |
| Partition name . . . . . ________  +      ________  +        |
|                                                              |
|  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    |
|  F9=Swap    F12=Cancel                                       |
└──────────────────────────────────────────────────────────────┘
```

Figure 103. Limit Processor Compare Reports

On the ***Limit Switch Compare Reports*** panel, you can limit the switch compare reports by one or more of the specific compare reports. In addition, you can limit the reports by specifying a switch ID for both, the new and the old IODF.

```
┌─────────────── Limit Switch Compare Reports ───────────────┐
|                                                             |
|                                                             |
| Select one or more of the switch compare reports.          |
|                                                             |
| _  Switch Compare                                           |
| _  Switch Port Compare                                      |
| _  Switch Configuration Compare                             |
| _  Port Configuration Compare                               |
|                                                             |
| To limit the report, specify the following values:         |
|                                                             |
|                  New IODF        Old IODF                  |
| Switch ID  . . . __  +           __  +                      |
|                                                             |
|  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset   |
|  F9=Swap    F12=Cancel                                      |
└─────────────────────────────────────────────────────────────┘
```

Figure 104. Limit Switch Compare Reports

On the ***Limit Operating System Compare Reports*** panel, you can limit the operating system compare reports by one or more of the specific compare reports. In addition, you can limit the reports by specifying an operating system ID for both, the new and the old IODF.

```
┌─────────── Limit Operating Systems Compare Reports ───────────┐
│                                                                │
│                                                                │
│ Select one or more of the operating system compare reports.    │
│                                                                │
│ _  Operating Systems Compare                                   │
│ _  EDT Compare                                                 │
│ _  Generic Compare                                             │
│ _  Generic Update Compare                                      │
│ _  Esoteric Compare                                            │
│ _  OS Console Compare                                          │
│ _  OS Device Compare                                           │
│                                                                │
│ To limit the report, specify the following values:             │
│                                                                │
│                         New IODF         Old IODF              │
│ Operating system ID  . . ________  +       ________  +         │
│                                                                │
│                                                                │
│  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset      │
│  F9=Swap    F12=Cancel                                         │
└────────────────────────────────────────────────────────────────┘
```

Figure 105. Limit Operating System Compare Reports

How to print a Compare IODFs Report

After you have selected the specific pairs for the compare reports, you can decide what print options to use. The print options are shown on the Select Print Options panel, see Figure 106.

If you do not select an option (by only pressing the Enter key), the default print options are used (`Print inserted data`, and `Print deleted data`).

Examples of these reports are shown in “Appendix B. Configuration reports” on page 377.

```
┌────────── Select Print Options ──────────┐
│                                           │
│                                           │
│ Select one or more of the following       │
│ options, or ENTER to use the defaults.    │
│                                           │
│ /  Print inserted data                    │
│ /  Print deleted data                     │
│ _  Print unchanged data                   │
│ _  Print unchanged item IDs               │
│                                           │
│  F1=Help       F2=Split      F3=Exit      │
│  F5=Reset      F9=Swap      F12=Cancel    │
└───────────────────────────────────────────┘
```

Figure 106. Select Print Options (for Compare IODFs only)

When you do not select any option, HCD prints a report of

- IDs of added or deleted objects, and those objects, that have added or deleted relations
- IDs of added relations
- Attributes of objects that are different in both IODFs

When you select the `Print inserted data` option, HCD prints a report of all attributes, and relations of added objects.

When you select the `Print deleted data` option, HCD prints a report of all attributes, and relations of deleted objects.

When you select the `Print unchanged data` option, HCD prints a report of all attributes, and relations of unchanged objects.

When you select the `Print unchanged item IDs` option, HCD prints a report of the IDs of unchanged objects. But this applies only, if the `Print unchanged data` option is not selected.

Compare CSS / operating system views

You can use the ***Compare CSS / operating system views*** function to compare the device definitions of a selected CSS and OS configuration, showing which devices (their numbers and types) are defined to either the CSS or the OS, or both. By using this function you can find out the differences between a hardware (channel subsystem/CSS) and software (operating system/OS) definition in the currently accessed IODF.

```
-------------------------- Compare CSS / OS Views --------------------------


 Specify the following values.

 IODF name . . : 'DOCU.IODF00.FP.NEW'

 CSS view
 Processor ID . . . . ________  +   Partition name . . ________  +

 OS view
 Configuration ID . . ________  +   2   1.  Print all data
                                        2.  Print different data
 Job statement information
 //         JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
 //*
 //*

  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 107. Select Print Options (for CSS/OS Compare only)

When using the ***Compare CSS / operating system views*** function, you are offered the possibility of selecting what to print on the ***Compare CSS / OS Views*** panel, shown in Figure 107. The `Print all data` option prints a report of all devices either defined in the CSS or the OS.

The `Print different data` option prints a report of the devices that differ as follows:
- Defined for the CSS, but not for the OS.
- Defined for the OS, but not for the CSS.
- Defined for both, but of different device type.

If you limit the Compare CSS/OS Views Report for the CSS-side to one partition, it will generate information only for those devices that are attached to the channel paths, that have the limiting partition in the access or candidate list.

View and print the HCD activity log

The HCD activity log is described in “Activity logging and change logging” on page 54.

To look at the activity log for an IODF,

1. Select ***Print or compare configuration data*** from the primary task selection panel.
2. On the Print or Compare Configuration Data panel, select ***View the activity log*** or ***Print the activity log***.

The log has the same format in both cases. For browsing, the log is displayed by the ISPF/PDF browse facility. For printing, the log is written to the ISPF list data set.

Note: HCD maintains an activity log only if this was requested when the IODF data set was created.

Chapter 10. How to query supported hardware and installed UIMs

Overview

This information unit describes how to view system data about:
- Supported processors
- Supported switches
- Supported control units
- Supported devices
- Supported installed UIMs

Your z/OS system has several tables and modules that contain data about the general characteristics of processors, switches, control units, and devices in the system.

HCD uses this data to validate your configuration definition. You might want to look at it during the definition task; it helps you select the correct characteristics when you define your hardware units. You can also use the supported hardware report as a help when defining your configuration. See "Supported Hardware Report" on page 400 for an example of a supported hardware report and "I/O Definition Reference" on page 430 for an example of an I/O definition reference.

You can view the system data by selecting ***Query supported hardware and installed UIMs*** from the primary task selection panel or the ***Query*** action from the action bar. Then select the subtask or pull-down choice that you want.

Query supported processors

The option `List supported processors` shows which processors are supported by the system. You can also see which features each processor supports, and its capabilities (such as what types of channel paths the processor supports).

```
                     Supported Processors
                                            Row 246 of 600 More:      >
Command ===> ___________________________________________ Scroll ===> CSR

Select one to view more details.

  Processor
  Type-Model Support Level
  2084-D32   XMP, Basic 2084 support, 3xx models    1
# 2084-D32
  2084-D32   XMP, 3xx models, OSC                   2
# 2084-D32
  2086-A04   XMP, Basic 2086 support
# 2086-A04
  2094-S08   XMP, Basic 2094 support
  2094-S18   XMP, Basic 2094 support
  2094-S28   XMP, Basic 2094 support
  2094-S38   XMP, Basic 2094 support
  2094-S54   XMP, Basic 2094 support
  3000-A10   Parallel, ESCON (CBY), OSA, ISD channels
 F1=Help        F2=Split       F3=Exit        F7=Backward    F8=Forward
 F9=Swap       F12=Cancel     F20=Right      F22=Command
```

Figure 108. List of Supported Processors

The two lines in Figure 108 marked with **1** and **2** illustrate that processors with different support levels generate more entries in the list of supported processors.

Horizontal scrolling displays additional information on the processors.

A # preceding a line indicates that this line and the previous line belong together, because the information of a horizontally scrolled screen does not fit in one line.

```
                     Supported Processors
                                            Row 246 of 600 More:  <   >
 Command ===> ___________________________________________ Scroll ===> CSR

 Select one to view more details.

   Processor  Supported
   Type-Model Channel Path Types
   2084-D32   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP,ICP,
 # 2084-D32   IQD,FCP
   2084-D32   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP,ICP,
 # 2084-D32   IQD,FCP,OSC
   2086-A04   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,
 # 2086-A04   OSC
   2094-S08   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC,OSN
   2094-S18   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC,OSN
   2094-S28   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC,OSN
   2094-S38   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC,OSN
   2094-S54   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC,OSN
   3000-A10   BL,BY,CNC,CTC,CVC,CBY,OSA,ISD
  F1=Help        F2=Split       F3=Exit        F7=Backward    F8=Forward
  F9=Swap       F12=Cancel     F19=Left       F20=Right      F22=Command
```

```
 ------------------------- Supported Processors -------------------------- 
                                                                           
                                              Row 246 of 600 More: <     > 
 Command ===> ________________________________________________ Scroll ===> CSR 
                                                                           
 Select one to view more details.                                          
                                                                           
   Processor   Support   Supported                                         
   Type-Model  Level ID  Protocols  DCM CAS WI  RI                         
   2084-D32    H030530   D,S,S4     Yes Yes Yes Yes                        
 # 2084-D32                                                                
   2084-D32    H040331   D,S,S4     Yes Yes Yes Yes                        
 # 2084-D32                                                                
   2086-A04    H040331   D,S,S4     Yes Yes Yes Yes                        
 # 2086-A04                                                                
   2094-S08    H050331   D,S,S4     Yes Yes Yes Yes                        
   2094-S18    H050331   D,S,S4     Yes Yes Yes Yes                        
   2094-S28    H050331   D,S,S4     Yes Yes Yes Yes                        
   2094-S38    H050331   D,S,S4     Yes Yes Yes Yes                        
   2094-S54    H050331   D,S,S4     Yes Yes Yes Yes                        
   3000-A10    H971001   D,S,S4     No  No  No  No                         
  F1=Help       F2=Split      F3=Exit       F7=Backward    F8=Forward      
  F9=Swap      F12=Cancel    F19=Left      F20=Right      F22=Command      
                                                                           
```

```
 ------------------------- Supported Processors -------------------------- 
                                                                           
                                               Row 246 of 600 More: <      
 Command ===> ________________________________________________ Scroll ===> CSR 
                                                                           
 Select one to view more details.                                          
                                                                           
   Processor  --Highest Number for--  ----------Maximum Number of--------- 
   Type-Model CUs      Devices        CHPIDs CUs  LCUs Partitions CSS SCHS 
   2084-D32   FFFE     FFFF           512    8192 4096 30         2        
 # 2084-D32                                                                
   2084-D32   FFFE     FFFF           1024   8192 4096 30         4        
 # 2084-D32                                                                
   2086-A04   FFFE     FFFF           512    8192 4096 30         2        
 # 2086-A04                                                                
   2094-S08   FFFE     FFFF           1024   8192 4096 60         4   2    
   2094-S18   FFFE     FFFF           1024   8192 4096 60         4   2    
   2094-S28   FFFE     FFFF           1024   8192 4096 60         4   2    
   2094-S38   FFFE     FFFF           1024   8192 4096 60         4   2    
   2094-S54   FFFE     FFFF           1024   8192 4096 60         4   2    
   3000-A10   FFFE     FFFF           32     6144 3072 10                  
  F1=Help       F2=Split      F3=Exit       F7=Backward    F8=Forward      
  F9=Swap      F12=Cancel    F19=Left      F22=Command                     
                                                                           
```

You can view channel path, control unit, and device information by placing the cursor in front of a processor and pressing the Enter key. As a sample of this type of information, you see the channel path information below:

```
 ┌──────────────────────── View Channel Path Information ─────────────────────────┐
 │                                                                               │
 │                                                              Row 1 of 17     │
 │ Command ===> ____________________________________________________________    │
 │                                                                               │
 │ ENTER to view information about allowed channel path type mixes.              │
 │                                                                               │
 │ Processor Type-Model  . . . . . : 2084-D32                                    │
 │     XMP, Basic 2084 support, 3xx models     1                                 │
 │                                                                               │
 │ Supported  Maximum  --Max. Number per CHPID-- ---Supported---- Shared         │
 │ Type       Number   UA Ranges  Links  Devices Time-out  STADET               │
 │ CBP        32                         256     No        No     Yes            │
 │ CBR        8                                                                  │
 │ CBS        8                          256     No        No     Yes            │
 │ CBY        512      64                256     No        Yes    No             │
 │ CFP        32                         256     No        No     Yes            │
 │ CFR        32                                                                 │
 │ CFS        32                         256     No        No     Yes            │
 │ CNC        512      120        120    1024    No        Yes    Yes            │
 │ CTC        512      120        120    512     No        Yes    Yes            │
 │ CVC        512      64                256     Yes       Yes    No             │
 │  F1=Help       F2=Split       F3=Exit        F7=Backward    F8=Forward        │
 │  F9=Swap      F12=Cancel     F22=Command                                      │
 │                                                                               │
```

Pressing the Enter key gives you a list of allowed channel path type mixtures. Pressing the Enter key again gives you similar information for control units and devices.

Note:
For zSeries processors, you can retrieve an explanation of the processor support level: Position the cursor on the processor support level description **1** and press PF1 to get an enumeration of functions provided by this support level.

Query supported switches

The option `List supported switches` shows the characteristics of each type of switch in the system, such as the port range and the supported channel attachments of each switch.

```
                            Supported Switches

ENTER to continue.

               Port Numbers  Supported
Switch Type    Low - High    Channel Attachments
FCS             00 - FF      FC
2032            00 - FF      FC
9032            C0 - FB      CNC,CTC,CVC,CBY
9032-3          80 - FB      CNC,CTC,CVC,CBY
9032-5          04 - FB      CNC,CTC,CVC,CBY,FCV
9033            C0 - CF      CNC,CTC,CVC,CBY
```

Query supported control units

The option `List supported control units` displays a panel showing a list of available control unit groups, for example the DASD control unit group. Select one control unit group to limit the list of supported control unit types. The Supported Control Units panel appears showing the characteristics of control unit types contained in a group.

```
 ---------------------- Supported Control Units -----------------------
                                              Row 2 of 28 More:       >
 Command ===> _____________________________________ Scroll ===> CSR

 Select a control unit to view the list of device types that can be
 attached to the control unit.

                           -------Default for-------
   Control Unit  Supported Protocol  I/O Concurrency
   Type          Protocols Used      Level
   2105          S,S4      S         2
   2835-2        D         D         2
   3380-CJ2      S         S         2
   3830-2        D         D         2
   3830-3        D         D         2
   3851          D         D         2
   3880-1        D,S       S         2
   3880-11       D,S       S         2
   3880-13       D,S       S         2
   3880-2        D,S       S         2
   3880-21       D,S,S4    S         2
   3880-23       D,S,S4    S         2
   3880-3        D,S       S         2
```

Horizontal scrolling displays additional information on supported channel path type attachments.

```
 ---------------------- Supported Control Units -----------------------
                                              Row 2 of 28 More: <
 Command ===> _____________________________________ Scroll ===> CSR

 Select a control unit to view the list of device types that can be
 attached to the control unit.


   Control Unit  Supported
   Type          Channel Attachments
   2105          CNC,FC,FCV
   2835-2        BL,CVC,EIO
   3380-CJ2      BL,CVC,EIO
   3830-2        BL,CVC,EIO
   3830-3        BL,CVC,EIO
   3851          BL,BY,CVC,CBY,EIO
   3880-1        BL,CVC,EIO
   3880-11       BL,CVC,EIO
   3880-13       BL,CVC,EIO
   3880-2        BL,CVC,EIO
   3880-21       BL,CVC,EIO
   3880-23       BL,CVC,EIO
   3880-3        BL,CVC,EIO
```

You can view which devices can be attached to a certain control unit type by placing the cursor in front of a control unit and pressing the Enter key. As a sample of this type of information, you see the CU - Device Attachment List below:

```
┌─────────────── CU - Device Attachment List ────────────────┐
│                                                  Row 1 of 2 │
│ Command ===> ___________________________ Scroll ===> PAGE   │
│                                                             │
│ Following device(s) can be attached to control unit type    │
│ 3990                                                        │
│                                                             │
│ ENTER to continue.                                          │
│                                                             │
│ Device Type                                                 │
│ 3380                                                        │
│ 3390                                                        │
│ ********************* Bottom of data ********************** │
```

Query supported devices

The option `List supported devices` displays a panel showing a list of available device groups, for example the DASD device group. Select one device group to view characteristics of device types contained in this group. You can limit the list of device types to view only the device types supported by a specific operating system type. After selecting a group of devices, the Supported Device Type List panel appears.

```
┌──────────────────────── Supported Device Type List ────────────────────────┐
│                                                               Row 13 of 27 │
│ Command ===> ___________________________________________ Scroll ===> PAGE  │
│                                                                            │
│ Select a device type to view the list of control unit type(s) to which the │
│ device can be attached.                                                    │
│                                                                            │
│                           --Support--          -Recommended- -Console-     │
│   Device                  Dyn.  Four- Multi-   Time-  STADET NIP    VM     │
│   Type          MVS  VM         Digit Exposure Out           Elig.  Us     │
│   3370               Yes              No       Yes    Yes           No     │
│   3375          Yes  Yes  Yes   Yes   No       Yes    Yes    No     No     │
│   3380          Yes  Yes  Yes   Yes   No       Yes    Yes    No     No     │
│   3380-CJ2      Yes  Yes  Yes   Yes   No       Yes    Yes    No     No     │
│   3390          Yes  Yes  Yes   Yes   No       Yes    Yes    No     No     │
```

You can also see what control units each I/O device type can be attached to by placing the cursor in front of a device and pressing the Enter key.

As a sample of this type of information, you can see the Device - CU Attachment List below:

```
 ---------------- Device - CU Attachment List -----------------
                                               Row 1 of 11
 Command ===> ___________________________ Scroll ===> PAGE

 Following control unit type(s) support the attachment of
 device type
 3380

 ENTER to continue.

 Control Unit Type
 NOCHECK
 3380-CJ2
 3880-13
 3880-2
 3880-23
 3880-3
```

Query installed UIMs

The option `List installed UIMs` shows which UIMs are available in the system and which I/O device types are supported by each UIM.

```
 ------------------------------ Installed UIMs ------------------------------
                                                              Row 1 of 51
 Command ===> ___________________________________________ Scroll ===> PAGE

 Select one for a list of the devices it supports.

   UIM Name  E Description
   CBDUS001    UIM for 3330, 3333, 3340, 3344, 3350
   CBDUS002    UIM FOR 3375, 3380 ,3390, 3995-151/153, 9345
   CBDUS003    UIM for 3350P and 3351P
   CBDUS004    UIM for 327x devices
   CBDUS005    UIM for Magnetic Tape Devices
   CBDUS011    UIM for 3800
   CBDUS012    UIM for Unit Record devices
   CBDUS013    UIM for 2305-2
   CBDUS014    UIM for CTC Devices
   CBDUS022    UIM for AFP1 and 3820 Printers
   CBDUS023    UIM for 37xx and 7770
   CBDUS024    UIM for 1030, 1050, 1050X, 115A, 2740, 2740C, 2740X, 376
   CBDUS025    UIM for 2741P, 2741C, 83B3, TWX, WTTA
   CBDUS026    UIM for BSC1, BSC2, BSC3
  F1=Help       F2=Split      F3=Exit       F7=Backward    F8=Forward
  F9=Swap      F12=Cancel     F22=Command
```

A `Y` (for Yes) in the `E` (for Error) column indicates that the respective UIM is in error and treated as not existing.

A # sign in front of a UIM name indicates that it cannot be selected because it is flagged in error.

For each of the installed UIMs you can view a list of supported devices by placing the cursor in front of a UIM and pressing the Enter key. As a sample of this type of information, you can see the View Supported Devices list below:

```
┌─────────────────────────── View Supported Devices ───────────────────────────┐
|                                                                 Row 1 of 7   |
| Command ===> ___________________________________________ Scroll ===> PAGE    |
|                                                                              |
| This UIM supports the listed device types.                                   |
|                                                                              |
| UIM name : CBDUS002                                                          |
|            UIM FOR 3375, 3380 ,3390, 3995-151/153, 9345                      |
|                                                                              |
| ENTER to continue.                                                           |
|                                                                              |
|               Generic                                                        |
|               -- or --                                                       |
| Device Type   VM D/T   Description                                           |
| 3375          3375     Direct Access Storage Device                          |
| 3380          3380     Direct Access Storage Device                          |
| 3380-CJ2      3380     Direct Access Storage Device                          |
| 3390          3390     Direct Access Storage Device                          |
| 3995-151      3390     Direct Access Storage Device                          |
| 3995-153      3390     Direct Access Storage Device                          |
| 9345          9345     Direct Access Storage Device                          |
|  F1=Help        F2=Split       F3=Exit        F7=Backward    F8=Forward      |
|  F9=Swap       F12=Cancel     F22=Command                                    |
└──────────────────────────────────────────────────────────────────────────────┘
```

Chapter 11. How to migrate existing input data sets

Overview

This information unit describes how to:
- Prepare the input data sets before migrating them
- Migrate the input data sets using the HCD dialog
- Migrate the input data sets using the HCD batch utilities
- Replace existing configuration data through migration
- Change I/O configurations by editing data sets
- Understand and resolve errors that occurred during migration

HCD allows you to migrate existing configuration data that was defined in IOCP, MVSCP, and HCPRIO input data sets to an IODF.

As input, you can use one of the following:
- An IOCP input data set
- An MVSCP input data set
- An HCPRIO input data set

You can also use the migration to create I/O definitions by editing control statements. Data sets containing the statements corresponding to a specific IODF can be generated using a batch utility. Refer to “Build I/O configuration statements” on page 320 for details on which data sets can be built and how to run the build process.

When migrating from input data sets, HCD checks the syntax of the input statements and runs a validation process that checks that the definitions being migrated do not conflict with the I/O configuration rules and with existing definitions in the IODF or with other definitions being migrated.

If HCD detects an error in the input data sets, it issues messages after the migration process has ended.

Note: The migration function has a prerequisite to the High Level Assembler.

Migration sequence

If you want to migrate more than one input data set into a single IODF, comply to the following migration sequence:
1. Migrate all IOCP input data sets
2. Migrate all MVSCP or HCPRIO input data sets

LPAR considerations

If you have a combined IOCP/MVSCP input data set containing definitions for more than one LPAR and the same device number specified for more than one LPAR, migrate this input data set in the following way:
1. Migrate the input data set as IOCP only input data set.

2. Remove the duplicate device number definition and repeat the migration as an MVSCP only input data set. In the appropriate IODEVICE statement, specify the control unit number the device attaches to by means of the CUNUMBR parameter.

Preparing your input data sets for migration

Before you can successfully migrate IOCP, MVSCP, or HCPRIO input data sets, you may need to change the input because HCD does a more rigorous checking of the input statements than IOCP or MVSCP.

To ensure that the migration is successful and that the resulting IODF accurately reflects the physical configuration, ensure that your input data sets apply to the validation rules described below. For assistance when checking the definitions in the input statements, you can use the following possibilities:
- Select ***Query supported hardware and installed UIMs*** from the primary task selection panel
- Use the ***Query*** action bar choice
- Use the batch facility ″Print a Configuration or Supported Hardware Report″

Data requiring attention

This section details which data may need to be changed and how to change it to ensure a successful migration.

Control unit types

HCD checks whether a specified control unit type is valid. Review your input for invalid control unit types. If applicable, correct the UNIT parameter of the CNTLUNIT statement.

If you do not want to change the type in your input data set, you can edit the HCD profile and specify how a control unit type in the IOCP input data set is mapped to a control unit type in the IODF. Specify one or more of the following keyword:

```
MAP_CUTYPE = xxxxx,yyyy-yy
```

xxxxx
is the control unit type specified in the IOCP input data set

yyyy-yy
is the control unit type and model (optional) to be used in the IODF

For more information about the HCD profile, refer to “Defining an HCD profile” on page 25.

Control unit models

HCD requires, for certain control unit types, the specification of a model. For example, the IBM 3880 control unit requires a model specification. If a control unit type requires a model specification, and if you do not specify one in the input data set, HCD assigns a model to the control unit definitions based on the attached devices and the used control unit protocol. This control unit model is indicated as default model in the UIM (information message CBDA534I is issued). As processing goes on, it can be necessary to change the default model to another model to support the specified protocol (warning message CBDA536I is issued). Or, the default model is changed to attach a device type which is not supported by the default control unit model (warning message CBDA265I is issued).

Note: The sequence of messages is shown in reverse order in the migration log file since the messages are sorted according to decreasing severities. For an example, please see "Errors detected during assembly process" on page 303.

To assign a model to a control unit, change the UNIT parameter of the CNTLUNIT statement in the input data set. Append the model number separated by a dash to the control unit type specification. For example:

```
CNTLUNIT ...,UNIT=3880-23
```

To avoid changing the input data sets, you can also add a model number by using the MAP_CUTYPE parameter in the HCD profile as described under "Control unit types" on page 262.

Protocol support for control units

HCD checks the protocols supported by a control unit type. For example, in the source you may have an IBM 3745 with protocol S specified as control unit type 3705. The IOCP program does not check the protocol S specification. To be accepted by HCD as valid input, you have to change the control unit type to 3745.

Device types

For IOCP input data sets: HCD checks the device types for validity and that they can be attached to the specified control unit. Check your IODEVICE statements in the IOCP input data set and make sure that the device types are valid and reflect the true physical device they are defining. A common error, for example, is the IBM 3745 device type defined as 3705.

For MVSCP input data sets: HCD supports device types that previously had to be defined as ″look-alike″ devices for MVSCP. For example, for an IBM 3251 graphic device (previously defined as 2250-3), it is mandatory that the correct device type is defined in the UNIT parameter. HCD validates the PCU parameter, which is different for the IBM 3251 and the IBM 2250-3 graphic devices.

A device whose device type supports the dynamic capability may be defined as dynamic or not dynamic by means of the DYNAMIC parameter. However, there are programs, including customer programs, supplier programs and IBM products, that depend on device related data structures such as UCB and EDT, or use existing operating system services which access these data structures, and are unprepared to handle dynamic changes to these structures.

Therefore, HCD considers devices that are not specified with the DYNAMIC parameter in the IODEVICE statement as ″installation-static″, as it does if DYNAMIC=NO. That means, that the device might support the dynamic capability, but the installation requests that the device is not treated as dynamic.

Installation-static devices can be dynamically added to the software I/O configuration, but can not be deleted or modified while z/OS is running.

When migrating the MVSCP input data sets, HCD shows **no** value as default with the DYNAMIC and the LOCANY parameter, instead of specifying NO.

For HCPRIO input data sets: HCD supports device types that previously had to be defined as ″look-alike″ devices for HCPRIO. For example, you can define an IBM 6262 printer device (previously defined as an IBM 4248 printer device in the HCPRIO input data set) with a device type of 6262.

The device type support for VM has been brought into line with the MVS type support. However, there might be some differences to HCPRIO device type support (for example, concerning the MODEL parameter).

Esoteric token

HCD introduces an esoteric token that will be used by allocation to find the appropriate esoteric for a data set that has been cataloged using the esoteric. You no longer have to maintain a chronological order and may delete and add esoterics without getting access problems for data sets that are cataloged using esoterics.

You may use the HCD profile (see "Defining an HCD profile" on page 25) to tell HCD to assign a token in ascending order to each esoteric when migrating an MVSCP input data set.

If you do not want to assign tokens in ascending order or when you migrate only parts of a configuration using the incremental update function (see "Updating parts of a configuration by migrating input data sets" on page 292), you can use a new parameter on the UNITNAME statement. This parameter lets you specify a token for an esoteric to be migrated to HCD, as follows:

```
UNITNAME=...,TOKEN=nnn
```

nnnn
: is a number from 1 to 8999.

You have to specify a token for all esoterics or for none at all. For more information on catalog considerations, refer to "Data sets cataloged with an esoteric device group name" on page 343.

Assembler statements

HCD generates own macro instructions into the logical input data set before processing. This may cause problems with assembler statements you inserted into your input data sets. For example, coding the ISEQ, CSECT, or RMODE instructions may cause a warning message issued by the assembler. As a consequence the migration will be terminated. To avoid this, remove your assembler statements. The generated HCD instructions look as follows:

```
       PRINT OFF
       COPY CBDZPARS
       TITLE 'xxx LISTING'
CBDTXT CSECT
CBDTXT RMODE ANY
       PRINT ON NOGEN
            .
            .
input data set statements
            .
            .
       PRINT OFF
       HCDEND
       END CBDTXT
```

Preparing additional input data sets for migration

This section describes what you have to consider when migrating more than one MVSCP, IOCP, or HCPRIO input data set to one IODF.

When you migrate additional input data sets to an IODF that already contains definitions, these input data sets may contain control units and devices that are already defined in the existing IODF. HCD assumes that control units being added that already exist in the IODF refer to the same physical control unit, and that the control unit is shared between processors. The following sections describe the rules when a control unit or device is mapped to an existing one and when it is newly defined.

Migrating additional IOCP input data sets

When migrating additional IOCP input data sets, the mapping of control units and devices depends on whether the attached control units are already defined in the IODF or not.

The same control unit number is already defined in the IODF: The control unit is mapped, if both:

- The control unit type is the same, and
- The number and type of attached devices are the same

If one of these conditions is not fulfilled, the control unit definition is rejected. Figure 109 to Figure 111 on page 266 show examples of how control units are mapped. These examples do not show more than two control units attached to devices, but the same rules also apply if more control units are attached.

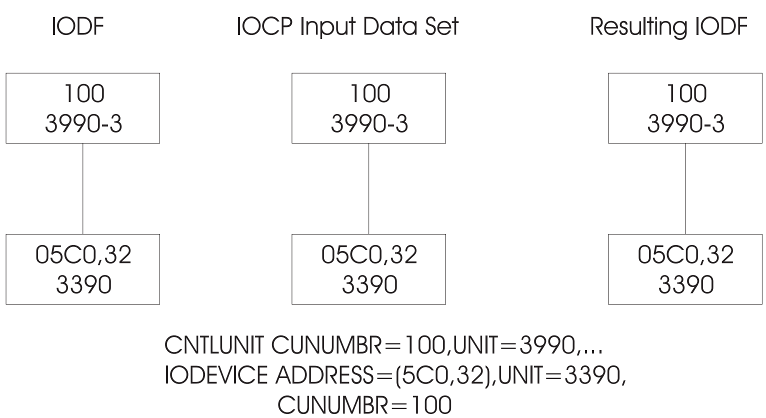


Figure 109. IOCP Migration. Control units and devices are mapped, because they already exist in the IODF.

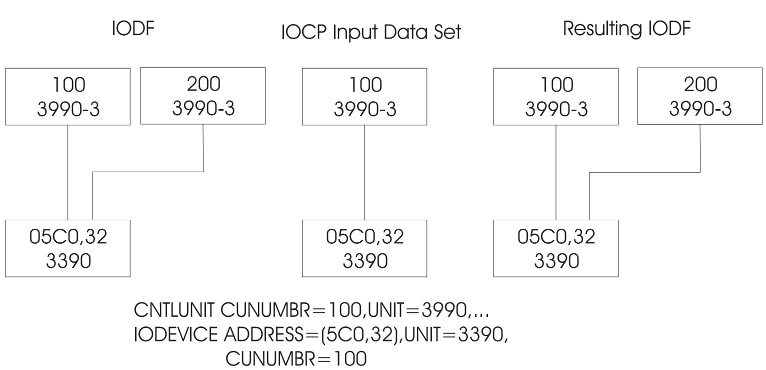
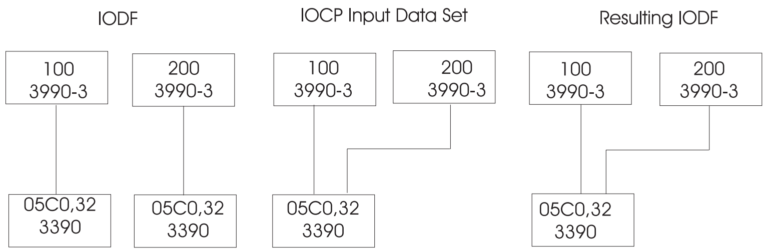


Figure 110. IOCP Migration. Control units and devices are mapped, although the devices also attached to another control unit in the IODF.

The following example shows the same control units in the IODF and IOCP input data set, but the attached devices are shared in the IOCP input data set. In this case, the devices are merged and will be shared after the migration (only if the control units do not connect to the same processor configuration).




```
CNTLUNIT CUNUMBR=100,UNIT=3990,...
CNTLUNIT CUNUMBR=200,UNIT=3990,...
IODEVICE ADDRESS=(5C0,32),UNIT=3390,
         CUNUMBR=(100,200)
```

Figure 111. IOCP Migration. Control units and devices are mapped (only if the control units do not connect to the same processor configuration).

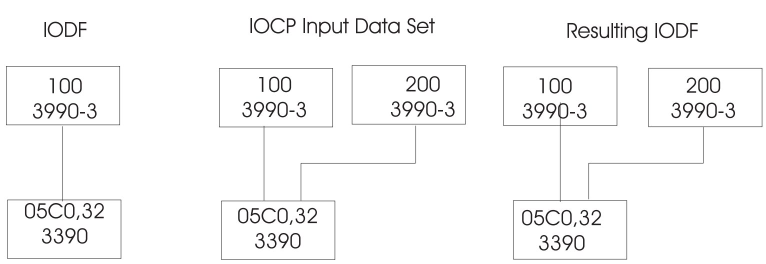
The same control unit number is not yet defined in the IODF: In this case:

- A new control unit is defined.
- A new device is defined, unless
  - The device in the input data set is attached to a control unit, to which it is already attached in the IODF. In this case, the new device is mapped to the existing one and attached to both control units (see Figure 112.)

  - or -

  - A device with same device number and type already exists in the IODF and is not attached to any control unit. In this case, the new device is mapped to the existing one and attached to the new control unit (see Figure 113 on page 267).

  If none of these conditions is fulfilled, a new device is defined (see Figure 114 on page 267).




```
CNTLUNIT CUNUMBR=100,UNIT=3990,...
CNTLUNIT CUNUMBR=200,UNIT=3990,...
IODEVICE ADDRESS=(5C0,32),UNIT=3390,
         CUNUMBR=(100,200)
```

Figure 112. IOCP Migration. Devices are mapped, because one attached control unit is already defined in the IODF.

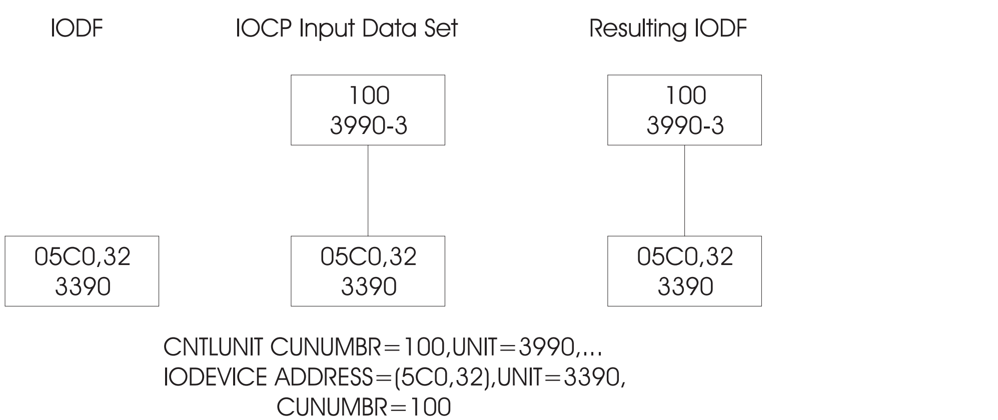


Figure 113. IOCP Migration. Devices are mapped, because the attached control unit is not yet defined in the IODF.

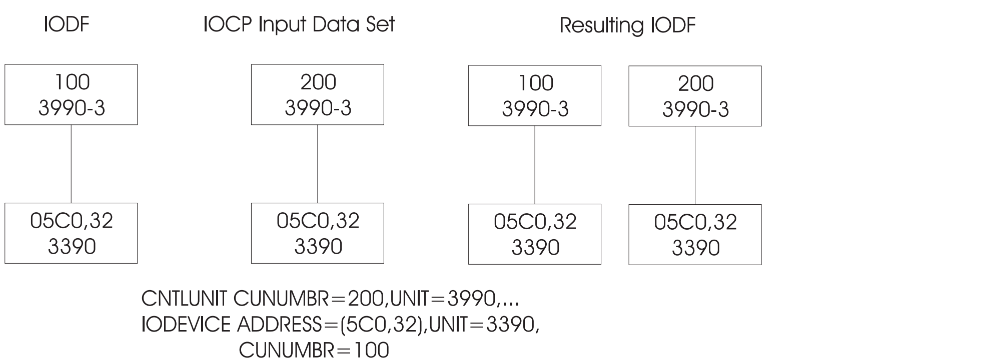


Figure 114. IOCP Migration. Devices are not mapped, because the control unit number does not exist in the IODF.

Migrating additional MVSCP or HCPRIO input data sets

A device can only be mapped if the device number and device type are the same. If the device number or type is not the same, a new device is defined.

If the device number and type are the same, HCD maps the device according to the following rules:

1. If you specify an associated processor and partition on the Migrate IOCP / MVSCP / HCPRIO Data panel or with the batch migration utility, HCD maps the new device to a device with the same device number and type connected to this processor and partition (provided that such a device exists).
2. If you do not specify an associated processor and partition or the new device does not attach to the specified processor and partition, HCD checks if the device is attached to a control unit. The device in the input data set is mapped, if
   - The device in the IODF is attached to the same control unit.

   - or -
   - The device in the IODF is not attached to any control unit.

   This is illustrated in Figure 115 on page 268.

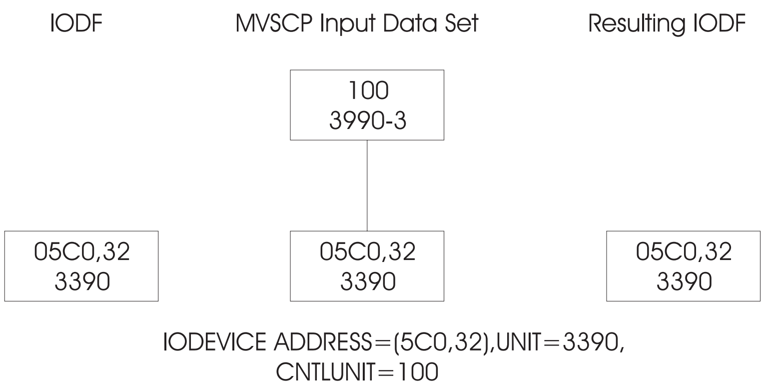


Figure 115. MVSCP Migration. Devices are mapped, because the devices are not attached to a control unit in the IODF.

3. If the new device is not attached to a control unit, the device is mapped to the first device found with the same device number and type.

   If the IODF contains several devices with the same device number and type, the device of the MVSCP input data set can be erroneously mapped to a wrong device. To avoid this, you can specify the associated processor and partition on the Migrate IOCP / MVSCP / HCPRIO Data panel.

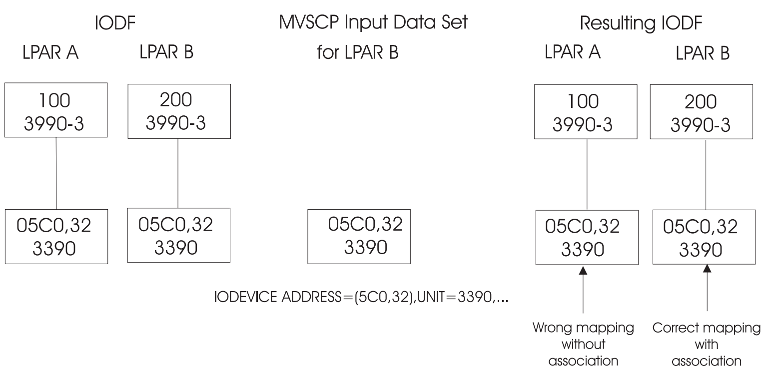


Figure 116. MVSCP Migration. Devices are mapped to the first devices found with the same type and number.

If only a subset of devices in the input data set is already defined in the IODF, this subset is mapped to the existing devices and the remaining new definitions are added.

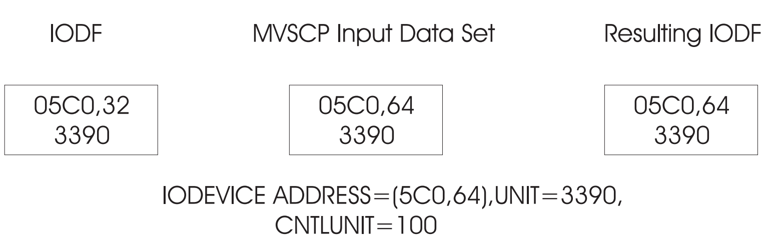


Figure 117. MVSCP Migration. 32 devices are mapped, the other 32 devices are newly defined.

Considerations for IBM ES/4381 processors

- HCD recognizes only valid control unit types and models. A control unit type of LCA (documented as a valid control unit type in *IBM ES/4381 Processor Input/Output Configuration Program User's Guide and Reference*) is not accepted by HCD. The control unit type must be changed (for example, to 3274).
- HCD derives the channel path identifier (CHPID) from the channel set and channel number. For example, the following CHPID statement results in a CHPID value of `03`:

  ```
  CHPID   PATH=((12,3,0)),TYPE=BL
  ```

  The channel path identifier `12`, specified in the CHPID statement, is used only during the migration function to relate the control units and devices to the channel path. After the migration is complete, the CHPID stored in the IODF will be `03`. Similarly, when building an IOCP input data set, a CHPID number of `03` will result in generating the following CHPID statement:

  ```
  CHPID   PATH=((03,3,0)),...
  ```
- The rules concerning native console devices are not validated by HCD.
- If the DEVNUMBR parameter is specified with an IODEVICE statement, HCD obtains the device number from the DEVNUMBR parameter, and the unit address from the last two digits of the ADDRESS parameter. If, however, the DEVNUMBR parameter is not specified, the ADDRESS parameter value is used as the device number. The unit address is taken from the UNITADD parameter (if present), otherwise from the last two digits of the ADDRESS parameter.

Migrating input data sets using the HCD dialog

The following steps describe how to migrate IOCP, MVSCP, or HCPRIO input data sets to an IODF using the HCD dialog.

Step 1: Specify the work IODF

Before starting the migration, you require a work IODF. You can create a new work IODF or use an existing one.

1. On the primary task selection panel enter the name of the IODF to which you want to migrate your input data sets.
2. Select ***Migrate configuration data***.

   If you create a new work IODF, a panel appears on which you have to enter IODF specifications. (Refer to Figure 11 on page 37.)
3. On the following Migrate Configuration Data panel, select ***Migrate IOCP/OS data***. The Migrate IOCP / MVSCP / HCPRIO Data panel shown in Figure 118 on page 270 appears.

Step 2: Migrate the input data sets

```
                   Migrate IOCP / MVSCP / HCPRIO Data


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . ________  +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . ________  +

 Combined IOCP/MVSCP input data set . 'HCI.FP.DECKS(FPTST)'
 IOCP only input data set . . . . . . _____________________________________
 MVSCP only or HCPRIO input data set  _____________________________________
            Associated with processor ________  +
                            partition ________  +
 Processing mode  . . . . . . . . . . 2   1.  Validate
                                          2.  Save

 Migrate options  . . . . . . . . . . 1   1.  Complete
                                          2.  Incremental
                                          3.  PCHIDs
 MACLIB used  . . . . . . . 'SYS1.MACLIB'
 Volume serial number . . . ______  + (if not cataloged)
```

Figure 118. Migrate IOCP / MVSCP / HCPRIO Data

1. Specify the identifier of the processor or operating system with which the input data sets will be associated.
   - For an IOCP input data set migration, specify a processor ID.
   - For an MVSCP or HCPRIO input data set migration, specify an OS configuration ID.

   If the specified processor or operating system does not exist in the IODF, a panel appears that allows you to define a new processor or operating system in the IODF.

   Migrating of a single channel subsystem (CSS) to an XMP processor is supported via the incremental migrate option (see Figure 118). Thus, you can consolidate multiple SMP processors on a single XMP processor using the migrate function. When migrating an SMP processor to an XMP processor, you must specify the target CSS. As default, CSS 0 is used.
2. Specify the input data set:
   - If you are migrating a combined MVSCP/IOCP input data set, specify the `Combined IOCP/MVSCP input data set` field.
   - If you are migrating an IOCP input data set only, specify the `IOCP only input data set` field.
   - If you are migrating an MVSCP or HCPRIO input data set only, specify `MVSCP only or HCPRIO input data set` field.
   - If you have separate IOCP and MVSCP (or IOCP and HCPRIO) input data sets, but want to migrate both into one IODF, specify both the `IOCP only input data set` and the `MVSCP only or HCPRIO input data set` field.
3. The specification of the `Associated with processor` and `partition` field is only applicable if you migrate MVSCP or HCPRIO input data sets to an IODF.

   Specify a processor and partition with which you want to associate definitions in the input data sets. HCD uses this information to map devices correctly if the IODF contains duplicate device numbers. For more information about this mapping, refer to "Migrating additional MVSCP or HCPRIO input data sets" on page 267.
4. Specify the processing mode:

- **Validate** causes HCD to check the input and to inform you if errors are discovered. HCD *does not store the input* in the IODF, even if the input data set is free of errors. Only the new processor and/or operating system definitions that you defined are stored.

  The validate mode provides detailed messages how HCD treats control units and devices that already exist in the IODF.
- **Save** causes HCD to check the input, and if free of errors, to store the data in the IODF. If there are errors in the input data set(s), HCD informs you by a message, and depending on the severity of the error, does not write the input to the IODF.

5. Specify the migrate option:

   complete
   Select this option if you want to add a complete processor and/or OS configuration.

   incremental
   If the specified processor or OS configuration already contains definitions, you can add and replace existing objects with the new information defined in the input data sets. Select this option for this partial migration on the panel from Figure 118 on page 270. Refer to "Updating parts of a configuration by migrating input data sets" on page 292 for more information about the partial migration.

   PCHIDs
   The migration task also allows updating the PCHIDs of a processor configuration in a validated work IODF with an IOCP input data set that has been generated by the CHPID Mapping Tool. HCD checks that the tokens in the IODF and in the IOCP input data set are matching. For more information on this process, see "How to interact with the CHPID Mapping Tool" on page 213.
6. If the CBDZPARS macro, which contains the migration parsing macros, is not in SYS1.MACLIB, specify the name of the library that contains it. If the library is not cataloged, specify the volume serial number.

After the input has been accepted, HCD issues a message informing you that the migration of input data sets is in process.

Step 3: Analyze errors and upgrade the input data set

During the migration process, HCD first invokes the assembler that parses the input statements. If it detects an error, migration is terminated.

- HCD writes a message to the terminal indicating that migration completed with return code RC=12.
- HCD writes a message to the HCD message list indicating that the assembler completed with a return code other than zero.
- The assembler writes information to the assembly listing that describes the problem in more detail.

If the assembler does not detect any errors, HCD runs a validation check. If it detects an error, HCD writes:

- A message to the terminal indicating that migration completed with a return code higher than 4.
- Error messages to the HCD message list describing the validation problem.

If the return code is 0 or 4, the IODF is updated and saved (if you specified to save the data). It is, however, recommended that you review the message log. HCD may have made assumptions that are contrary to your configuration requirements. Your actions:

1. Review the message list. For explanations and examples refer to "Resolving migration errors" on page 302.
2. Edit and correct the IOCP, MVSCP, and HCPRIO input data sets.
3. Migrate your input data sets again.

Step 4: Update configuration data

If the protocol or the attached devices specified in the IOCP input data set do not match the supported control unit model, HCD may change the model definitions.

If HCD changes definitions, you are informed by messages. Review the messages, and follow the recommendation provided in the individual message.

If the type/model designated by HCD does not match the real type/model of the control unit, use the HCD dialog to specify the correct type/model.

Also, if this control unit is to be shared with another processor, update the IOCP input data set that is to be migrated accordingly.

Note: The configuration stored in an IODF may not match the IOCP/MVSCP or HCPRIO input. If discrepancies occur, you can make corrections by using the dialog.

The following notes apply only if you do not use the extended migration function as described in "Changing I/O configurations by editing data sets" on page 273.

For coupling facility migration: After the IOCP input has been accepted, HCD issues messages informing you that the CF control unit and CF device definitions of the IOCP input data set were ignored.

Migrating input data sets using the batch utility

The following steps explain how to migrate your input data sets using the HCD batch utility instead of the HCD dialog. The batch utility is an easy way to migrate your input data sets if you are not familiar with the dialog yet. You have to use it for migrating your input data sets from MVS/XA SP 2.n or MVS/ESA SP 3.n.

Step 1: Create the work IODF

If an IODF does not yet exist, you first have to create a work IODF into which you want to migrate your MVSCP, IOCP, or HCPRIO data sets. Refer to "Initialize IODF" on page 309 on how to create and initialize an IODF.

Step 2: Migrate input data set

The HCD utility function for migration allows you to migrate the content of MVSCP, IOCP, and HCPRIO input data sets and to store the definitions into an IODF. For a detailed description of the utility function for migration, refer to "Migrate I/O configuration statements" on page 311.

Step 3: Analyze errors and upgrade the input data set

During the migration process, HCD first invokes the assembler that parses the input statements. If it detects an error, the migration process is terminated.

- HCD writes a message to the data set allocated by HCDMLOG that the migration completed with return code RC=12.
- HCD writes a message to the HCD migration log (HCDPRINT) indicating that the assembler completed with a return code other than zero.
- The assembler writes information to the assembly listing (HCDASMP) that describes the problem in more detail.

If the assembler does not detect any errors, HCD runs a validation check. If it detects an error:

- HCD writes a message to the data set allocated by HCDMLOG that the migration completed with return code higher than 4.
- HCD writes error messages to the HCD migration log (HCDPRINT) describing the validation problem.

If the return code is 0 or 4, the IODF is updated. It is, however, recommended that you review the migration log. HCD may have made assumptions that are contrary to your configuration requirements. Your actions:

1. Review the migration log. For explanations and examples refer to “Errors detected during validation process” on page 304.
2. Edit and correct the IOCP, MVSCP, and HCPRIO input data sets.
3. Migrate your input data sets again.

Step 4: Build production IODF

Before you can use the IODF to IPL your operating system you have to convert the work IODF into a production IODF. Refer to “Build a Production IODF” on page 314 for an example on how to build a production IODF using the work IODF.

Changing I/O configurations by editing data sets

With z/OS HCD the extended migration function and the added possibilities for writing and migrating configurations allow defining or changing configuration definitions without using the HCD ISPF dialog front-end.

Using I/O configuration statements with IOCP/MVSCP syntax, you can also define all configuration objects with their attributes and their connections. Type these statements into a data set as input to the migrate function. For example, a switch together with its ports can be defined via this method.

It is also possible to recreate data sets containing I/O configuration statements for the processor, operating system and switch configurations from an IODF.

However, for some tasks, such as deleting certain configuration objects, it is necessary or easier to make the configuration changes directly in the HCD dialog. For more details on the capabilities of the migration function refer to the table in Table 7 on page 292.

Processor configurations

The migrate IOCP function is extended to allow the specification of parameters, additional to IOCP, in the input data set. Analogously, when building an IOCP input data set from the IODF, information is generated which describes the additional parameters of the configuration objects.

Processor configuration data sets can be built using the Build IOCP Input Data Set function or the new CONFIG PR batch utility. For details, refer to "Build an IOCP input data set" on page 208 and to "Build I/O configuration statements" on page 320.

Operating system configurations
The migrate MVSCP function is extended to allow for the specification of all configuration data of an OS configuration, for example the device preference values for esoterics or the user parameters for devices. Also, it is possible to generate an OS configuration data set from the IODF using the Build OS Configuration Data Set dialog or the CONFIG OS batch utility. For details, refer to "Build I/O configuration statements" on page 215 and to "Build I/O configuration statements" on page 320.

Switch configurations and switch-to-switch connections
It is possible to migrate switch definitions with all ports, switch-to-switch connections and all switch configurations from a data set. Analogously, it is possible to build such a data set from the IODF using the CONFIG SW batch utility. For details, refer to "Build I/O configuration statements" on page 320.

Important Note:

It may not be possible to remigrate an IOCP input data set generated by HCD back into the IODF. The reasons are:

- HCD uses the High Level Assembler program for parsing the IOCP statements. The High Level Assembler earlier than V1.5 is restricted to 255 characters for any keyword value. IOCP statements, however, may contain keywords with a value greater than 255 characters. High Level Assembler V1.5 removes this restriction.
- HCD keeps additional data for a processor configuration that is not contained in an IOCP input data set. This data may be used for validation and, therefore, missing at the migrate step leading to validation errors. For example, the partition usage is defaulted to CF/OS. For a shared CF peer channel, this may lead to a validation error, because only a CF partition may be specified in the access or candidate list.
- Since the IOCP data are only a subset of the processor configuration data, you may lose this additional configuration data if you update a processor configuration from an IOCP input data set.

For updating the IODF via I/O control statements, it is recommended to use the extended I/O configuration statements of HCD instead of an IOCP input data set (see "IOCP input data sets using extended migration" on page 210).

Additional parameters and statements

In the following, the configuration objects and their attributes you can define via I/O control statements and migrate into HCD are described. For a detailed description of the IOCP keywords and parameters, refer to the *IOCP User's Guide* for your processor.

Operating system
ID
Name
Type
Description

NIP console	Device number Order
EDT	ID Preference value Description
Esoteric	Name Device numbers Token VIO indication
Generic	Name Preference value VIO indication
Switch	ID Unit Model Description Serial number Installed ports Chained switch connection
Port	Address Name Occupied indication
Switch configuration	ID Switch ID Description Default dynamic connection
Port configuration	ID Allowed dynamic connections Prohibited dynamic connections Dedicated connection Blocked indication
Processor	ID Unit Model Support level Configuration mode SNA address Serial number Description
Channel Subsystem	ID Description Maximum number of devices
Partition	Name Number Usage Description
Channel path	ID Type Operation mode PCHID Partition access list Partition candidate list Channel parameter I/O cluster Dynamic switch Description Coupling facility (CF) connection information Entry switch/port connected to a channel path

Control unit	Number Unit Model Serial number Switch/port connected to a control unit Description Connected channel paths/link addresses Unit address ranges I/O concurrency level Protocol Logical address
Device	Number Unit Model Serial number Volume serial number Connected control units Description Unit address Preferred channel path TIMEOUT indication Status detection indication OS parameters/features Subchannel set ID

Operating system

An operating system is specified with the IOCONFIG statement. It contains the following parameters:

ID Specifies the numerical identifier of the OS (mandatory).

This keyword is maintained for compatibility with the MVSCP syntax.

TYPE Specifies the OS configuration type. This is required only, if the migration is performed using the wildcard * in the parameter string of the batch utility. Otherwise, it is ignored and the OS configuration type is taken from the invocation parameters.

NAME Specifies the OS configuration ID. This is required only, if the migration is performed using the wildcard * in the parameter string of the batch utility. Otherwise, it is ignored and the OS configuration ID is taken from the invocation parameters.

DESC Specifies a description of the operating system (optional). The description of the OS configuration is added or updated.

Syntax:

`ID=id`	2 alphanumeric characters
`NAME=os_name`	up to 8 alphanumeric characters
`TYPE=type`	MVS or VM
`DESC='description'`	up to 32 characters

Example: The following example defines an OS configuration named NEWOS01B of type MVS together with the given description.

```
IOCONFIG ID=01,NAME=NEWOS01B,DESC='MVS 5.1 LPAR system',TYPE=MVS
```

NIP consoles

A NIP console is specified with the NIPCON statement. It contains the DEVNUM keyword.

DEVNUM
Specifies a list of device numbers to be used as NIP consoles (mandatory). All devices specified must be defined in your configuration.

NIP tries to use the devices in the order they are listed (left-to-right).

Syntax:

`DEVNUM=(device_number[,device_number]...)`	list of device numbers

Example: In the example the devices with numbers 102E and 102F are assigned to be used as consoles. NIP will try device 102E first.

```
NIPCON DEVNUM=(102E,102F)
```

EDT

An Eligible Device Table is specified with the EDT statement.

Note: If you want to define only one EDT, place the EDT statement ahead of all UNITNAME statements (see "Esoteric" and "Generic" on page 278). If multiple EDT statements are written, each statement must precede the UNITNAME statements defining the corresponding EDT.

The EDT statement contains the following parameters:

ID
Specifies the identifier of the EDT. The default is the ID specified on the IOCONFIG statement. If multiple EDT statements are written, the ID parameter is mandatory for all but one statement.

DEVPREF
Specifies a list of devices in the order of preference (optional).

This parameter conforms to legacy syntax but is still supported. However, it is recommended to use the DEVPREF parameter with the UNITNAME statement, see "Generic" on page 278, instead.

DESC
Specifies a description of the EDT (optional).

Syntax:

`ID=id`	2 hexadecimal characters
`DEVPREF=(generic_name[,generic_name]...)`	list of generic device types, generates the preference value of generics according to the list position
`DESC='description'`	up to 32 characters

Example: The following example defines EDT 01 with the given description.

```
EDT ID=01,DESC='Eligible Device Table 1'
```

Esoteric

An esoteric is specified with the UNITNAME statement. For use with esoterics it contains the following parameters:

NAME
Specifies the name of the esoteric (mandatory).

Note: Do not use esoteric names SYSALLDA, SYS3480R, or SYS348XR.

UNIT
Specifies a sequence of consecutive device numbers (optional). The numbers specified must be defined in the configuration.

TOKEN
Allows controlling the order of esoterics in the EDT (optional). Only relevant if you have data sets that are cataloged using esoterics.

Tokens prevent the order of esoterics from becoming alphabetical after IPL, thus avoiding access problems for data sets that are cataloged using esoterics.

If a token is specified for one esoteric you must also specify tokens for all other esoterics.

VIO
States whether or not the devices are eligible for VIO. May only be set to YES if the esoteric contains at least one DASD device type (optional).

Syntax:

`NAME=esoteric_name`	8 alphanumeric characters
`UNIT=((devnum,n)[,(devnum,n)]...)`	4 hexadecimal characters followed by a decimal number
`TOKEN=token_value`	number in the range 1 to 8999
`VIO=value`	YES or NO

Example: The following example assigns 8 device numbers 01D1 through 01D8 and the token value to esoteric device group ES002. The group is not eligible for VIO.

```
UNITNAME NAME=ES002,                            *
         UNIT=((01D1,8)),                       *
         TOKEN=2015,                            *
         VIO=NO
```

Generic

A generic is specified with the UNITNAME statement. For use with generics it contains the following parameters:

NAME
Specifies the name of the generic (mandatory; must be a valid generic name).

VIO
Specifies whether or not the devices are eligible for VIO (optional). VIO=YES may only be specified if the generic name specifies a DASD device type.

DEVPREF
Allocates a position in a preference order of generics (optional).

For default values see the information on MVS devices within the “Supported Hardware Report” on page 400. This parameter value must be unique for the OS configuration.

Syntax:

`NAME=generic_name`	8 alphanumeric characters
`VIO=value`	YES or NO
`DEVPREF=pref_value`	decimal number between 1 and 99999

Example: The following example defines the generic device group 3390 with the preference value 150. The devices are eligible for VIO.

```
UNITNAME NAME=3390,                   *
        VIO=YES,                      *
        DEVPREF=150
```

Switch

A switch is specified with the SWITCH statement. It contains the following parameters:

SWID Specifies an identifier for the switch (mandatory).

UNIT Specifies the switch unit (mandatory).

MODEL Specifies the switch model (optional).

DESC Specifies a description of the switch (optional).

SERIAL Specifies a serial number (optional).

PORT Specifies the installed ports (default from UIM, optional).

Specify only ports that are supported by the switch type. At least the minimum installed port range is set to installed. If the switch already exists with an installed port range that differs from the specified installed port range(s), only the new specified ports are set to installed if possible. That means, any existing installed port that does not hold a connection to a channel path or control unit is set to not installed if not specified with the PORT parameter.

SWPORT Specifies the chained switch connections (optional). If operand exceeds 255 characters, repeat the SWITCH statement with the remaining values.

If the switch already exists, all existing connections to other switches are broken. The connections to other switches are established as specified by the SWPORT parameter.

ADDRESS Specifies the switch address for a FICON switch (optional).

The corresponding switch control unit and device are specified by corresponding CNTLUNIT and IODEVICE statements.

Syntax:

SWID=id	2 hexadecimal characters
UNIT=switch_unit	like CU type
MODEL=switch_model	like CU model
DESC='description'	up to 32 characters
SERIAL=serial_no	up to 10 characters
PORT=((low_port_id,high_port_id),...)	up to 32 port ranges
SWPORT=((from_port,to_switch,to_port),...)	up to 32 switch-to-switch connections

Example: In the following example, switch 02 with an installed port range 80 to FB is chained to port D1 of switch 01 via port C0.

```
SWITCH SWID=02,UNIT=9032,MODEL=3,                           *
           PORT=((80,FB)),                                  *
           DESC='Aspen switch, installed 10/09/94',         *
           SERIAL=55-8888,                                  *
           SWPORT=(C0,01,D1)
```

Note: Put the serial numbers in quotes, if you use characters such as blanks or commas as part of your serial numbers.

Port

A switch port is specified with the PORT statement. It contains the following keywords:

ID Port address identifying the port (mandatory).

NAME Specifies a port name (optional).

To be accepted within I/O Operations (ESCON Manager) commands the port name must not include commas, asterisks, or blanks. It must not contain X'FF' or any extended binary-coded decimal interchange code (EBCDIC) character less than X'40'. It must also not begin with a left parenthesis and end with a right parenthesis.

OCC Indicates that the port has an external connection (optional).

External means a connection to a processor, switch, or control unit.

Syntax:

`ID=port_id`	2 hexadecimal characters
`PORTNM='portname'`	up to 24 characters
`OCC`	no value assigned

Example: In the following example port D5 is named 'connected_to_CU_7230' and indicated as occupied.

```
PORT ID=D5,                             *
     PORTNM='connected_to_CU_7230',     *
     OCC
```

Switch configuration

A switch configuration is specified with the SWCONF statement. It contains the following parameters:

ID Specifies the switch configuration ID (mandatory).

SWID Identifies the switch owning the configuration (mandatory).

DESC Specifies a description of the switch configuration (optional).

DEFCONN Specifies whether the default port connections are set to allowed or prohibited (mandatory).

Syntax:

`ID=switch_configuration_id`	8 characters
`SWID=switch_id`	2 hexadecimal characters
`DESC='description'`	up to 32 characters
`DEFCONN=dynamic_default_connection`	A (allowed) or P (prohibited)

Example: In the following example the default connection for switch configuration BASECONF of switch 01 is set to allowed.

```
SWCONF ID=BASECONF,                          *
       SWID=01,                              *
       DESC='basic configuration',           *
       DEFCONN=A
```

Port configuration

A port configuration is specified with the POCONF statement.

The POCONF statement is an optional extension to the switch configuration. With POCONF, port connections are defined explicitly and existing defaults are overridden. In all, the statement may be a maximum of 255 characters long. To express longer statements the POCONF may be repeated. POCONF includes the following parameters:

ID Port address identifying the port (mandatory).

PORTCF Specifies the type of connections to target ports (mandatory).

In the PORTCF operand

- **A** sets the dynamic connection to the succeeding list of target port IDs to allowed
- **P** sets the dynamic connection to the succeeding list of target port IDs to prohibited
- **D** sets a dedicated connection to the succeeding target port ID
- **BLOCKED** blocks the port

Syntax:

ID=port_id	2 hexadecimal characters
PORTCF=([A,(id1,...,idn),] [P,(id1,...,idm),] [D,(id),] [BLOCKED])	One or more of the following specifications: list of ports in installed range (A, connection allowed) list of ports in installed range (P, connection prohibited) port with dedicated connection (D) BLOCKED attribute

Example: In the following example port D2 has allowed dynamic connections to ports B1 and B3, and prohibited dynamic connections to B5 and B7. Port D4 has a dedicated connection to port C0.

```
POCONF ID=D2,                                          *
      PORTCF=(A,(B1,B3),P,(B5,B7))
POCONF ID=D4,                                          *
      PORTCF=(D,(C0))
```

Processor

A processor is specified with the ID statement. If specified, it must precede all other statements in the configuration data set. It contains the following keywords:

NAME Specifies the processor ID. If the ID does not exist, it is created (1).

MSG1 Specifies the identification information that is printed on the ID1 line of the heading in IOCP configuration reports (optional). Only supported for compatibility with IOCP.

MSG2 Specifies the identification information that is printed on the ID2 line of the heading in IOCP configuration reports (optional). Only supported for compatibility with IOCP.

SYSTEM Specifies the machine limits and rules that IOCP will enforce for a deck verification. The system parameter includes a specification of the processor machine type number and, optionally, a machine limits number (optional). Only supported for compatibility with IOCP.

LSYSTEM Specifies the system name (CPC designator) of the local system; that is the system which uses this IOCDS.

UNIT Specifies the processor unit (1).

MODEL Specifies the processor model (1).

LEVEL Specifies the processor support level (1). For further information on support levels refer to "'support_level_ID'" on page 313.

MODE Specifies the processor configuration mode as LPAR or BASIC (1).

SNAADDR Specifies the SNA address (network name, system name) for a processor in an S/390 microprocessor cluster (optional).

SERIAL Specifies the processor serial number (optional).

DESC Specifies a description for the processor (optional).

Note (1): UNIT, MODEL and LEVEL are processed only if the migration is performed using the wildcard * in the parameter string of the batch utility.

Syntax:

`NAME=processor_id`	8 characters
`MSG1='message'`	up to 64 characters; first 8 characters are taken as IOCDS name
`MSG2='message'`	up to 64 characters
`SYSTEM=(processor_unit[,limits_number])`	4 characters followed by a decimal number
`UNIT=processor_unit`	8 characters
`MODEL=processor_model`	4 characters
`LEVEL=support_level`	8 characters
`LSYSTEM=local_cpc_designator`	8 characters
`SNAADDR=(network_name,system_name)`	list of 2 entries, each up to 8 characters
`MODE=processor_mode`	BASIC or LPAR
`SERIAL=serial_number`	up to 10 characters
`DESC='description'`	up to 32 characters

Example: In the following example processor PROC01 of type 2094, model S28 is defined with the serial number 0518712094, in LPAR mode, support level H050331.

```
ID NAME=PROC01,UNIT=2094,MODEL=S28,                          *
      DESC='XMP, Basic 2094 support',SERIAL=0518712094,      *
      MODE=LPAR,LEVEL=H050331
```

Channel subsystem and partition

Depending on whether you use the RESOURCE statement for XMP processors or SMP processors, it specifies the channel subsystems, the logical partitions (names and numbers) and groups the logical partitions to the channel subsystems. It contains the following keywords:

PART or PARTITION
Specifies a list of partition names with an optional addition of the corresponding partition numbers (mandatory).

DESCL
Specifies a list containing descriptions for the defined partitions (optional).

USAGE
Specifies a list describing the partition usage type for each partition.

MAXDEV
Is only allowed for XMP processors and specifies for each channel subsystem the maximum number of devices, including those defined in the IOCDS, to be allowed using dynamic I/O. For z9 EC processors and later models, it specifies the maximum number of devices in each subchannel set.

CSSDESCL
specifies a list of channel subsystem descriptions, one list entry for each channel subsystem listed in the MAXDEV keyword.

Note: If the partition type is missing, it is set automatically depending on which types of channel paths are assigned to the partition and the capability of the processor.

Syntax:

For XMP processors:
`PART[ITION]=`
`((CSS(0),(lpname[,lpnumber])[,(lpname[,lpnumber])...])`
` ...`
` [,(CSS(n),(lpname[,lpnumber])[,(lpname[,lpnumber])...])]`
`)`
 	
For SMP processors:
`PART[ITION]=`
`((lpname[,lpnumber])[,(lpname[,lpnumber])...])`
	lpname: up to 8 alphanumeric characters for the LPAR name; for XMP processors, an * is accepted as lpname to indicate a reserved partition;
	
	lpnumber: 1 hexadecimal character for the LPAR number.
	The CSS(n) parameter(s) must be used for XMP processors and must not be used for SMP processors.

`DESCL=('descp1_css0','descp2_css0',...,`
`       'descp1_css1','descp2_css1',...,`
`       ...`
`       'descp1_cssn','descp2_cssn',...)`
	description for all partitions in the processor complex, up to 32 characters per description

`CSSDESCL=('desc_css0','desc_css1',...)`	description syntax of channel subsystems for XMP processors

`USAGE=(usage1_css0,usage2_css0,...,`
`       usage1_css1,usage2_css1,...,`
`       ...`
`       usage1_cssn,usage2_cssn,...)`
	usage of each partition in the processor complex (CF, OS, or CF/OS)

`MAXDEV=((CSS(0),maxnum1[,maxnum2]),...,` `        (CSS(n),maxnum1[,maxnum2]))`	maximum number of devices for each channel subsystem and each subchannel set

Example for an SMP processor: In the following example, partitions LP1, LP2, and CF1 are defined and described.

```
RESOURCE PART=((LP1,1),(LP2,2),(CF1,3)),                    *
         DESCL=('Logical Partition 1',                      *
                'System 3',                                 *
                'Coupling Facility'),                       *
         USAGE=(CF/OS,OS,CF)
```

Example for an XMP processor: In the following example, the XMP processor contains three channel subsystems with three partitions in each. Channel subsystem CSS(2) contains two subchannel sets. This is indicated by the MAXDEV statement containing two maximum numbers of devices (35 and 20).

```
RESOURCE PART=((CSS(0),(LP01,1),(LP02,2),(LP03,3)),            *
               (CSS(1),(LP11,1),(LP12,2),(LP13,3)),            *
               (CSS(2),(LP21,1),(LP22,2),(LP23,3))),           *
         DESCL=('LPAR1_of_CSS0','LPAR2_of_CSS0','LPAR3_of_CSS0',  *
                'LPAR1_of_CSS1','LPAR2_of_CSS1','LPAR3_of_CSS1',  *
                'LPAR1_of_CSS2','LPAR2_of_CSS2','LPAR3_of_CSS2'), *
         USAGE=(CF/OS,OS,CF,CF/OS,OS,CF,CF/OS,OS,CF),          *
         MAXDEV=((CSS(0),63),(CSS(1),50),(CSS(2),35,20)),      *
         CSSDESCL=('first CSS(0)','second CSS(1)','third CSS(2)')
```

For HCD, it is also possible to specify a separate RESOURCE statement for each channel subsystem. This may be required if you do not use a High Level Assembler V1.5 or later. You can split the previous RESOURCE example for an XMP processor into the following parts:

```
RESOURCE PART=((CSS(0),(LP01,1),(LP02,2),(LP03,3))),             *
         DESCL=('LPAR1_of_CSS0','LPAR2_of_CSS0','LPAR3_of_CSS0'),  *
         USAGE=(CF/OS,OS,CF),                                    *
         MAXDEV=(CSS(0),63),                                     *
         CSSDESCL=('first CSS(0)')
RESOURCE PART=((CSS(1),(LP11,1),(LP12,2),(LP13,3))),             *
         DESCL=('LPAR1_of_CSS1','LPAR2_of_CSS1','LPAR3_of_CSS1'),  *
         USAGE=(CF/OS,OS,CF),                                    *
         MAXDEV=(CSS(1),50),                                     *
         CSSDESCL=('second CSS(1)')
RESOURCE PART=((CSS(2),(LP21,1),(LP22,2),(LP23,3))),             *
         DESCL=('LPAR1_of_CSS2','LPAR2_of_CSS2','LPAR3_of_CSS2'),  *
         USAGE=(CF/OS,OS,CF),                                    *
         MAXDEV=(CSS(2),35,20),                                  *
         CSSDESCL=('third CSS(2)')
```

Channel path

A channel path is specified with the CHPID statement. For an XMP processor, a spanned CHPID is defined for one or more channel subsystems. Therefore, the CHPID statement must contain channel subsystem data. If only one CSS is defined, it is not required to specify it on the PATH keyword.

The CHPID statement contains the following keywords:

PATH
Specifies the CHPID number and, if required, the CSS IDs of the channel path (mandatory).

TYPE
Specifies the channel path type of I/O operation for the channel path (mandatory).

SHARED
Specifies that the channel path on the CHPID statement is shared (optional).

REC
Specifies that the channel path on the CHPID statement is reconfigurable (optional).

PART, PARTITION, or NOTPART
PART and PARTITION specify the access list of logical partitions that will have the channel path configured online after POR, and the candidate list identifying the logical partitions which can access the device.

NOTPART specifies the access list of logical partitions that will not have the channel path configured online after POR, and the list of logical partitions which cannot access the device.

REC REC in the PART or PARTITION keyword allows the channel path to be dynamically moved between partitions after POR.

CHPARM,OS Specifies channel path data that is used by the operating system. For example, CHPARM=01 indicates that the channel path is managed by DCM. Or, CHPARM=40 indicates that the maximum frame size for an IQD channel is 24K.

I/O CLUSTER Specifies an I/O cluster name. An I/O cluster is a sysplex that owns a managed channel path for an LPAR processor configuration.

SWITCH Specifies a number for a switch (ESCON Director) which is used as a dynamic switch for all paths from the channel path (CHPID) to the connected control units (required for dynamic connections through a switch).

DESC Specifies a description of the channel path (optional).

TPATH Specifies a connected CF channel path (optional).

The TPATH parameter can be specified for a CF channel path, either CF receiver, CF sender, or CF peer channel path.

For a CF sender or CF receiver channel path, the TPATH parameter must contain:
- the target processor
- the target CSS ID for XMP processors
- the target channel path ID

When specified with a CF sender channel path id, the TPATH parameter must also contain:
- the CF sender control unit and device numbers used for the CF connection. This information is optional for a CF receiver channel path.

For a CF peer channel path, the TPATH parameter contains the following items for the target and source channel paths of the CF connection:
- the target processor
- the target CSS ID for XMP processors
- target channel path ID
- control unit number (only if this is a sending CF channel, that is, the channel path connects to a target CF logical partition)
- starting device number (only if this is a sending CF channel)

A CF connection uses two (CF sender channel) or seven (sending CF peer channel) devices. Only the starting one can be specified (with four digits). The remaining devices are automatically assigned to the next consecutive device numbers.

Any CF control units and CF devices specified via CNTLUNIT and IODEVICE statements are ignored.

The connection can only be established if the target channel path exists. If the target channel path is already connected, the existing connection is broken and a new connection is established.

SWPORT Specifies an entry switch port (optional).

PCHID Specifies a physical channel identifier (optional).

AID Specifies the ID of the host communication adapter (HCA) on which the channel is defined.

PORT Specifies the port on the HCA on which the channel is defined.

Syntax:

`PATH=[(CSS(n,...),]chpid_number[)]`	2 hexadecimal characters
`TYPE=type`	valid channel path type
`SHARED`	no value assigned
`REC`	no value assigned

For XMP processors:
`PART[ITION]=((CSS(0),(acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)][,REC])`
`...`
`[(CSS(n),(acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)][,REC])]`
`)`
 	
For SMP processors:
`PART[ITION]=((acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)][,REC]`
`)`
	access list and optional
	candidate list of partitions;
	optional addition of REC;
	for XMP processors: CSS ID is required

For XMP processors:
`NOTPART=((CSS(0),(acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)])`
`...`
`[(CSS(n),(acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)])]`
`)`
For SMP processors:
`NOTPART=((acc_lp1,...,acc_lpn)`
`[,(cand_lp1,...,cand_lp2)]`
`)`
	up to 2 lists of partitions

`OS=xx, CHPARM=xx`	2 hex character OS parameter
`IOCLUSTER=sysplex`	8 character sysplex name for managed CHPID
`SWITCH=xx`	2 hexadecimal characters
`DESC='description'`	up to 32 characters
`TPATH=(proc,chpid[,CFS CU,CFS device])` `(for legacy CF channel path only)`	target CHPID for connected CHPID pairs (CF connection): 8 character processor name 2 hex character CHPID 4 hex character CU number 4 hex character device number

`TPATH=((proc,chpid[,CFP CU,CFP device]),`
`(proc,chpid[,CFP CU,CFP device]))`
`(for CF peer channel path only)`
	pair of target and source CHPIDs
	(CF peer connection):
	8 character processor name
	2 hex character CHPID
	4 hex character CU number
	4 hex character device number

`TPATH=((CSS(n),proc,chpid[,cu,device]),...)`	for XMP processors
`SWPORT=(swid,port)`	switch and port to which the CHPID connects
`PCHID=xxx`	three hexadecimal characters for the physical channel ID

AID=xx	two hexadecimal characters
PORT=n	one numeric character

Example for an SMP processor: In the following example channel path 35 of type CNC is connected to port FB of switch 03, which is used as a dynamic switch. Channel path 35 is defined as shared with all partitions of the processor in its access list.

Channel path 10 of type CFS, defined to partition LP4, is connected to CFR channel 11 of processor PROC1 using control unit FFFE and devices FFF0,2 for the coupling facility connection.

Channel path 12 of type CFR, defined as dedicated to partition C1, is connected to CF sender channel 70 of processor PROC2. (The used coupling facility devices and control units are defined with CHPID 70 of processor PROC2.)

```
CHPID PATH=(35),SWITCH=03,TYPE=CNC,                              *
      SWPORT=(03,FB),SHARED,                                     *
      DESC='Chpid connected to switch'
CHPID PATH=(10),TYPE=CFS,PART=((LP4),(LP4)),                     *
      TPATH=(PROC1,11,FFFE,FFF0)
CHPID PATH=(12),TYPE=CFR,PART=((C1),(C1)),                       *
      TPATH=(PROC2,70)
```

Example for an XMP processor: In the following example, the spanned channel path 33 of type IQD is shared by partitions from channel subsystems 0 and 1.

```
CHPID PATH=(CSS(0,1),33),             *
      TYPE=IQD,                       *
      PART=((CSS(0),(LP01,LP02)),     *
            (CSS(1),(LP11,LP12)))
```

Control unit

A control unit is specified with the CNTLUNIT statement. It contains the following keywords:

CUNUMBR Specifies a number assigned to the control unit (mandatory). The number assigned to each control unit must be unique within an IODF.

UNIT Specifies the type of control unit (mandatory).

SERIAL Specifies a serial number (optional).

SWPORT Specifies switch ports to which the control unit is connected (optional). If operand exceeds 255 characters, repeat the CNTLUNIT statement with the remaining values.

DESC Specifies a description of the control unit (optional).

PATH For each channel subsystem, this keyword specifies the channel paths attached to the control unit (mandatory).

LINK For each channel subsystem, this keyword specifies the link address to which the control unit is attached (optional).

The order in which the link addresses are specified corresponds to the order in which the channel paths are specified in the PATH keyword.

UNITADD Specifies the unit address ranges that are recognized by the control unit (mandatory).

CUADD Specifies the logical address for the control unit (optional).

SHARED Specifies the level of concurrency of I/O requests that the parallel channel path allows for the control unit (optional).

PROTOCOL Specifies the interface protocol that the parallel control unit uses when operating with the channel paths specified in the PATH keyword (optional).

Syntax:

`CUNUMBR=number`	4 hexadecimal characters
`UNIT=type`	valid control unit type
`SERIAL=serial_number`	up to 10 characters
`SWPORT=((swid1,port1),(swid2,port2),...)`	list of up to 32 sublists (switch ID, port ID) 2 hex character switch ID 2 hex character port ID
`DESC='description'`	up to 32 characters max.

For XMP processors:
`PATH=((CSS(0),chpid[,chpid,...])`
`[,(CSS(1),chpid[,chpid,...])]`
`...`
`[,(CSS(n),chpid[,chpid,...])])`
For SMP processors:
`PATH=(chpid[,chpid]...)`
	0,1,... for the CSS ID;
	2 hexadecimal characters for each static CHPID
	'**' for each managed CHPID

For XMP processors:
`LINK=((CSS(0),link_addr[,link_addr,...])`
`[,(CSS(1),link_addr[,link_addr,...])]`
`...`
`[,(CSS(n),link_addr[,link_addr,...])])`
For SMP processors:
`LINK=(link_addr[,link_addr]...)`
	0,1,... for the CSS ID;
	two or four hexadecimal characters for the link address of each CHPID
	'**' if not specified

`UNITADD=((address[,number]),...)`	2 hexadecimal characters for each unit address followed by a decimal number
`CUADD=address`	1 or 2 hexadecimal characters
`SHARED=value`	Y or N
`PROTOCOL=value`	D, S, or S4

Example for an SMP processor: In the following example, control unit 0CC0 of type 3995-151 is connected to channel path 20 using link address E4. The control unit is connected to port E4 of switch AA.

```
CNTLUNIT CUNUMBR=0CC0,PATH=(20),UNITADD=((00,256)),LINK=(E4), *
      UNIT=3995-151,SWPORT=((AA,E4)),                         *
      SERIAL=0123456789,DESC='Building 12'
```

Note: Put the serial numbers in quotes, if you use characters such as blanks or commas as part of your serial numbers.

Example for an XMP processor: In the following example, control unit 0780 of type 2105 is connected to channels 11 and 14 in channel subsystem 0 and to channels 21 and 24 in channel subsystem 1. All channels in both channel subsystems use link address E8. Channels from CSS 0 are connected to the control unit via switch 01, channels from CSS are connected via switch 02.

```
CNTLUNIT CUNUMBR=0780,PATH=((CSS(0),11,14),(CSS(1),21,24)),   *
      UNITADD=((00,128)),LINK=((CSS(0),E8,E8),(CSS(1),E8,E8)),*
      CUADD=F,UNIT=2105
      DESC='ESS12 780 CU F (3390-mix) VSE128'
      SWPORT=((01,E8),(02,E8))
```

Device

A device is specified with the IODEVICE statement. It contains the following keywords:

ADDRESS Specifies the device number and how many devices are to be defined (mandatory).

UNIT Specifies the device type (mandatory).

MODEL Specifies the model number of the device, if available (optional).

PART, PARTITION or NOTPART
PART and PARTITION specify the candidate list identifying the logical partitions which can access the device (optional).

NOTPART specifies the logical partitions which cannot access the device (optional).

If for an XMP processor the device has access to more than one CSS, the CSS subkeyword is required to indicate to which channel subsystem the partition belongs.

SERIAL Specifies the serial number of the device (optional).

VOLSER Specifies the volume serial number (optional).

CUNUMBR Specifies the number(s) of the control unit(s) the device is attached to (mandatory).

DESC Specifies a description of the device (optional).

UNITADD Specifies the unit address that is transmitted on the channel path to select the I/O device (optional). If not specified, the last two digits of the device number are used.

PATH Specifies the preferred channel path (optional).

TIMEOUT Specifies whether the I/O interface timeout function is to be active (optional).

STADET Specifies whether the Status Verification Facility is to be enabled or disabled (optional).

SCHSET Specifies for z9 EC processors or later models the subchannel set ID where the device is located.

OS parameters/features: In the following section device specific parameters and features are described. To find out which parameters, private parameters, and features are available to you for a particular device run your Supported HW Report and I/O Definition Reference. (See "Print configuration reports" on page 324 for details on how to run the report function.) Examples of a Supported HW Report and of an I/O Definition Reference are shown in "Supported Hardware Report" on page 400 and in "I/O Definition Reference" on page 430, respectively.

USERPRM Allows the specification of OS private parameters.

To locate the private parameters available to you for a particular device refer to your Supported HW Report. The OS private parameters are listed in column `SUPPORTED PARAMETERS / FEATURES`, following PRIVATE: and extending to the slash (/). For example, device 3590 listed in the sample Supported Hardware Report - MVS Devices (Figure 170 on page 401) supports the private parameters LIBRARY and AUTOSWITCH.

FEATURE
If included in the device specific parameters, FEATURE allows device specific features to be assigned. The features available depend on your UIMs.

To locate the features available to you for a particular device type refer to your Supported HW Report. The features are listed in column `SUPPORTED PARAMETERS / FEATURES`, following the slash (/). For example, device 3590 listed in the sample Supported Hardware Report - MVS Devices (Figure 170 on page 401) supports the features SHARABLE and COMPACT.

ADAPTER
Specifies either the terminal control or transmission adapter used to connect a telecommunications line to a transmission control unit, or the type of channel adapter that connects a communications controller to a channel path (optional).

DYNAMIC
Specifies if the device is eligible for dynamic I/O configuration (optional).

LOCANY
Specifies if UCB can reside in 31 bit storage (optional).

NUMSECT
Specifies the number of guaranteed 256-byte buffer sections in a 2840 display-control buffer allocated to a device 2250-3 (optional).

OFFLINE
Specifies if the device is considered online or offline at IPL (optional).

OWNER
Specifies the subsystem or access method using the device (optional).

PCU
Only applicable to a display device 2250-3 attached to a control unit 2840-2 (optional)

Identifies the 2840-2 control unit the 2250-3 is attached to. For all 2250-3 attached to the same control unit the same value is specified.

If coded, no separate IODEVICE statement `UNIT=2840` must be used.

SETADDR
Specifies which of the 4 set address (SAD) commands is to be issued to the transmission control unit for operations on the line specified by the ADDRESS operand (optional).

TCU
Specifies the transmission control unit for a telecommunications line (optional).

Syntax:

`ADDRESS=(device_number,number_of_units)`	4 hexadecimal characters followed by a decimal number in the range 1 to 4095
`UNIT=device_type`	up to 8 alphanumeric characters
`MODEL=model_number`	up to 8 alphanumeric characters

For XMP processors:
`PART[ITION]=((CSS(0),(lpname1[,lpname2,...]))`
`...`
`[,(CSS(m),(0))]`
`...`
`[,(CSS(n),(lpname1[,lpname2,...]))]`
`)`
 	
For SMP processors:
`PART[ITION]=(lpname1[,lpname2,...])`
	list of partition names with up to 8 alphanumeric characters;
	0,1,... for the CSS ID;
	
	For XMP processors, a 0 is accepted as lpname to indicate a null device candidate list; that is, the control unit shared by several CSSs cannot access the device through CSS(m).

For XMP processors:
`NOTPART=((CSS(0),(lpname1[,lpname2,...]))`
`...`
`[,(CSS(m),(0))]`
`...`
`[,(CSS(n),(lpname1[,lpname2,...]))]`
`)`
 	
For SMP processors:
`NOTPART=(lpname1[,lpname2,...])`
	list of partition names with up to 8 alphanumeric characters;

`SERIAL=serial_number`	up to 10 numeric characters
`VOLSER=volume_serial_number`	up to 6 characters
`CUNUMBR=(number1[,number2]...)`	up to 8 hexadecimal numbers of 4 characters
`DESC='description'`	up to 32 alphanumeric characters
`UNITADD=unit_address`	2 hexadecimal characters

For XMP processors:
`PATH=((CSS(0),chpid[,chpid,...])`
`[,(CSS(1),chpid[,chpid,...])]`
`...`
`[,(CSS(n),chpid[,chpid,...])]`
`)`
 	
For SMP processors:
`PATH=(chpid[,chpid]...)`
	0,1,... for the CSS ID;
	2 hexadecimal characters for each CHPID

`TIMEOUT=value`	Y or N
`STADET=value`	Y or N
`SCHSET=n` `SCHSET=((CSS(0),n),...,(CSS(m),n))`	0 or 1; use the short form SCHSET=n if the placement of the device is the same for all CSSs; SCHSET=0 is the default.
`USERPRM=((param1,value1)[,(param2,value2)]...)`	list of device specific parameter/value pairs
`FEATURES=(feature1[,feature2]...)`	list of device specific features
`ADAPTER=adapter`	up to 5 alphanumeric characters
`DYNAMIC=value`	Y or N
`LOCANY=value`	Y or N
`NUMSECT=number`	decimal number
`OFFLINE=value`	Y or N
`OWNER=value`	VTAM or OTHER
`PCU=number`	decimal value in the range 1 to 4095
`SETADDR=value`	0, 1, 2, or 3
`TCU=value`	2701, 2702, or 2703

Example for an SMP processor: In the following example device numbers 0A90 to 0A9F of type 3490 are defined with unit addresses 00 to 0F. Each device is attached to control unit 0A00. It is sharable between systems, data is compacted, it is considered off-line at IPL, and supports dynamic configuration. The device does not support auto tape library nor is it automatically switchable and its UCB cannot reside above 16 MB.

```
IODEVICE ADDRESS=(0A90,16),UNIT=3490,UNITADD=00,               *
         FEATURE=(SHARABLE,COMPACT),OFFLINE=YES,DYNAMIC=YES,     *
         LOCANY=NO,USERPRM=((LIBRARY,NO),(AUTOSWITCH,NO)),       *
         CUNUMBR=0A00,DESC='VIRTUELL TAPE',SERIAL=033401
```

Note: Put the serial numbers in quotes if you use characters such as blanks or commas as a part of your serial numbers.

Example for an XMP processor: In the following example, the devices numbers 7400 to 741F of type 3390A are defined together with an explicit candidate list: they can be accessed by partition TRX1 from channel subsystem 0 and from partition TRX2 from channel subsystem 1. The Status Verification Facility is enabled. The devices are placed in subchannel set 0 for channel subsystem 0 (this is the default and needs not be specified) and in subchannel set 1 for channel subsystem 1.

```
IODEVICE ADDRESS=(7400,032),UNITADD=50,CUNUMBR=(7300),        *
      STADET=Y,PARTITION=((CSS(0),TRX1),(CSS(1),TRX2)),       *
      SCHSET=((CSS(1),1)),UNIT=3390A
```

Updating parts of a configuration by migrating input data sets

The HCD incremental update function allows you to modify objects in your IODF by specifying the objects with I/O control statements in data sets, e. g. IOCP, MVSCP, or HCPRIO input data sets, and migrating these input data sets into your existing IODF.

Possible actions on objects using the incremental update

Table 7 shows what actions you can perform on objects by using the HCD incremental update function. The meaning of the markup is as follows:

x Action possible, you can make the change.

— Action not possible, you cannot make the change with the batch migration utility but must use the HCD dialog.

(x) Action possible. These attributes are deleted when the object itself is deleted.

(—) Action not possible. These attributes cannot be deleted because the object itself cannot be deleted.

See the notes below the table for further instructions on how to add, delete, or change certain objects, their attributes and connections.

Table 7. Actions on IODF Objects

Object/Attributes	Add	Delete	Change
Processor			
ID	x	—	—
Type/model	x	(—)	—
Support level	x	(—)	—
Configuration mode	x	(—)	—
Serial number	x	—	x

Table 7. Actions on IODF Objects (continued)

Object/Attributes	Add	Delete	Change
Description	x	—	x
SNA address	x	—	x
Channel Subsystem			
ID	x	—	—
Maximum Number Devices	x	—	x
Description	x	x	x
Partition			
Name	x	x 1)	x 11)
Image number	x	(x)	x11)
Usage type	x 10)	(x)	x
Description	x	x	x
Channel path			
CHPID	x	—	—
PCHID	x	x	x 5)
Type	x	(—)	x 5)
Operation mode	x	(—)	x 5)
Access list	x	x	x 5)
Candidate list	x	x	x 5)
Dynamic switch	x	x	x 5)
Switch connection	x	x	x 5; 15)
CF connection	x	x	x 5)
Description	x	x	x 5)
OS parameter	x	x	x 5)
I/O cluster	x	x	x 5)
Control unit			
Number	x	x 2)	x 4)
Unit/model	x	(x)	x
Description	x	x	x
Serial number	x	x	x
Switch connection	x	x	x 15)
Channel paths	x	(x)	x
DLA	x	x	x
Logical address (CUADD)	x	x	x
Unit addresses	x	(x)	x
Protocol	x	x	x
IOCL	x	x	x
Device			
Number	x	x 3)	x 4)
Unit/model	x	(x)	x
Description	x	x	x
Serial number	x	x	x
Volume serial number	x	x	x
Control units	x	(x)	x
Processor connect	x	(x)	x
Unit address	x	(x)	x
Preferred CHPID	x	x	x
TIMEOUT	x	x	x
STADET	x	x	x
Candidate list	x	x	x
OS connect	x	—	x
Subchannel set	x	(x)	x
Parameters	x	x	x
Features	x	x	x
User parameters	x	x	x

Table 7. Actions on IODF Objects (continued)

Object/Attributes	Add	Delete	Change
Operating system			
ID	x	—	—
Type	x	(—)	—
Description	x	—	x
EDT			
ID	x	—	—
Description	x	—	x
Esoteric			
Name	x	—	—
VIO	x	(—)	x
Device list	x	x 6)	x 7)
Token	x	—	x
Generic			
VIO	x	(—)	x
Preference value	x	(—)	x
Console			
Device list	x	x 9)	x 13)
Order	(x)	(x)	x
Switch			
ID	x	—	—
Unit/model	x	(—)	x
Ports (installed range)	x	(—)	x 8)
Serial number	x	—	x
Description	x	—	x
Switch connection	x	x 14)	x 15)
Address	x	—	x
Ports			
ID	x	—	—
Name	x	(—)	x
Occupied indicator	x 15)	x 15)	n/a
Switch configuration			
ID	x	—	—
Description	x	—	x
Default connection	x	—	x
Port configuration			
Allowed connection	x	—	x
Prohibited connection	x	—	x
Dedicated connection	x	—	x
Blocked indicator	x	x	n/a

References to IOCP and MVSCP in the following notes refer to data sets with extended syntax as described in "Changing I/O configurations by editing data sets" on page 273.

Notes:

1. To delete a partition, specify all connected channel paths (defined via access or candidate lists) together with their attached I/O units without referring to the partition and without repeating the partition in the RESOURCE statement.
2. A control unit is implicitly deleted, if its channel paths are respecified in the IOCP input data set together with their attached I/O units (except the control unit) and it no longer has any connection to a processor.

3. A device is implicitly deleted, if its attaching control units are implicitly deleted using the incremental update specification, and there is no additional connection left to any control unit or operating system.
4. To change control unit and device attributes, specify the entire logical control unit(s) (LCU) the control unit or device is part of. For migration to an OS configuration only (MVSCP data set), respecify the I/O device with the changed parameters. HCD will redefine the device in the corresponding subchannel set.
5. To change channel path attributes, specify all logical control units the channel path is connected to in the IOCP input data set. Otherwise, the channel path is disconnected from the corresponding control units.
6. To delete an esoteric device list, specify all device definitions in the MVSCP input data set, but do not connect them to the esoteric name.
7. To add a device to an esoteric device list, specify the esoteric with the device number.

   To delete a device from the esoteric device list, specify the device in an IODEVICE statement) but do not specify the device number for the esoteric device list.
8. An installed port can be set to uninstalled only if it does not belong to the minimum installed port range and does not hold a connection to a channel path or control unit.
9. To delete a console list, specify all contained devices using the IODEVICE statement but do not include the devices in a NIPCON statement.
10. If the usage type is not specified and you add a partition, the usage type is automatically defined: if the IOCP input data set contains a CF receiver channel path with the partition in its access or candidate list, the usage type is set to CF/OS, if not, the usage type is set to OS.
11. To change the partition name or partition number specify the whole partition configuration including all channel paths with attached I/O units which have the partition in their access and candidate lists.
12. (No longer used.)
13. To change a complete console device list, use the NIPCON statement.

    To remove a single device from the console list, specify the corresponding IODEVICE statement and omit the NIPCON statement.
14. To delete a switch-to-switch connection, specify a switch via a SWITCH statement and omit the switch-to-switch connection in the SWPORT parameter.
15. When updating switch ports new connections always overwrite a previous connection or status. To be updated with an occupied status the port must currently not be connected.

How to invoke the incremental update

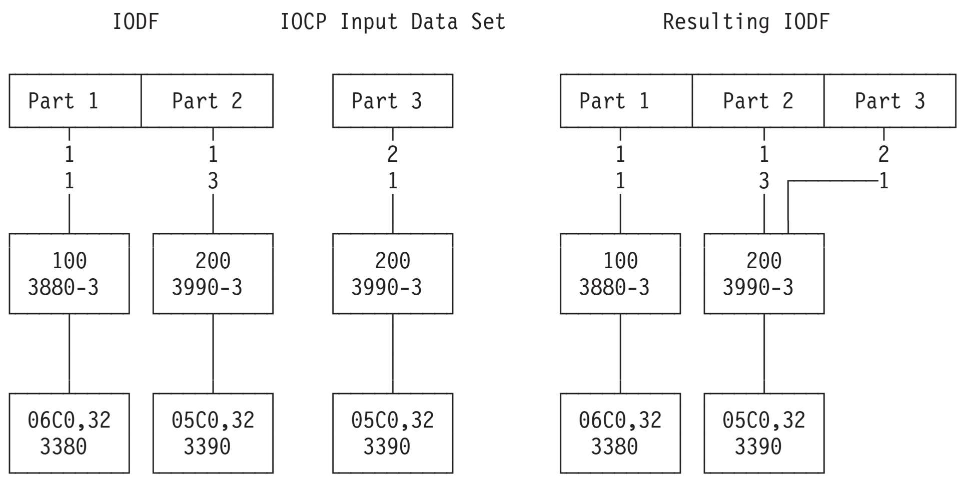
1. Specify your objects with IOCP, MVSCP, or HCPRIO control statements. Note that you can add additional parameters and SWITCH statements to exploit the extended migration as described under “Changing I/O configurations by editing data sets” on page 273).
2. Select ***Migrate configuration data*** on the primary task selection panel and on the resulting panel the ***Migrate IOCP/OS data*** option.
3. On the following Migrate IOCP / MVSCP / HCPRIO Data panel (see Figure 118 on page 270), enter the required data and change the incremental update to Yes.

4. After the input has been accepted, HCD issues a message informing you that the migration of input data sets is in process.

Example 1: Adding a partition

In this example, you specify a partition in your input data set that does not yet exist in the IODF. The attached control units and devices are already defined in the IODF for another processor.

The following figure illustrates the result after the incremental update:




```
RESOURCE PART=(PART3)
CHPID    PATH=21,TYPE=CNC,PART=(PART3)
CNTLUNIT CUNUMBR=200,UNIT=3990,PATH=(13,21)
IODEVICE ADDRESS=(5C0,32),UNIT=3390
         CUNUMBR=200
```

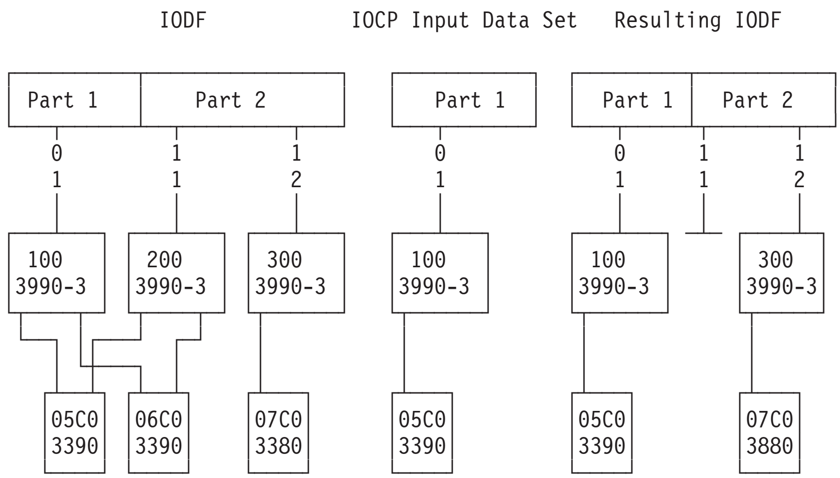
Figure 119. Partial Migration of an IOCP Input Data Set. A new partition is added. Control units and devices are mapped.

The partition is added and the control unit and devices are mapped. For a detailed description when control units and devices are mapped, refer to “Migrating additional IOCP input data sets” on page 265.

Example 2: Replacing a channel path and attached control unit

In this example, you specify a channel path with attached control unit and devices in an IOCP input data set. The channel path, the control unit, and one device already exist in the IODF.

The following figure illustrates the result after the incremental update:




```
CHPID    PATH=01,TYPE=CNC,PART=PART1
CNTLUNIT CUNUMBR=100,UNIT=3990,PATH=01,...
IODEVICE ADDRESS=(5C0,32),UNIT=3390,
         CUNUMBR=100
```

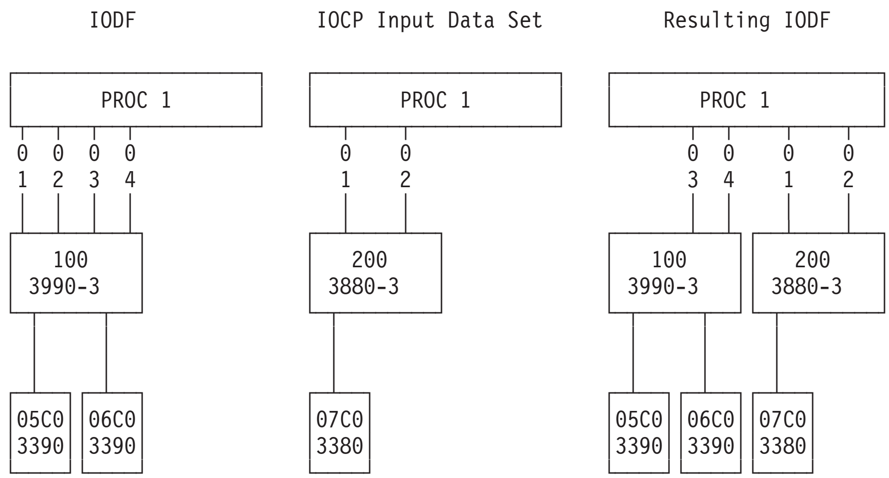
Figure 120. Partial migration of an IOCP input data set. The whole logical control unit (control unit 100 and 200 and connected devices) are replaced by control unit 100 and its connected devices.

The logical control unit in the IOCP input data set replaces the whole logical control unit in the IODF.

Example 3: Replacing a channel path with a new control unit

In this example, you specify channel paths with control unit and device in the input data set. The channel paths are already defined in the IODF, but connect to another control unit.

The following figure illustrates the result after the incremental update:




```
CHPID    PATH=01,TYPE=BL
CHPID    PATH=02,TYPE=BL
CNTLUNIT CUNUMBR=200,UNIT=3880,PATH=(01,02),..
IODEVICE ADDRESS=(7C0,32),UNIT=3380,
         CUNUMBR=200
```

Figure 121. Partial migration of an IOCP input data set. CHPIDs are defined as in the IOCP input data set

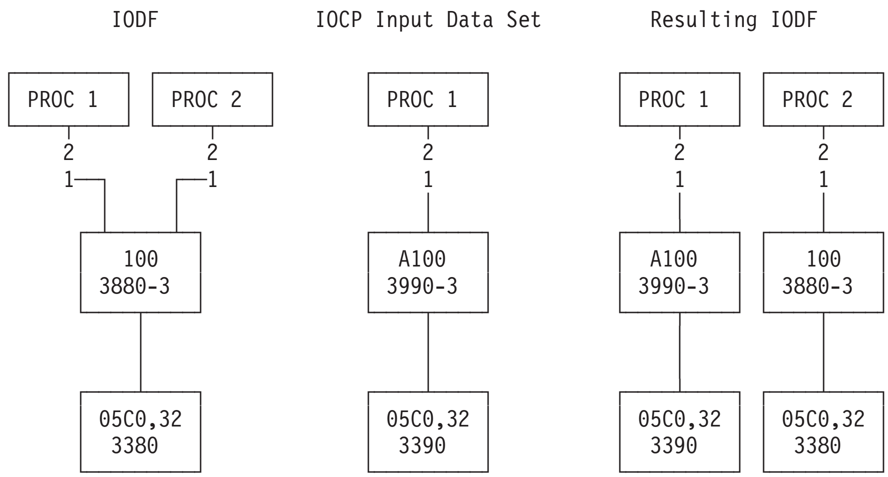
The channel paths in the IODF are deleted and newly defined as they are defined in the IOCP input data set.

Example 4: Replacing a control unit that attaches to two processors

In this example, you want to replace existing control units and devices by another type. The control units and devices are attached to two processors.

The incremental update must be done in several steps:

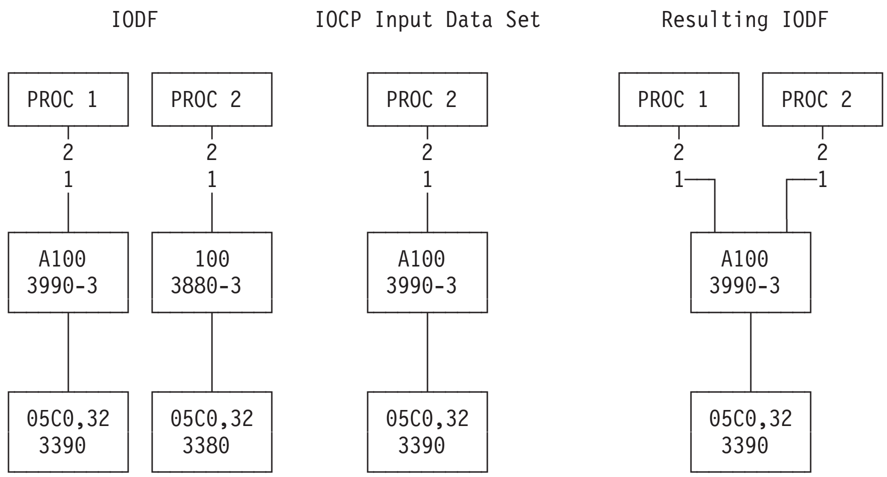
1. Specify another control unit number in your IOCP input data set than the one in the existing IODF. Specify the CHPID, CNTLUNIT, and IODEVICE control statements.
2. Migrate your input data set for the first processor.




```
CHPID    PATH=21,TYPE=CNC,...
CNTLUNIT CUNUMBR=A100,UNIT=3990,...
IODEVICE ADDRESS=(5C0,32),UNIT=3390,
         CUNUMBR=A100
```

Figure 122. Partial migration of an IOCP input data set. Control unit defined for two processors is migrated to the first processor.

3. Migrate your input data set again for the second processor.




```
CHPID    PATH=21,TYPE=CNC,...
CNTLUNIT CUNUMBR=A100,UNIT=3990,PATH=(21)
IODEVICE ADDRESS=(5C0,32),UNIT=3390,
         CUNUMBR=A100
```

Figure 123. Partial migration of an IOCP input data set. Control unit defined for two processors is migrated to the second processor.

Example 5: Updating an operating system

In this example, you update an operating system by adding and changing EDTs, generics, esoterics, and console devices.

```
          IODF                                    MVSCP Input Data Set
                                            IODEVICE ADDRESS=(800,8),UNIT=...,MODEL=...

EDT ID=01                                   EDT ID=01
UNITNAME=POOL1,UNIT=((700,8),(900,8))       UNITNAME=POOL1,UNIT=((800,8)),VIO=YES
UNITNAME=POOL2,UNIT=((100,16))              UNITNAME=POOL3,UNIT=((0270,16))
UNITNAME=TAPES,UNIT=((A80,4))               UNITNAME=9345,VIO=YES

NIPCON DEVNUM=(40,41,42)                    EDT ID=02
                                            UNITNAME=TAPES,UNIT=((180,4))

                                            NIPCON DEVNUM=(40,50,60)


       Resulting IODF
IODEVICE ADDRESS=(800,8),UNIT=...,MODEL=...

EDT ID=01
UNITNAME=POOL1,UNIT=((700,8),(800,8),(900,8)),VIO=YES
UNITNAME=POOL2,UNIT=((100,16))
UNITNAME=POOL3,UNIT=((0270,16))
UNITNAME=TAPES,UNIT=((A80,4))
UNITNAME=9345,VIO=YES

EDT ID=02
UNITNAME=TAPES,UNIT=((180,4))

NIPCON DEVNUM=(040,050,060)
```

Figure 124. Partial migration of an MVSCP input data set

You can either migrate the changes with a combined input data set or with an MVSCP only input data set. With a combined input data set, you can make CSS and operating system changes at the same time.

If you migrate an MVSCP only input data set, specify a processor and partition, with which device definitions in the input data sets will be associated in the IODF, on the Migrate IOCP / MVSCP /HCPRIO Data panel. HCD uses this information to map devices correctly if the IODF contains duplicate device numbers. For more information about this mapping, refer to “Migrating additional MVSCP or HCPRIO input data sets” on page 267.

The result after the migration is as follows:
- The definition of EDT input statements replaces the definition in the IODF, new definitions are added. That means in the example above, EDT 01 is replaced and EDT 02 is added.
- Devices are added. To add devices, you also have to newly define the esoterics to which the devices are to be assigned.
- Devices in a UNITNAME statement are added to the devices already defined for the esoteric.
- The list of consoles is replaced.

Note: If an EDT statement is missing or specified without EDT ID, the EDT ID for esoterics and generics is taken from the ID of the IOCONFIG statement. If the IOCONFIG statement is also not available, the EDT ID will be assumed as ’00’.

Resolving migration errors

If HCD detects an error when you migrate using the HCD dialog, it displays a message list when the migration has been completed.

Figure 125 is an example of such a message list. It lists all the messages that were issued during the process. The list shows the statement number of the input statement for which the message was issued. You can now:

- Get explanations of messages in the list. To get explanations, use the ***Explain message*** action from the context menu or action code **e** .
- Delete messages that are of no further interest. That is, delete those messages that you do not want to appear in the *HCD migration log*.

```
┌─────────────────────────── Message List ──────────────────────────────────┐
│  Query  Help                                                               │
│------------------------------------------------------------------------   │
│                                                                Row 1 of 6 │
│                                                                            │
│Select one or more messages, then press Enter.                             │
│                                                                            │
│ /  Statement Orig Sev Message Text                                        │
│ -  9         1    E   Duplicate unit address F0 on channel path 01 of    │
│ #                      processor BOEHCD.                                  │
│ -  5         2    W   Type of control unit 0131 assumed as 3800-13 to    │
│ #                      attach device 01F0.                                │
│                   I   No output written to IODF. VALIDATE processing     │
│ #                      forced due to errors.                              │
```

Figure 125. Message List

When you exit the message list or when you migrated your input data sets using the batch utility, HCD writes the error messages to the HCD migration log.

You can display the HCD migration log through ISPF. The name of the HCD migration log data set is developed from the name of the input data set, without high-level qualifier, and your user ID as follows:

`*userid.yyy.zzz*.MESSAGES`

where the input data set, without high-level qualifier, is:

`yyy.zzz`

or

`yyy(zzz)`

Errors detected during assembly process

During migration, HCD invokes the assembler to parse the input statements. If it encounters an error, it writes a message to the message list. This message points to an assembler listing for more details.

```
  Query  Help
------------------------------------------------------------------------
                              Message List                       Row 1 of 2

Select one or more messages, then press Enter.

 /  Statement Orig Sev Message Text
 -                 T   Assembler processing returns with return code    =
 #                     8. See BPAN.CDS.CSYSIO.LISTING for details.
```

Figure 126. Message List containing an Assembler message

The name of the assembly listing data set is developed from the name of the input data set, without high-level qualifier, and your user ID as follows:

```
userid.yyy.zzz.LISTING
```

where the input data set, without high-level qualifier, is:

```
yyy.zzz
```

or

```
yyy(zzz)
```

At the bottom of the assembly listing, you find the statement numbers where errors were detected. If you locate the statement numbers in the listing, you see the IOCP statement in error followed by the error message. The following examples show IOCP statements and the assembly messages issued.

Example 1

In this example an entry in the IOCP input data set is commented out, but the continuation character $ is left in column 72.

```
7493 *       CNTLUNIT CUNUMBR=02E,PATH=(02,06),SHARED=N,UNIT=3990,       91A$
7494 *             UNITADD=((E),32)),PROTOCL=S4
```

The assembler listing shows the following message:

```
IEV144   *** ERROR ***  BEGIN-TO-CONTINUE COLUMNS NOT BLANK
```

Example 2

This example shows a line with only 87A being included in the IOCP input data set.

```
7493 *       CNTLUNIT CUNUMBR=234,PATH=24,SHARED=N,UNIT=3880,            87A
7494 *             UNITADD=(30,16),PROTOCL=S4                            87A
7495                                                                     87A
7496 *IOCP                                                               87A
```

The assembler listing shows the following message:

```
IEV144   *** ERROR ***  OPERATION CODE NOT COMPLETE ON FIRST CARD
```

Example 3

This example shows a wrong channel path type in the CHPID statement.

```
CHPID PATH=((00)),TYPE=CMC
```

The assembler listing shows the following message:

```
IEV144   *** MNOTE ***  8,003 TYPE=CMC  IS  INVALID
```

Errors detected during validation process

During the validation process, HCD checks that the definitions being migrated do not cause any conflicts with existing definitions in the IODF and with other definitions being migrated. HCD also checks that the contents of the input data sets is valid. The errors are shown in the message list and migration log.

Figure 127 shows error messages in the migration log.

```
I/O Configuration Migration              Time: 11.39    Date: 94-11-26    Page:    1
MVS/ESA HCD V 5.2

(1) DSN=BBEI.IOCP01.CTL     1
(2) DSN=BBEI.MVSCP01.CTL

Statement  Orig  Sev  Msgid   Message Text

      9    (1)  E  CBDA230I  Duplicate unit address F0 on channel path 01 of processor BOEHCD.

      5    (2)  W  CBDA265I  Type of control unit 0131 assumed as 3880-13 to attach device 01F0.

                I  CBDA516I  No output written to IODF. VALIDATE processing forced due to errors.

Total Messages   Terminating   Error   Warning   Informational
          3           0          1        1            1

Return Code was   8
```

Figure 127. Example: HCD Migration Log

The messages are sorted according to their severity, and within a certain severity level according to their occurrence.

The value in the **Orig** column points to the input data set that caused this error. At the top of the migration log you find a reference list that shows the values with the names of the input data sets (see the line marked **1**).

In Figure 127 the first message line means, that the statement number 9 in the input data set 1 (data set BBEI.IOCP01.CTL) is the cause of the error message.

The following examples show common validation errors and explain their causes.

Example 1

```
Statement Orig Sev  Msgid   Message Text

      7    (1)  E  CBDA154I  Channel path type CNC is not supported by channel
                             path ID 3A.
```

This message is issued, because an ESCON channel is defined although the support level was defined in the IODF as having only parallel channels installed for the specified CHPID. To resolve this, either change the channel type in the IOCP input data set, or change the processor type or support level in the IODF.

Example 2

```
Statement Orig Sev  Msgid   Message Text

      4    (1)  E  CBDA234I  Unknown type 38823 of control unit 0000
                             specified.
```

This message is issued, because HCD does not know the control unit type 38823. Select the ***Query supported hardware and installed UIMs*** from the primary task selection panel or use the ***Query*** action bar choice for information on valid control unit and device types.

Example 3

```
Statement Orig Sev  Msgid     Message Text

     228   (1)   W  CBDA265I  Type 3800-3 assumed for control unit DD32
                              to attach the device 0828.
     227   (1)   I  CBDA534I  Control unit DD32 is assumed as 3800-1.
```

These messages are issued, because HCD has to choose the control unit type among several models.

The control unit model 3800-1 is indicated as default model in the UIM (information message CBDA534I is issued). As processing goes on, it is necessary to change the default model (3800-1) to another model (3800-3) to attach a device type which is not supported by the default control unit model (warning message CBDA265I is issued).

Note: The sequence of messages is shown in reverse order in the migration log file since the messages are sorted according to decreasing severities. To resolve this, either include the model in the IOCP input data set, map the control unit types via HCD profile entries, or update the IODF using the HCD dialog, if HCD has made an incorrect assumption.

Insufficient data set sizes

HCD dynamically allocates the data sets required for migration. It can happen that the default data set sizes are insufficient for the migration of the existing data. During the migration process, the system informs you by a message which data set needs to be enlarged. In that case, the data set needs to be preallocated with a larger size before invoking the HCD migration task again.

HCD uses, by default, the following ddnames and data set sizes:

- HCDPRINT

  Used for the HCD migration log.

  The data set name is built from the input data set name — if two input data sets are specified from the IOCP input data set name — qualified with ’MESSAGES’. If the input is a member of a partitioned data set, an additional qualifier - the name of the member - is inserted before ’MESSAGES’. The high-level qualifier of that data set name is replaced by the TSO prefix (user ID).

  The minimum allocation (also used as default allocation if the data set does not exist) is: RECFM=FBA, LRECL=133, BLKSIZE=2926, SPACE=(TRK,(1,10)), exclusive access.
- HCDASMP

  Contains the assembler SYSPRINT data set, which contains the assembly listing (input statements with sequence numbers and messages).

The data set name is built from the input data set name qualified with ’LISTING’. If the input is a member of a partitioned data set, an additional qualifier - the name of the member - is inserted before ’LISTING’. The high-level qualifier of that data set name is replaced by the TSO prefix (user ID).

The minimum allocation (also used as default allocation if the data set does not exist) is as follows: RECFM=FBA, LRECL=121, BLKSIZE=1573, SPACE=(TRK,(15,150)), exclusive access.

- HCDUT1

  Used by the assembler as a work data set (UNIT=SYSALLDA, LRECL=80, BLKSIZE=3200, SPACE=(TRK,(15,150)), exclusive access).

- HCDUT2

  Used as output data set for the modified input stream and by the assembler as SYSIN data set (UNIT=SYSALLDA, LRECL=80, SPACE=(TRK,(10,15)), exclusive access).

- HCDUT3

  Used by the assembler as punch data set (SYSPUNCH).

  Used by the loader as input data set (UNIT=SYSALLDA, LRECL=80, SPACE=(TRK,(10,30)), exclusive access).

Notes:

1. The sizes of the output data sets HCDUT2, HCDASMP, and HCDPRINT depend on the size of the input and on the number of messages produced. The space given above should be taken as minimum allocation values.
2. For HCDASMP and HCDPRINT, HCD checks whether data sets with the default names exist. If so, the space allocations of these existing data sets are used if they exceed the minimum allocation values. If they are below the minimum allocation value, the data sets are deleted and allocated with a new (minimum) size. Correspondingly, the space of the HCDUT2 data set is made dependent on the input data set(s). This rule is only applicable if the ddnames have not been previously allocated.
3. Preallocate HCDASMP and HCDPRINT if:
   - You want to have them on a different data set than the default one
   - You want to place these data sets on a specific volume
   - The default size is not large enough
   - A size different from the default size should be used.

Chapter 12. How to invoke HCD batch utility functions

Programming Interface information

You can invoke HCD batch utility functions:

- With an input parameter string. The diagram below shows how to invoke an HCD batch utility function. For formats of the input parameter strings and sample batch jobs see "Input parameter string" on page 308.

HCD Batch Invocation

```
►►──EXEC──PGM=CBDMGHCP,──PARM='─┤ Input Parameter String ├─'──────────►◄
```

- By using an ATTACH or LINK module programming statement to invoke the module CBDMGHCP.

  When you invoke the module, register 1 must contain the address of a two-word parameter list.

  Word 1
  Address of input parameter (see "Input parameter string" on page 308), preceded by a two byte length field.

  Word 2
  Address of a list of alternate DD names. If not used, the address must be binary zero. For the list format of alternate DD names see "List of alternate DD names" on page 338.

You may overwrite standard DD names listed in Table 8 on page 337 as desired before invoking HCD.

If you specify the UIMs and UDTs in a library other than SYS1.NUCLEUS, you have to add the following statement to your batch jobs:

```
//HCDPROF DD DSN=BPAN.HCD.PROF,DISP=SHR
```

In the HCD profile (in our example BPAN.HCD.PROF) specify the following keyword:

```
UIM_LIBNAME=libname
```

If the keyword is omitted, SYS1.NUCLEUS is assumed. If you specify an asterisk (*) as data set name, HCD assumes that the UIM data set is part of the ISPF load library concatenation chain, contained in the JOBLIB/STEPLIB concatenation chain, or specified in the active LNKLSTxx member. For more information, see "Defining an HCD profile" on page 25.

Running jobs in a sysplex environment:

If you want to execute a job on a specific system in a sysplex, you must specify in your batch job which system is to be used. If you do not specify the exact system of a sysplex for which the batch job is planned to execute on, the job executes on the system that has the free space to run on.

The output from some of the HCD functions depend very much on where the job was executed; for example, downloading IOCDSs and requesting the I/O Path report.

How to Read Syntax Diagrams

For details on this subject see "How to read syntax diagrams" on page xv.

Note: Trailing commas in the parameter string can be omitted.

Input parameter string

Input Parameter String

```
►►──┬────────┬──┬─┤ Start the dialog ├──────────────────────────┬──►◄
    └─TRACE,─┘  ├─┤ Initialize a VSAM data set into an IODF ├───┤
                ├─┤ Upgrade an IODF ├───────────────────────────┤
                ├─┤ Migrate I/O configuration statements ├──────┤
                ├─┤ Build a production IODF ├───────────────────┤
                ├─┤ Build a work IODF from a production IODF ├──┤
                ├─┤ Build an IOCDS or an IOCP input data set ├──┤
                ├─┤ Build an HCPRIO input data set ├────────────┤
                ├─┤ Build I/O configuration statements ├────────┤
                ├─┤ Copy an IODF ├──────────────────────────────┤
                ├─┤ Print a configuration report ├──────────────┤
                ├─┤ Create a graphical configuration report ├───┤
                ├─┤ Compare IODFs or CSS/OS views ├─────────────┤
                ├─┤ Import an IODF ├────────────────────────────┤
                └─┤ Export an IODF ├────────────────────────────┘
```

TRACE
When specified, the HCD trace will be activated.

Input Parameter String
You will find a detailed description of the input parameter strings in the following sections.

You can also activate tracing by adding the TRACE command in the HCD profile. This allows you to specify the trace parameters in more detail. In this case, you must allocate DD name HCDPROF to the HCD profile when invoking the batch utility. For more information, see "Defining an HCD profile" on page 25, and "TRACE command" on page 469.

Function parameter strings

Start the dialog

This utility function starts the HCD (ISPF) Dialog session. The HCD primary task selection panel is displayed.

This function is invoked by passing the following parameter string.

Start the dialog

```
├──DIALOG──┬─────────┬──────────────────────────────────────────────────┤
           │   ┌─E─┐ │
           └─,─┴─J─┴─┘
```

E | **J** is a one-character code for national language support in help panels and messages. Specify one of the following (if omitted, the default is E):

E for English

J for Japanese

Initialize IODF

This utility function initializes a defined VSAM DIV file into an IODF. Each IODF contains as first record a header record, called the IHR (IODF Header Record). This record contains, among other information, the size of the IODF, an optional description of up to 128 characters, as well as an option whether activity logging is enabled or disabled. HCD rejects any data set that does not contain such a header record.

The VSAM DIV file must be preallocated using DD name HCDIODFT. You can add an optional IODF description using DD name HCDCNTL.

This function is invoked by passing the following parameter string.

Initialize a VSAM data set into an IODF

```
├──INITIODF──SIZE=nnnn──┬─────────────────────┬──┬────────┬──────────────────┤
                        │           ┌─YES─┐   │  └─,FORCE─┘
                        └─,ACTLOG=──┴─NO──┴───┘
```

SIZE=*nnnn*

nnnn specifies the size of the IODF in 4K blocks. This value must not be greater than the number of records specified with the IDCAMS Define Cluster control statement. If SIZE=0 is specified, the number of allocated records of the VSAM data set is used. If an existing IODF is re-initialized, the specified size value must not be smaller than the number of allocated IODF blocks.

ACTLOG=(YES | NO)

specifies enabling of activity logging. If omitted, the default is YES.

FORCE

indicates that reinitialization of an existing IODF is allowed.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFT	IODF to be initialized

DD name	Description
HCDCNTL	Up to 128 characters used as description for the IODF.
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

The following example shows the IDCAMS control statements necessary to define a VSAM DIV file.

```
DEFINE CLUSTER (NAME (SYS1.IODF01.CLUSTER) -
       LINEAR -
       RECORDS (1024) -
       VOLUMES (DATA02) -
       ) -
       DATA (NAME (SYS1.IODF01))
```

For an example see the batch job on page 335.

Notes:

1. This batch job issues a job message IEC161I, which can be ignored.
2. The VSAM DIV file consists of a data and a cluster file. According to the IODF naming convention (see "IODF naming convention" on page 35), the name of the data file is the IODF name (in this example SYS1.IODF01), and .CLUSTER is appended to the data file for a cluster file. To define your VSAM DIV file, you must append .CLUSTER to the IODF name in the DEFINE CLUSTER statement (in this example SYS1.IODF01.CLUSTER).

Upgrade IODF

This utility function upgrades a back-level IODF to be accessible with the current HCD release.

You have to allocate:
- The IODF you want to upgrade with DD name HCDIODFS
- The IODF into which the I/O definitions are to be upgraded with DD name HCDIODFT

This function is invoked by passing the following parameter string.

Upgrade an IODF

```
├──UPGRADE──────────────────────────────────────────────────────────────┤
```

Notes:

1. The target data set must be large enough to hold the source IODF.
2. The target IODF may be created using the utility ***Initialize IODF*** (described in "Initialize IODF" on page 309).
3. Both data sets must be valid IODFs.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Back-level IODF to be upgraded
HCDIODFT	IODF into which IODF definitions are to be upgraded (if not specified, the IODF is upgraded in place)
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* UPGRADE IODF
//*
//UPGRADE  EXEC PGM=CBDMGHCP,PARM='UPGRADE'
//HCDIODFS DD   DSN=BWIN.IODFR2.WORK,DISP=SHR
//HCDIODFT DD   DSN=BWIN.IODF00.WORK,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

For considerations concerning the size when upgrading a back-level IODF, refer to Table 4 on page 49.

Migrate I/O configuration statements

This utility function allows you to migrate the data set containing I/O configuration statements, e. g. an IOCP, MVSCP, or HCPRIO input data set and store the definitions into an IODF.

You have to allocate:
- The IODF into which the I/O definitions are to be migrated with DD name HCDIODFT
- The I/O configuration input data set with DD name HCDIN
- The MACLIB containing the parsing macros with DD name HCDLIB

This function is invoked by passing the following parameter string.

Migrate I/O configuration statements

```
├──MIGR──,──┬─┬─I──┬─┬─┤ processor parameters ├─┬──────────┬──┤
            │ └─IP─┘ └─,──*─────────────────────┘          │
            ├─┬─O──┬─┬─┤ OS parameters ├─┬──────────────┬─┬┤
            │ └─OP─┘ │                   └─┤ association ├┘ ││
            │        └─,──*────────────────────────────────┘│
            ├─┬─B──┬─┤ OS parameters ├─┤ processor parameters ├┤
            │ └─BP─┘                                          │
            ├─S─,─*───────────────────────────────────────────┤
            └─C─,─procid──────────────────────────────────────┘
```

processor parameters:

```
├──,──┬─procid──────────┬─,──proctype──,────────────────────────►
      ├─procid.cssid────┤
      └─procid(#cssid)──┘

►─┬──────────────┬─┬──────────────────────┬──────────────────────┤
  └─┤ procmode ├─┘ └─,──support_level_ID──┘
```

OS parameters:

```
├──,──osid──,──ostype────────────────────────────────────────────┤
```

association:

```
├──,──asproc──┬──────────────┬──────────────────────────────────┤
              └─,──aspart────┘
```

procmode:

```
   ┌─BASIC─┐
├──┴─LPAR──┴─────────────────────────────────────────────────────┤
```

I | IP | O | OP | B | BP | S | C

Function indicator:

I	Migration of processor configuration statements (e. g. IOCP data sets)
IP	Partial migration of processor configuration statements
O	Migration of OS configuration statements (for example MVSCP or HCPRIO data sets)
OP	Partial migration of OS configuration statements
B	Combined migration of processor and OS configuration statements
BP	Partial combined migration of processor and OS configuration statements

S Switch migration

C physical channel ID (PCHID) migration

Processor related variables and keywords:

procid
Processor ID (up to 8 characters)

procid.cssid, procid(#cssid)
When migrating an SMP processor to an XMP processor, the channel subsystem ID of the target processor may be appended to the processor ID as one character either by a # and in parenthesis or by a dot (.). The default is 0.

proctype
Processor type and model separated by a hyphen, for example 9672-E08

procmode
Processor mode

BASIC
If the processor operates in BASIC mode (default).

LPAR If the processor operates in LPAR mode.

support_level_ID
Support level ID associated with the processor. This parameter is required if the processor does not already exist and several support level IDs are installed for a supported processor type. The support level ID can be obtained by the ***List supported processors*** function or by the supported hardware report described in "Print configuration reports" on page 324. For an example of a supported hardware report refer to "Supported Hardware Report" on page 400.

If you do not specify a support level, the highest support level will be used for the processor.

Note: The support level ID is unique to HCD and does not correspond to the EC level of the processor.

*****
Allows multiple processor configurations to be migrated. Scans the input data set to determine which processor configurations are to be processed. For successful migration the configurations must include the ID statement described in "Processor" on page 281.

OS related parameters:

osid
Operating system ID (up to 8 characters)

ostype
OS type (MVS or VM)

asproc
Associated processor. For more information, see "Migrating additional MVSCP or HCPRIO input data sets" on page 267

aspart
Associated partition. For more information, see "Migrating additional MVSCP or HCPRIO input data sets" on page 267

*****
Allows multiple OS configurations to be migrated. Scans the input data set to determine which OS configurations are to be processed. For successful migration the configurations must include the IOCONFIG statement described in "Operating system" on page 276.

Switch related wildcard:

`*` Allows switch configurations of multiple switches to be migrated. Scans the input data set to determine which switch configurations are to be processed. For successful migration the configurations must include the SWCONF statement described in "Switch configuration" on page 280.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFT	IODF into which I/O definitions are to be migrated
HCDIN	I/O configuration input data set
HCDLIB	MACLIB containing the parsing macros (CBDZPARS)
HCDMLOG	HCD Message Log data set
HCDPRINT	Data set for migration log (see "Insufficient data set sizes" on page 305)
HCDASMP	Data set for assembly listing (see "Insufficient data set sizes" on page 305)
HCDPROF	HCD profile (when using extended migrate function)
HCDTRACE	Trace data set (if trace is activated)

For defaults of HCDPRINT and HCDASMP, for preallocating additional migration data sets, and for viewing the migration log see "Resolving migration errors" on page 302. **Example:**

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* MIGRATE AN IOCP DECK
//*
//MIGRATE  EXEC PGM=CBDMGHCP,
//            PARM='MIGR,I,PROC1,9672-E08,LPAR'
//HCDIODFT DD   DSN=BWIN.IODF03.WORK,DISP=OLD
//HCDIN    DD   DSN=BWIN.IOCP.DECK,DISP=SHR
//HCDLIB   DD   DSN=SYS1.MACLIB,DISP=SHR
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//HCDPRINT DD   DSN=BWIN.IOCP.MESSAGES,DISP=OLD
//HCDASMP  DD   DSN=BWIN.IOCP.LISTING,DISP=OLD
//
```

Build a Production IODF

This utility function creates a production IODF using the work IODF. The work IODF has to be specified with DD name HCDIODFS, the target production IODF with DD name HCDIODFT. First, the target production IODF has to be created by defining a VSAM DIV file and initializing it using the utility Initialize IODF (see "Initialize IODF" on page 309).

If the work IODF has an associated MCF, the MCF data set is copied and associated to the production IODF.

After the production IODF has been built, it is copied back to the work IODF. Thus, the work IODF contains the new tokens and can be used for further updates.

Since the production IODF may be larger than the original work IODF, the work IODF may be automatically enlarged to accommodate the contents of the production IODF.

This function is invoked by passing the following parameter string.

Build a Production IODF

```
├──PRODIODF──┬──────────────────────────────────────┬──────────────────┤
             ├─DESC1=descriptor1────────────────────┤
             ├─DESC2=descriptor2────────────────────┤
             └─DESC1=descriptor1,DESC2=descriptor2──┘
```

DESC1=*descriptor 1*
: Default is the first qualifier of the production IODF name (up to 8 characters).

DESC2=*descriptor 2*
: Default is the second qualifier of the production IODF name, which is IODFxx (up to 8 characters).

The descriptor fields describe the IODF and will be part of the HSA token. **Attention:** If you specify asterisks (**), equals (==), pluses (++), or minuses (––) for the IODF suffix in LOADxx, never change the default descriptor field values, because z/OS uses these values to find the current IODF during IPL. Take this relationship also into consideration, if you copy the IODF to a different data set name.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Work IODF
HCDIODFT	Production IODF
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* BUILD PRODUCTION IODF
//*
//PROD     EXEC PGM=CBDMGHCP,
//             PARM='PRODIODF DESC1=BWIN,DESC2=IODF03'
//HCDIODFS DD   DSN=BWIN.IODF03.WORK,DISP=OLD
//HCDIODFT DD   DSN=BWIN.IODF03,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Build a work IODF from a production IODF

This utility function creates a work IODF using an existing production IODF. The production IODF has to be specified with DD name HCDIODFS, the target work IODF with DD name HCDIODFT. First, the work IODF has to be created by defining a VSAM DIV file and initializing it using the utility Initialize IODF (see "Initialize IODF" on page 309).

This function is invoked by passing the following parameter string.

Build a Work IODF

```
├──WORKIODF──────────────────────────────────────────────────────────────┤
```

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Production IODF
HCDIODFT	Work IODF
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* BUILD WORK IODF
//*
//WORK     EXEC PGM=CBDMGHCP,PARM='WORKIODF'
//HCDIODFS DD   DSN=BWIN.IODF03,DISP=SHR
//HCDIODFT DD   DSN=BWIN.IODF03.WORK,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Build an IOCDS or an IOCP input data set

This utility function builds the IOCDS or the IOCP input data set using the definitions of a production IODF. This function is invoked by passing the following parameter string.

Build an IOCDS or an IOCP input data set

```
►►──IOCDS──,──┬───────┬──,──procid──,──┤ ind ├──────────────────────►◄
              └─iocds─┘
```

ind

```
       ┌─SA───┐
├──┬─D──,─┼──────┼──────────────────────┬──────────────────────────────┤
   │      └─NOSA─┘                      │
   ├─I──┬────────────┬──┬────────────┬──┤
   │    └─,──NOCHKCPC─┘  └─,──LOCALWRT─┘  │
   ├─W──┬────────────┬──┬────────────┬──┤
   │    └─,──NOCHKCPC─┘  └─,──LOCALWRT─┘  │
   ├─S──────────────────────────────────┤
   └─T──────────────────────────────────┘
```

iocds is a two-character IOCDS identifier, if building an IOCDS

procid Processor ID

D | I | W | S | T
One-character request code:

D Build an IOCP input data set

SA
The generated IOCP statements can be used for the stand-alone IOCP program (default).

NOSA
Depending on the HCD profile option MIGRATE_EXTENDED=YES, the generated IOCP statements have additional information that can be used for the extended migration. This information is shown as comments to IOCP.

Note: An IOCP input data set generated with operand NOSA may not be accepted by the stand-alone IOCP program, because of differences between the IOCP program running in z/OS and the stand-alone IOCP program.

I Build an IOCDS

NOCHKCPC
Write an IOCDS regardless of the type of the receiving processor. Refer to “Supported Hardware Report” on page 400 for a list of processor types that can receive an IOCDS in preparation for a processor upgrade and for processor types for which such an IOCDS can be written.

LOCALWRT
This parameter enforces a local IOCDS write. A defined SNA address which is normally used by HCD to initiate a remote IOCDS build to the support element with the designed SNA address, is ignored in this case.

W Build an IOCDS with dual-write option (optionally with **NOCHKCPC** and **LOCALWRT**, see option **I**).

S Build an IOCDS and set the IOCDS active for next POR

T Build an IOCDS with dual-write option and set the IOCDS active for next POR

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Source IODF
HCDDECK	IOCP data set (if build IOCP input data set is requested)
HCDCNTL	Control data set for specifying the MSG1 IOCP parameter
SYSPRINT	SYSPRINT data set for IOCP output listing (requested for build IOCDS)
SYSIN	Temporary work file used as IOCP input deck
HCDMLOG	HCD Message Log data set
HCDPROF	HCD profile (when generating additional information for extended migration)
HCDTRACE	Trace data set (if trace is activated)

Example 1:

The following example shows a ***Build IOCDS*** job.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=5M
//*
//* BUILD IOCDS (WITH DUAL-WRITE OPTION)
//*
//IOCDS    EXEC PGM=CBDMGHCP,
//            PARM='IOCDS,A0,PROC1,W'
//HCDIODFS DD   DSN=BWIN.IODFA3,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//SYSPRINT DD   DSN=&&IOCPOUT,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650),
//             SPACE=(CYL,(1,1)),DISP=(NEW,PASS,DELETE),UNIT=SYSALLDA
//SYSIN    DD   DSN=&&TEMP,DISP=(NEW,DELETE),SPACE=(CYL,(1,1)),
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=6080),UNIT=SYSALLDA
//HCDCNTL  DD   *
IOCDSNAM
/*
//* EXECUTED ONLY IF RETURN CODE HIGHER THAN 0
//PRINT    EXEC PGM=IEBGENER,COND=(0,EQ,IOCDS)
//SYSUT1   DD   DSN=&&IOCPOUT,DISP=(OLD,DELETE)
//SYSUT2   DD   SYSOUT=*
//SYSIN    DD   DUMMY
//SYSPRINT DD   DUMMY
//*
//CLEANUP  EXEC PGM=IEFBR14,COND=(0,NE,IOCDS)
//SYSUT    DD   DSN=&&IOCPOUT,DISP=(OLD,DELETE)
//
```

Figure 128. Build IOCDS job

Example 2:

The following example shows a ***Build IOCP input data set*** job.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=5M
//*
//* BUILD IOCP DECK
//*
//IOCP     EXEC PGM=CBDMGHCP,
//            PARM='IOCDS,,PROC1,D,SA'
//HCDIODFS DD   DSN=BWIN.IODFA3,DISP=SHR
//HCDDECK  DD   DSN=BWIN.IOCP3.DECK,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//HCDCNTL  DD   *
IOCDSNAM
/*
//
```

Figure 129. Build IOCP input data set

Note: `HCDCNTL` specifies the value of the `MSG1` parameter (in the example: IOCDSNAM) which is the identification information printed on the first ID line of the heading of the IOCP input data set. Specify the text without any keyword and quotation-marks. The first eight characters are used as IOCDS name.

Build an HCPRIO input data set

This utility function creates an HCPRIO input data set using the definitions of a VM operating system in a production IODF.

The IODF from which I/O definitions are extracted has to be specified with DD name HCDIODFS, and the HCPRIO input data set with DD name HCDDECK.

This function is invoked by passing the following parameter string.

Build an HCPRIO input data set

```
├──VMBUILD──,──H──,──osid────────────────────────────────────────┤
```

H Function indicator for HCPRIO input data set

osid
VM operating system ID (up to 8 characters)

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	IODF from which I/O definitions are extracted
HCDDECK	VM I/O configuration data set
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* BUILD AN HCPRIO INPUT DATA SET
//*
//HCPRIO   EXEC PGM=CBDMGHCP,PARM='VMBUILD,H,VM1'
//HCDIODFS DD   DSN=BWIN.IODF03,DISP=SHR
//HCDDECK  DD   DSN=BWIN.HCPRIO3.DECK,DISP=OLD
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Build I/O configuration statements

This utility function allows you to build I/O configuration statements from an IODF and to store them in a data set. The statements describe:
- Operating system configurations
- Processor configurations
- Switch configurations

The data sets created can be edited and re-migrated into the IODF.

In addition, you can build:
- JES3 initialization stream checker data
- CONFIGxx members (from production IODF only)

You invoke this function by passing the following parameter string:

Build I/O configuration Statements

```
├──CONFIG──,──┬─OS──,──┬─osid─┬───────────────┬──────────────────────┤
              │        └─*────┘               │
              ├─PR──,──┬─procid─┬─────────────┤
              │        └─*──────┘             │
              ├─SW──,──┬─swid─┬───────────────┤
              │        └─*────┘               │
              ├─JES──,──osid──,──edt_id───────┤
              └─XX──,──┤ CONFIGxx_parameters ├┘
```

CONFIGxx_parameters:

```
                                                  ┌─U─┐
├──xx──,──procid──,──┬──────────────┬──,──osid──,──┼───┼──,──┬────────┬──,──┬─────────┬──────┤
                     └─partition_id─┘              └─R─┘     └─backup─┘     └─sysplex─┘
```

OS | PR | SW | JES | XX
Function indicator:

OS Build OS configuration statements
- **osid** OS configuration ID (up to 8 characters)
- ***** If you specify * in place of an OS configuration ID, HCD searches for a list of OS configuration IDs in a data set allocated to HCDCNTL. If no data set has been allocated to DD name HCDCNTL, statements are built for all operating systems in the IODF.

PR Build processor configuration statement
- **procid** processor ID (up to 8 characters)
- ***** If you specify * in place of a processor ID, HCD searches

for a list of processor IDs in a data set allocated to HCDCNTL. If no data set has been allocated to DD name HCDCNTL, statements are built for all processors in the IODF.

If only the coupling facility partition and CF receive channels are to be generated for a particular processor, the respective processor ID in the list has to be qualified by the keyword CF, according to the following syntax:

```
├──procid──┬───────┬──────────────────────────────────────┤
           └─,──CF─┘
```

SW Build switch configuration statements

swid Switch ID (2 hexadecimal characters)

***** If you specify * in place of a switch ID, HCD searches for a list of switch IDs in a data set allocated to HCDCNTL. If no data set has been allocated to DD name HCDCNTL, statements are built for all switches in the IODF.

JES Build JES3 initialization stream checker data

osid OS configuration ID (up to 8 characters)

edt_id EDT ID (2 hexadecimal characters)

XX Build CONFIGxx members

xx Suffix of the CONFIGxx member to be built

procid Processor ID (up to 8 characters)

partition_id
Partition name; required entry, if the processor is in LPAR mode (up to 8 characters).

osid OS configuration ID (up to 8 characters)

U/R `U` updates the current CONFIGxx member. The CHP and DEVICE statements are replaced and all other statements remain unchanged. This is the default.

`R` deletes the current CONFIGxx member and generates new CHP and DEVICE statements.

backup
Name for the backup copy of the current CONFIGxx member (up to 8 characters).

sysplex
Name of the sysplex used for setting managed channel paths to ONLINE.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Source IODF
HCDDECK	Generated output data set For CONFIGxx this must be a data set name of a partitioned data set.

DD name	Description
HCDMLOG	HCD Message Log data set
HCDCNTL	Optional for specifying a list of operating systems, processors, or switches Not applicable for building CONFIGxx member or JES3 inish data set
HCDTRACE	Optional for capturing the trace if trace is activated.

Example 1:

The following example shows a job to build a configuration data set containing processor configuration PROC1 including its CF connections to processor PROC2.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* BUILD Processor configuration statement
//*
//BUILD  EXEC PGM=CBDMGHCP,PARM='CONFIG,PR,*'
//HCDIODFS DD   DSN=BWIN.IODF03,DISP=SHR
//HCDDECK  DD   DSN=BWIN.IODF.03.DECKS(PROC1),DISP=SHR
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//HCDCNTL  DD   *
PROC1
PROC2,CF
/*
//
```

Example 2:

The following example shows a job to update CONFIG03 in data set SYS1.PARMLIB from processor configuration PROC1, partition LPAR1 and OS configuration MVS1 while saving the existing member under the name CONFBK03.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* BUILD CONFIGxx
//*
//BUILD  EXEC PGM=CBDMGHCP,PARM='CONFIG,XX,03,PROC1,LPAR1,MVS1,U,CONFBK03'
//HCDIODFS DD   DSN=BWIN.IODF03,DISP=SHR
//HCDDECK  DD   DSN=SYS1.PARMLIB,DISP=SHR
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
/*
//
```

Copy IODF

This utility function copies the content of the IODF, addressed by DD name HCDIODFS, into another data set, addressed by DD name HCDIODFT. If the IODF has an associated activity log, that log is also copied. Likewise, if an HCM master configuration file (MCF) is associated to the IODF, it is also copied along with the IODF. However, a change log file (CHLOG), if available, is not copied.

This function is invoked by passing the following parameter string.

Copy an IODF

```
├──COPYIODF──────────────────────────────────────────────────────────┤
```

Notes:

1. The target data set must be large enough to hold the source IODF.
2. The target IODF can be created by defining a VSAM DIV file and by initializing it using the utility ***Initialize IODF*** (described in “Initialize IODF” on page 309).
3. Both data sets must be valid IODFs.

4. If you copy an IODF which is enabled for multi-user access, this property is not inherited by an existing target IODF. However, a target IODF defined with the multi-user access property will always preserve this property, independent from the source IODF.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Source IODF
HCDIODFT	Target IODF
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

For an example see the batch job on page 335.

Print configuration reports

This HCD batch utility function allows you to print reports about:
- The hardware definitions stored in the specified IODF.
- The I/O paths of an actual system compared to the definitions in the IODF.
- The processors, control units, and devices supported in your installation.

This function is invoked by passing the following parameter string.

Print a configuration report

```
             ┌──────┐
             ▼      │
├──REPORT──,───┬─C─┬┴──┬─,──,──────────────────┬──,──┬──────┬──,──────►
               ├─P─┤   └─,─procid──,─┬────────┬┘     └─osid─┘
               ├─U─┤                 └─partnm─┘
               ├─D─┤
               ├─S─┤
               ├─M─┤
               ├─E─┤
               ├─N─┤
               ├─T─┤
               ├─I─┤
               ├─X─┤
               └─Y─┘

►──┬──────┬──,──┬────────┬──,──┬─────────┬──,──┬─────┬──────────────────┤
   └─swid─┘     └─system─┘     └─sysplex─┘     └─XML─┘
```

C | P | U | D | S | M | E | N | T | I | X | Y
Type of the report. Specify one or more of the following codes in any order, with no separating characters:

C CSS report - CSS summary report only
P CSS report - channel path detail report
U CSS report - control unit detail report

D CSS report - device detail report
S Switch report
M OS report - OS devices
E OS report - EDTs
N OS report - NIP/VM consoles
T CTC report
I I/O Path report
X Supported hardware report
Y I/O definition reference

procid Processor ID to limit a CSS, CTC connection or I/O Path report to a specific processor. If not specified for an I/O Path report, the ID of the active processor configuration is taken (=default).

partnm
Partition name to limit a CSS, CTC connection or I/O Path report to a specific logical partition. The processor ID must also be specified; otherwise, the partition name is ignored for the CSS and CTC connection report. For the I/O Path report, the partition name is defaulted to a partition that contains a device common to the specified or defaulted OS configuration.

osid Operating system configuration ID to limit an OS report or an I/O Path report to a specific operating system configuration. If not specified for an I/O Path report, the ID of the active operating system configuration is taken (=default).

swid Switch identifier to limit a Switch report to a specific switch

system
If the sysplex name is also specified, the system name (1 - 8 alphanumeric characters) identifies the system of a sysplex for that the I/O Path report is to be generated. If the sysplex is not specified, the system name is the VTAM application name of the host for that the I/O Path report is to be generated. The default is the local system.

sysplex
Sysplex name (1 - 8 alphanumeric characters) to specify the sysplex of the system for which the I/O Path report is to be generated. If you specify the sysplex, you must also specify the system name.

XML Specify the `XML` keyword if you want to print your report in XML output format.

Note: It is recommended to print the I/O Path report separately from the other reports. However, if you want to print an I/O Path report together with any other reports, your limitations for the I/O Path report are propagated to all other specified reports. These limitations to a certain processor, partition or operating system can be either user-specified or HCD takes the active processor, partition or operating system as the default.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
STEPLIB	SYS1.SCBDHENU (required for I/O definition reference)
HCDIODFS	Source IODF (not required when printing the supported hardware report, and I/O definition reference)

DD name	Description
HCDRPT	Output data set: record size 133, record format fixed block
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example 1:

```
//BWINJOB   JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//              MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*************************************************************
//*  PRINTS A CSS SUMMARY REPORT FOR PARTION PART1 OF PROCESSOR
//*                            PROC1,
//*         A SWITCH REPORT FOR SWITCH 00,
//*         AN OS REPORT FOR DEVICES, EDT AND NIP CONSOLES OF
//*                            OS CONFIGURATION MVS1
//*************************************************************
//REPORT1   EXEC PGM=CBDMGHCP,
//             PARM='REPORT,CSMEN,PROC1,PART1,MVS1,00'
//HCDIODFS  DD   DSN=BWIN.IODF03.WORK,DISP=SHR
//HCDRPT    DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//HCDMLOG   DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Example 2:

```
//BWINJOB   JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//              MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*************************************************************
//*  PRINTS A SUPPORTED HARDWARE REPORT AND
//*         AN I/O DEFINITION REFERENCE
//*************************************************************
//REPORT2   EXEC PGM=CBDMGHCP,
//               PARM='REPORT,XY'
//STEPLIB   DD   DSN=SYS1.SCBDHENU,DISP=SHR
//HCDRPT    DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//HCDMLOG   DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Example 3:

```
//BWINJOB   JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//              MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*************************************************************
//*  PRINTS AN I/O PATH REPORT OF THE ACTIVE CONFIGURATION
//*  COMPARED TO THE DEFINITIONS IN IODF SYS1.IODF00
//*************************************************************
//REPORT3   EXEC PGM=CBDMGHCP,
//               PARM='REPORT,I'
//HCDIODFS  DD   DSN=SYS1.IODF00,DISP=SHR
//HCDRPT    DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//HCDMLOG   DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Example 4:

```
//BHEIREP  JOB (DE03243,,RZ-29),'HEISSER',CLASS=A,REGION=4M,
//       MSGLEVEL=(1,1),NOTIFY=BHEI,MSGCLASS=Q
//*******************************************************************
//*EXAMPLE OF A BATCH JOB THAT IS CREATED FROM THE DIALOG AND THAT
//*PRINTS AN I/O PATH REPORT OF THE ACTIVE CONFIGURATION OF THE
//*SYSTEM HCDTST3 COMPARED TO THE DEFINITIONS FOR THE PROCESSOR
//*VMABASIC AND THE OPERATING SYSTEM MVSVM IN BHEI.IODF01.WORK
//*******************************************************************
```

```
//REP0    EXEC PROC=CBDJRPTS,
//             RPARM='REPORT,I,VMABASIC,,MVSVM,,HCDTST3,LOCAL'
//             IODF='BHEI.IODF01.WORK'
//
```

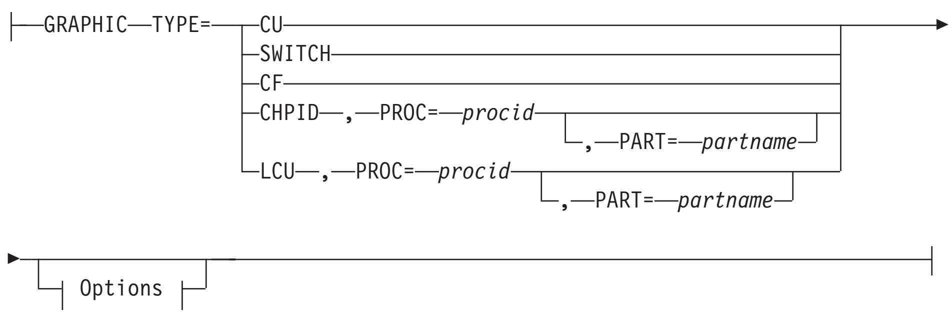
Note: For generating the I/O Path Reports which are printed in examples 3 and 4, System Automation for z/OS (I/O Operations) or the ESCON Manager is required.

Create a graphical configuration report

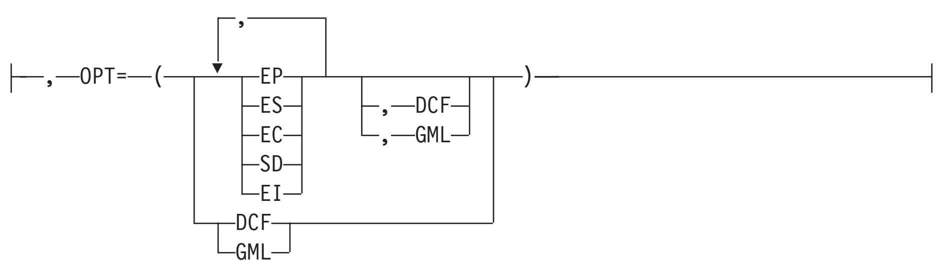
This utility function allows you to produce a graphical representation of the I/O configuration based on the definitions in the IODF.

This function is invoked by passing the following parameter string.

Create a graphical configuration report



Options



TYPE Type of the report. Specify one of the following codes:

CU	CU report
SWITCH	Switch report
CF	CF connection report
CHPID	CHPID report
LCU	LCU report
Procid	Processor ID for which the LCU or CHPID report is produced.
Partname	Partition name to limit an LCU or CHPID report to one partition.

OPT Options of the report. Specify one or more of the following codes in any order, separated by a comma:

EP	Exclude partition
ES	Exclude switch

EC	Exclude CTC control units
SD	Show control unit description (instead of serial number)
EI	Exclude index
DCF	DCF output format
GML	GML output format

Notes:

1. If no output format is specified, the specification in the HCD profile is used. If the HCD profile does not specify a formatting type either, the default BookMaster format is used.
2. The output format GDF is not supported in batch mode.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	Source IODF
HCDRPT	Output data set: record size 200, record format FB. **Note:** This must be a cataloged data set.
HCDMLOG	HCD Message log data set
HCDPROF	HCD profile data set (if profile contains keywords concerning the graphical report)
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINGCR1 JOB (DE3259,,71034-83),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//* -------------------------------------------------------
//* Graphical Configuration Report
//* -------------------------------------------------------
//GCREP  EXEC PGM=CBDMGHCP,
//           PARM='GRAPHIC TYPE=CHPID,PROC=TEST3'
//HCDIODFS DD DSN=USER.IODF00.DBR4,DISP=SHR
//HCDRPT   DD DSN=USER.IODF00.DBR4.REPORT,
//            DCB=(RECFM=FBA,LRECL=200,BLKSIZE=6400),
//            SPACE=(TRK,(50,50)),DISP=(NEW,KEEP),UNIT=SYSALLDA
//HCDMLOG  DD DSN=USER.HCD.LOG,DISP=OLD
//HCDPROF  DD DSN=USER.HCD.PROF,DISP=SHR
//
```

Compare IODFs or CSS/OS Reports

This utility function allows you to compare two IODFs and report the differences. You can compare the IODFs from the CSS, OS, and switch perspective.

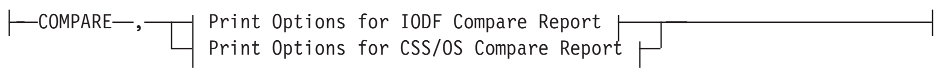
In addition, you can limit the CSS, OS, and switch perspective by single compare reports, and the CSS perspective by LPARs.

You have to allocate the new IODF with DD name HCDIODFS, and the old IODF with DD name HCDIODFT for comparing IODFs. If you compare the CSS to the OS definition, you always compare within one IODF that must be allocated to HCDIODFS.

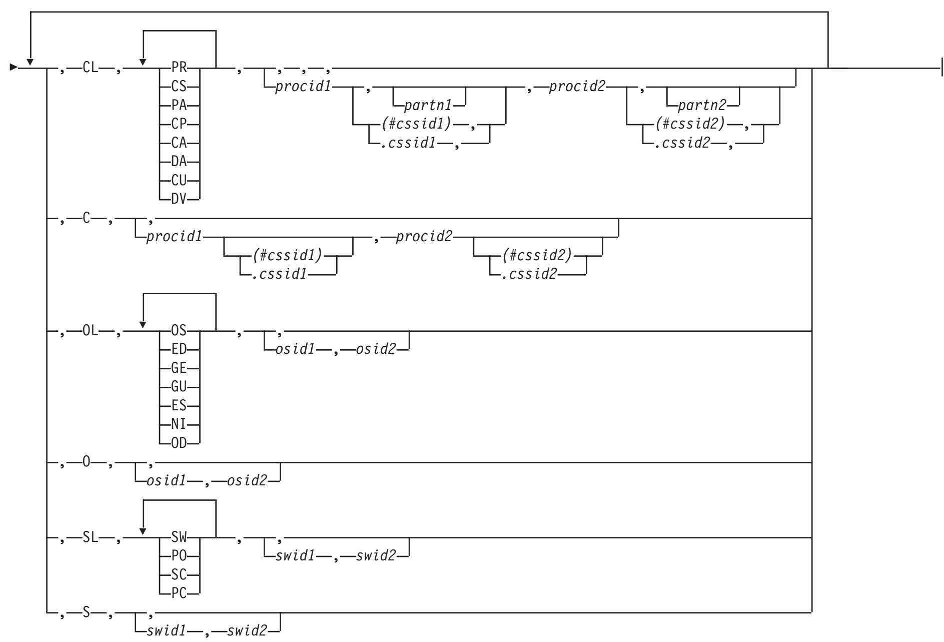
You invoke this function by passing the following parameter string.

Note: This parameter string must not exceed 100 characters.

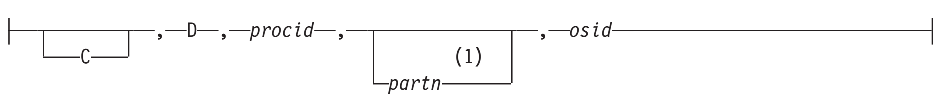
Compare IODFS or CSS/OS Reports



Print Options for IODF Compare Report:



Print Options for CSS/OS Compare Report:



Notes:

1 Required if processor runs in LPAR mode.

Print options for IODF Compare Report

Specify one or more of the following print options, without separating characters, in exactly this order. For more information about the print option types, see "How to print a Compare IODFs Report" on page 249.

A Print added data

B Print deleted data

C Print unchanged data

D Print unchanged item IDs

CL | C | OL | O | SL | S
Type of the report. Specify one or more of the following codes in any order, with no separating characters:

CL Limit the CSS compare report by single compare reports and LPARs

PR	Processor compare
CS	Channel subsystem compare
PA	Partition compare
CP	Channel path compare
CA	Control unit attachment compare
DA	Device attachment compare
CU	Control unit compare
DV	Device compare

procid1
New processor ID

partn1 Partition name of the new processor

cssid1 selected CSS ID of the new XMP processor, either appended by a # and in parenthesis or appended by a dot (.). If the CSS ID is specified for one processor only (old or new), the CSS ID for the other processor is defaulted to CSS ID 0.

procid2
Old processor ID

partn2 Partition name of the old processor

cssid2 selected CSS ID of the old XMP processor, either appended by a # and in parenthesis or appended by a dot (.)

C Indicates CSS compare report

procid1
New processor ID

cssid1 selected CSS ID of the new XMP processor, either appended by a # and in parenthesis or appended by a dot (.). If the CSS ID is specified for one processor only (old or new), the CSS ID for the other processor is defaulted to CSS ID 0.

procid2
Old processor ID

cssid2 selected CSS ID of the old XMP processor, either appended by a # and in parenthesis or appended by a dot (.)

OL Limit OS compare report by single compare reports

OS	Operating system compare
ED	EDT compare
GE	Generic compare
GU	Generic update compare
ES	Esoteric compare
NI	OS console compare

OD OS device compare

osid1 New operating system ID

osid2 Old operating system ID

O Indicates OS compare report

osid1 New operating system ID

osid2 Old operating system ID

SL Limit switch compare report by single compare reports

SW Switch compare
PO Switch port compare
SC Switch configuration compare
PC Port configuration compare

swid1 New switch ID

swid2 Old switch ID

S Indicates SWITCH compare report

swid1 New switch ID

swid2 Old switch ID

Print options for CSS/OS Compare Report

C Print all devices. If C is not selected, only devices are printed that are
- Defined for the CSS, but not for the OS
- Defined for the OS, but not for the CSS
- Defined for both, but of different device type

D Indicates CSS/OS compare

procid Processor ID

partn Partition name. This is a required parameter, if the processor runs in LPAR mode. For more information, see “Compare CSS / operating system views” on page 250.

osid Operating system ID

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
STEPLIB	SYS1.SCBDHENU (required for OS device compare)
HCDIODFS	New IODF
HCDIODFT	Old IODF (only for IODF compare)
HCDMLOG	HCD Message Log data set
HCDRPT	Report data set; record size 133, record format fixed block
HCDTRACE	Trace data set (if trace is activated)

Example 1:

The following example shows a job to ***compare two IODFs***.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* COMPARE IODFs WITH ADDED AND DELETED DATA
//* DEVICE, DEVICE ATTACHMENT AND OS DEVICE COMPARE
//* LIMITED TO LPAR PROC2.LPAR1 ON BOTH AND OS PROD17
//*
//COMPARE1 EXEC PGM=CBDMGHCP,
//            PARM='COMPARE,AB,CL,DVDA,PROC2,LPAR1,PROC2,LPAR1,
//            OL,PROD17,PROD17'
//STEPLIB  DD   DSN=SYS1.SCBDHENU,DISP=SHR
//HCDIODFS DD   DSN=BWIN.IODF06.WORK,DISP=SHR
//HCDIODFT DD   DSN=BWIN.IODF03,DISP=SHR
//HCDRPT   DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Example 2:

The following example shows a job to ***compare CSS/OS reports***.

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* COMPARE CSS/OS CONFIGURATION BETWEEN
//* DEVICES CONNECTED TO PROC1, PART1 ON CSS SIDE
//*         DEFINED TO OS MVS1
//*
//COMPARE2 EXEC PGM=CBDMGHCP,
//            PARM='COMPARE,AB,D,PROC1,PART1,MVS1'
//HCDIODFS DD   DSN=BWIN.IODF06.WORK,DISP=SHR
//HCDRPT   DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Import an IODF

This utility function allows you to import configuration data (previously exported from another system) into an IODF. It is assumed that the mentioned configuration data has been received outside HCD, for example, using the TSO RECEIVE command, and stored in a sequential data set.

The data set containing IODF data to be imported has to be specified with DD name HCDIN.

This function is invoked by passing the following parameter string.

Import an IODF

```
├──IMPORT──,──IODF name──,──┬────────┬──,──┬─────────┬──────────────┤
                            └─volume─┘     └─REPLACE─┘
```

IODF name Specifies the name of the target IODF (fully qualified).

volume Specifies the volume serial number of the IODF destination. This parameter is neglected if the target IODF already exists and REPLACE is specified, or, if the data set is SMS managed.

REPLACE Specifies that an IODF with the same name will be replaced by the received IODF. If REPLACE is not specified, the IODF is not replaced.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIN	The data set containing IODF data to be imported
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

Example:

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* IMPORT AN IODF
//*
//IMPORT   EXEC PGM=CBDMGHCP,
//            PARM='IMPORT,BWIN.IODF08,DATA04'
//HCDIN    DD   DSN=BWIN.EXPORTED.IODF03,DISP=SHR
//HCDMLOG  DD   DSN=BWIN.HCD.LOG,DISP=OLD
//
```

Export an IODF

This utility function allows you to send an IODF to another system.

You have to preallocate the IODF you want to export with DD name HCDIODFS.

If you want to send an IODF to an unattended z/OS system, you have to allocate a data set with DD name HCDCNTL. From this data set, HCD extracts information to set up the JCL to run on the unattended target system. You have to modify or adapt the JOB statement, JES routing statement(s), and JOBLIB information in this data set before you call the export utility.

This function needs to be executed in an TSO environment, for example, by invoking HCD under control of the TSO terminal monitor program IKJEFT01.

This function is invoked by passing the following parameter string.

Export an IODF

```
├──EXPORT──,──user id──,──┬─────────┬──,──┬───────────┬──,──┬────────┬──────►
                          └─node id─┘     └─IODF name─┘     └─volume─┘

►──,──┬────────┬──,──┬───────────┬──────────────────────────────────────────┤
      └─ACTLOG─┘     └─NOREPLACE─┘
```

user id
: Specifies the user ID of the target, or a nickname (nickname only if the IODF is not sent to an unattended z/OS system).

node id
: Specifies the node ID of the target system, but only if the IODF is not sent to an unattended target system (otherwise it is ignored in favor of information provided by the JCL).

IODF name
: Specifies the name of the target IODF. Default is the name of the source IODF prefixed with the specified target user ID. This

parameter is only applicable if the IODF is sent to an unattended z/OS system, otherwise it is ignored.

volume
Specifies the volume serial number of the DASD on which the target IODF is created if it does not exist. This parameter is only applicable if the IODF is sent to an unattended z/OS system, and the IODF data set is not managed by SMS, otherwise it is ignored.

ACTLOG
Specifies that the appropriate Activity Log file should also be sent. If this parameter is missing, or the target is an unattended MVS system, it is not sent.

NOREPLACE
For unattended exports, this keyword provides overwrite protection for an IODF at the target system with the same name as the IODF to be exported.

Batch invocation

A data set must be allocated to the following DD names when invoking the batch utility.

DD name	Description
HCDIODFS	IODF to be exported
HCDCNTL	JCL data set containing the JOB statement, the JES routing statement(s) and the JOBLIB information for sending the IODF to an unattended z/OS system.
SYSTSPRT	Print data set
SYSTSIN	SYSIN data set
HCDMLOG	HCD Message Log data set
HCDTRACE	Trace data set (if trace is activated)

You can also find the following examples in the data set SYS1.SAMPLIB.

Example 1:

The following example shows a job to export an IODF to an attended system.

```
//BWINEX1 JOB (3259,7030-83),'BWIN',CLASS=A,USER=BWIN,
//         MSGLEVEL=(1,1),NOTIFY=BWIN,MSGCLASS=Q,REGION=4M
/*
//EXPORT1 EXEC PGM=IKJEFT01
//SYSPRINT DD SYSOUT=*
//HCDIODFS DD DSN=BWIN.IODF52.WORK,DISP=SHR
//HCDMLOG  DD DSN=BWIN.HCD.LOG,DISP=OLD
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
     CALL 'SYS1.LINKLIB(CBDMGHCP)',      +
     'EXPORT,BMGN,BOETST1'
/*
//
```

Example 2:

The following example shows a job to export an IODF to an unattended z/OS system.

```
//BWINEX2 JOB (3259,7030-83),'BWIN',CLASS=A,USER=BWIN,
//         MSGLEVEL=(1,1),NOTIFY=BWIN,MSGCLASS=Q,REGION=4M
//***********************************************************
//* MODIFY AND ADAPT DATA SET ALLOCATED WITH DDNAME HCDCNTL
```

```
//* BEFORE YOU SUBMIT THIS JOB.
//*   USE HCDCNTL2 FOR A JES2 SYSTEM
//*   USE HCDCNTL3 FOR A JES3 SYSTEM
//**************************************************************
//EXPORT1 EXEC PGM=IKJEFT01
//SYSPRINT DD SYSOUT=*
//HCDIODFS DD DSN=BWIN.IODF52.WORK,DISP=SHR
//HCDMLOG  DD DSN=BWIN.HCD.LOG,DISP=OLD
//HCDCNTL  DD DSN=SYS1.SAMPLIB(HCDCNTL2),DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSTSIN  DD *
      CALL 'SYS1.LINKLIB(CBDMGHCP)',      +
      'EXPORT,BMGN,,BMGN.IODF11.WORK,DATA05'
/*
//
```

Example 2.1:

The following example shows the JCL statements that may be specified in a data set allocated with DD name HCDCNTL for a JES3 system.

```
//BWINEX1 JOB (3259,7030-83),'BWIN',CLASS=A,NOTIFY=BWIN,
//            MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//*
//* JCL STATEMENTS SPECIFIED WITH DDNAME HCDCNTL
//*
//*ROUTE  XEQ  BOETST1
//BBMGNIM NJB (3259,7030-83),'BMGN',CLASS=A,
//            MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M,
//            USER=BMGN,PASSWORD=password
//OUT1    OUTPUT JESDS=ALL,DEFAULT=YES,DEST=BOEVS01.BWIN
//
```

Example 2.2:

The following example shows the JCL statements that may be specified in a data set allocated with DD name HCDCNTL for a JES2 system.

```
//BMGNIM  JOB (3259,7030-83),'BMGN',CLASS=A,
//            MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M,
//            USER=BMGN,PASSWORD=password
/*ROUTE  XEQ  BOETST1
//
```

Note: You can replace the /*ROUTE statement by the /*XMIT statement.

```
/*XMIT XEQ BOETST1 DLM=xx
```

When you use the DLM parameter with the /*XMIT statement, you specify a two-character delimiter to terminate the data being transmitted. (For the end of the records to be transmitted, the default is /* in the input stream.)

Batch IODF copy example

You may want to use the batch initialize and copy IODF functions when performing system maintenance. For example, these functions can be used when copying all the data sets from one volume (that contains IODFs) to another volume.

The following sample jobs show how to copy multiple IODFs to an alternate volume. In the example it is assumed that the following IODFs exist: SYS1.IODF00 and SYS1.IODF03. The first sample job allocates corresponding data sets on volume DATA02. The second sample job initializes these data sets into IODFs, and copies the source IODFs into the newly created IODFs. Jobs similar to these are contained in member CBDSALIO and CBDSCPIO in SYS1.SAMPLIB.

```
//* JOB TO DEFINE IODF
//DEFIODF JOB REGION=4M,...
//*
//* DEFINE NEW IODF DATASETS SYS2.IODF00, SYS2.IODF03
//*
//ALLOC    EXEC PGM=IDCAMS
//SYSPRINT DD   SYSOUT=*
//SYSIN    DD   *

     DEFINE CLUSTER (NAME (SYS2.IODF00.CLUSTER) -
                    LINEAR                      -
                    RECORDS (1024)              -
                    VOLUMES(DATA02)             -
                    )                           -
            DATA (NAME (SYS2.IODF00))

     DEFINE CLUSTER (NAME (SYS2.IODF03.CLUSTER) -
                    LINEAR                      -
                    RECORDS (1024)              -
                    VOLUMES(DATA02)             -
                    )                           -
            DATA (NAME (SYS2.IODF03))

//* JOB TO COPY IODF
//INITIODF JOB REGION=4M,...
//*
//* INITIALIZE AND COPY SYS1.IODF00 to SYS2.IODF00
//*
//INIT1    EXEC PGM=CBDMGHCP,PARM='INITIODF SIZE=1024,ACTLOG=NO'
//HCDCNTL  DD *
This IODF is a copy of SYS1.IODF00
/*
//HCDIODFT DD   DSN=SYS2.IODF00,DISP=OLD
//HCDMLOG  DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//*
//COPY1    EXEC PGM=CBDMGHCP,PARM='COPYIODF'
//HCDIODFS DD   DSN=SYS1.IODF00,DISP=SHR
//HCDIODFT DD   DSN=SYS2.IODF00,DISP=OLD
//HCDMLOG  DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//*
//* INITIALIZE AND COPY SYS1.IODF03 to SYS2.IODF03
//*
//INIT2    EXEC PGM=CBDMGHCP,PARM='INITIODF SIZE=1024,ACTLOG=NO'
//HCDCNTL  DD *
This IODF is a copy of SYS1.IODF03
/*
//HCDIODFT DD   DSN=SYS2.IODF03,DISP=OLD
//HCDMLOG  DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//*
//COPY2    EXEC PGM=CBDMGHCP,PARM='COPYIODF'
//HCDIODFS DD   DSN=SYS1.IODF03,DISP=SHR
//HCDIODFT DD   DSN=SYS2.IODF03,DISP=OLD
//HCDMLOG  DD   SYSOUT=*,DCB=(RECFM=FBA,LRECL=133,BLKSIZE=6650)
//
```

Notes:

1. This batch job issues job message IEC161I, which can be ignored.
2. The VSAM DIV file consists of a data and a cluster file. According to the naming convention, the name of the data file is the IODF name (in this example SYS1.IODF01), and .CLUSTER is appended to the data file for a cluster file. Append .CLUSTER to the IODF name in the DEFINE CLUSTER statement (in this example SYS1.IODF01.CLUSTER).

When designating the number of records to be allocated in an IODF (specified on the DEFINE CLUSTER statement and as a PARM value on the INITIODF job step), it is important that the target IODF be allocated at least as big as the source IODF. While using the HCD dialog, you can use the SHOWIODF command from the command line, or the View action bar choice to display the number of records allocated in the source IODF.

Note: Remember to also copy the associated LOADxx members. For information on the LOADxx members, see *z/OS MVS Initialization and Tuning Reference* and *z/OS MVS Initialization and Tuning Guide*.

List of standard DD names

Standard DD names are used in the job control statements that define the data sets used by HCD. These names are shown in Table 8. If you want to change these names, you must create a list of alternate DD names, using the standard format for such a list.

Table 8. Standard DD names Used by HCD

	DD name	HCD Task	Data Set Contents
1	not used		
2	not used		
3	not used		
4	HCDLIB	Migration	Assembler macro library
5	HCDIN	Migration	Migration input
6	HCDPRINT	Migration	Migration log (messages)
7	not used		
8	HCDUT1	Migration	Assembler work file
9	HCDUT2	Migration Activity Log	Modified IOCP, MVSCP, and HCPRIO input to assembler Target activity log during copy
10	HCDUT3	Migration	Assembler output (object) data
11	not used		
12	HCDTERM	Migration	Assembler and loader messages
13	not used		
14	not used		
15	not used		
16	not used		
17	HCDRPT	Query/print	HCD reports
18	HCDALOG	All	Activity log
19	HCDJES3	All	JES3 initialization stream checker data
20	HCDASMP	Migration	Assembler output listing
21	HCDDECK	Activation	IOCP and HCPRIO input data set (output)
22	HCDIODFP	All	First IODF
23	HCDIODFS	Maintain IODF	Source IODF (for COPY, for example)
24	HCDIODFT	Maintain IODF	Target IODF

Table 8. Standard DD names Used by HCD (continued)

	DD name	HCD Task	Data Set Contents
25	HCDPROF	Tailor HCD defaults	HCD profile definitions
26	HCDMLOG	All	Message log
27	HCDTRACE	All	Trace data set (if trace is activated)
28	HCDCNTL	Activation Maintain IODF	Control file for Build IOCDS Control file for Build IOCP input data set JCL data set for Import/Export IODF IODF description List of configurations for Build I/O configuration statements

List of alternate DD names

If used, this optional list, must start on a halfword boundary that is not also a fullword boundary.

- The first two bytes must contain a binary count of the number of bytes in the rest of the list.
- The rest of the list specifies alternate DD names that you wish to use in place of the standard DD names.
  - DD names in the alternate list must appear in the same sequence as they appear in the standard list.
  - Each name must be eight characters long. If a name contains fewer than eight characters, pad it with blanks. If you omit an alternate DD name, set that entry in the alternate DD names list to binary 0.
  - Entries in the alternate DD names list that correspond to empty entries in the standard DD names list must be set to binary 0.

End of Programming Interface information

Chapter 13. Security and other considerations

Overview

This information unit discusses the following topics:
- Security-related considerations
- Catalog-related considerations
- Considerations concerning data sets cataloged with an esoteric device group name
- SMS-related considerations
- ISPF and TSO/E aspects that you need to consider
- VM-related considerations

Security-related considerations

An appropriate resource-level security facility, such as Resource Access Control Facility (RACF*) 1.9 or an equivalent security product, is required to control access to the data sets used by HCD. You perform the access control in two steps:
1. Define the necessary RACF profiles
2. Give users access authority

Note: If no security product is installed, you cannot perform the ***activate*** function from HCD.

For additional RACF definitions necessary to run the HCD LDAP Backend against IODF data, see Chapter 14, “How to provide LDAP support for HCD,” on page 347.

Defining RACF profiles

You define three types of profiles:
1. Data Set Profiles

   Define data set profiles for all data sets used by HCD.
2. OPERCMDS Class Profile:

   Define the profile MVS.ACTIVATE to invoke the dynamic reconfiguration function under HCD or to use the MVS operator command ACTIVATE from an MVS console. (For a description of the command syntax, see *z/OS MVS System Commands*.)

   If you issue the ACTIVATE command, the I/O supervisor calls jobname IEASYSAS stepname IOSAS to assist in the activate procedure. IOSAS requires read access to the IODF data sets. Because the default entry for IOSAS in the Program Properties Table (PPT) is PASS, RACF checking occurs. ICH408I is the result of an ACTIVATE IODF=XX command. To ensure the successful completion of the activate process, you have to choose one of the following alternatives:
   - Place the IOSAS task into the RACF started task table (ICHRIN03) and indicate that the user is authorized.
   - Define the IODF data sets to RACF with UACC=READ.

- Add IOSAS as an entry in the Started Procedures Table with a valid user ID. This user ID must have read access to the SYS1.NUCLEUS and the IODF data sets.

  The ACTIVATE command needs UPDATE access, regardless whether the TEST option is specified or not.

  You also have to define the profile MVS.DISPLAY.IOS with read access if you wish to work from the sysplex member list to view the active configuration status or to process a CONFIGxx member.

3. FACILITY Class Profiles:

   Define the following two profiles:

   - CBD.CPC.IPLPARM to query and update the IPLADDR and IPLPARM attribute values of the last IPL, and to be used for next IPL.
   - CBD.CPC.IOCDS to query and update IOCDS control information.

Giving users access authority

The access authority you can give to a user depends on the profile.

Access to data set profiles

You can give READ, UPDATE, or ALTER access to IODFs in general or to a specific IODF.

Access to profile MVS.ACTIVATE

You can give UPDATE access to allow the user to activate a configuration change. You can give READ access if you want to restrict the ***activate*** function to the test option.

Access to profile CBD.CPC.IPLPARM

NONE
: Indicated that the user is not allowed to query or change the IPLADDR and IPLPARM attribute values. This is also the case if profile CBD.CPC.IOCDS is not defined or RACF is not installed,

READ
: Allows the user to query the IPLADDR and IPLPARM attribute values; however changing the IPLADDR and IPLPARM attribute values is not allowed.

UPDATE
: Allows the user to update the IPLADDR and IPLPARM attribute values.

Figure 130 shows the relationship between HCD IPL attribute management functions and the CBD.CPC.IPLPARM access authority. Option 2.11 in the figure refers to option 2 on the primary selection panel and option 11 on the resulting panel.

Option	HCD IPL Attribute Management Functions	RACF Authority
2.11	List S/390 microprocessor cluster	READ (or READ authority in CBD.CPC.IOCDS)
2.11	View IPL attributes	READ
2.11	Update NEXT IPL attributes	UPDATE

Figure 130. CBD.CPC.IPLPARM access authority and HCD IPL attribute management functions

Access to profile CBD.CPC.IOCDS

If profile CBD.CPC.IOCDS is not defined or RACF is not installed, the local IOCDS functions (that is for processors with no SNA address specified) work as before, that is, the operator will be requested to approve the write-IOCDS request.

The new remote IOCDS functions (that is for processors with an SNA address specified) require RACF authorization.

NONE
The user is not allowed to query or change IOCDS control information, or to write an IOCDS (neither by HCD nor IOCP).

READ
Allows the user to query IOCDS control information. Changing IOCDS control information or writing an IOCDS is not allowed (neither by HCD nor IOCP).

UPDATE
Allows the user to write IOCDSs (by HCD or IOCP), or to change and view IOCDS control information. If profile CBD.CPC.IOCDS is defined, then the operator will not be requested to approve the writing of an IOCDS. (That is, only users with update access to profile CBD.CPC.IOCDS are allowed to write an IOCDS.)

Table 9 shows the relationship between IOCDS management functions and the CBD.CPC.IOCDS access authority. The first column in the table refers to the options you have to select to get to the HCD functions, that is, you start with option 2 on the primary selection panel and select options 2, 6, or 11 on the resulting panel.

Table 9. CBD.CPC.IOCDS access authority and HCD IOCDS management functions

Option	HCD IOCDS Management Functions	RACF Authority
2.11	List S/390 microprocessor cluster	READ (or READ authority in CBD.CPC.IPLPARM)
2.11	View IOCDS control information	READ
2.11	Update IOCDS control information (switch IOCDS, enable or disable write protection)	UPDATE
2.2 or **2.6**	Build IOCDS (SNA address not defined for processor ***or*** batch IOCP job runs on SP 4.3 system)	UPDATE [1] or Profile not defined to RACF [2]
2.2 or **2.6** or **2.11**	Build IOCDS (SNA address defined for processor ***and*** batch IOCP job runs on SP 5.1 system)	UPDATE [1]
--	Direct invocation of IOCP	UPDATE [1] or Profile not defined to RACF [2]
[1] The build IOCDS function does not require authorization by the system operator, that is, no WTOR message is written. [2] A WTOR message will be issued to the operator to authorize the build IOCDS function.		

For more information on security considerations for IOCDS management, refer to the *IOCP User's Guide*.

Providing additional security for devices

If your system has stringent security requirements and includes Resource Access Control Facility (RACF), you can ensure that only certain programs can allocate unit record, communication, or graphics devices. These programs include Print Services Facility (PSF) for printers, Advanced Communication Facility/Virtual Telecommunications Access Method (ACF/VTAM) for communication or graphics devices, and JES2 or JES3 for unit record, communication, or graphics devices.

When a user attempts to allocate a device, the system uses SAF (the system authorization facility) to issue an authorization check. If RACF is installed, it checks a profile in the DEVICES class to determine whether the user can access the device. If the user does not have authority to access the device, the allocation fails. (Note that the system does not retry an allocation request that fails because the user is not authorized to access the device.)

Work with your RACF security administrator to set up profiles in the DEVICES class:

1. Determine your exact security requirements. Consider questions such as these:
   - Are there some devices that only a few users can use?
   - Are there some devices that all users can use?
   - Do some devices share the same security requirements?
2. Work with your RACF security administrator to assign profile names for the devices to be protected. Assign a discrete profile name to each device that has a unique security requirement. Assign a generic profile name to each device group that shares security requirements. For devices, RACF profile names include the following information:

   sysid This is the system identifier, which is defined on the SYSNAME keyword in the IEASYSxx member of SYS1.PARMLIB.

   Note: The system identifier is necessary only if different devices with the same device class, unit name, and device address can be attached to multiple systems and they have different security requirements. In most cases, you should specify an asterisk (*) for this qualifier.

   device-class
   This can be one of the following UCB device classes:

   TP Teleprocessing or communications devices

   UR Unit record devices

   GRAPHIC Graphic devices. These device classes are consistent with the class names used on the DISPLAY U operator command.

   unit-name
   This is a generic name (such as 3800) that identifies the device or devices.

For more details, see *z/OS Security Server RACF Security Administrator's Guide*.

Catalog considerations

One IODF can contain configuration data mirroring multiple processor or logical partition system images, but being a VSAM data set, it can be cataloged in only one catalog. Therefore, if you wish to share an IODF data set among multiple systems and each system is using a separate master catalog, you must define (in the master catalog of each system) an alias that relates to the user catalog on the DASD that is shared among the systems. Define aliases and the user catalog *before* using HCD to define IODF data sets. Figure 131 shows the recommended catalog structure.

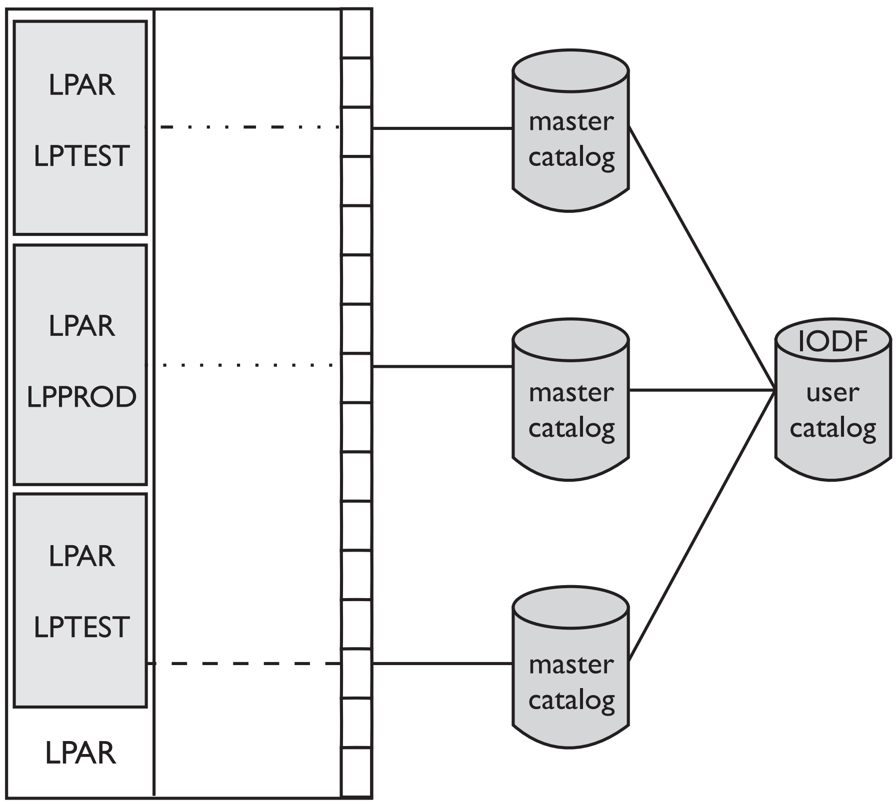


Figure 131. Recommended IODF catalog structure. (When several OSs share one IODF)

Note: It is useful to catalog the IODF in a user catalog which resides on the same volume as the IODF. That way if the volume fails and must be restored, the catalog/IODF connection is always preserved across the restore. The catalog is used to reference the IODF during HCD definition activities and during dynamic I/O reconfiguration, *not* during IPL.

Data sets cataloged with an esoteric device group name

When using HCD, data sets that were previously cataloged with an esoteric device group name (for example, SYSDA) by use of the DEFINE NONVSAM, or IMPORT CONNECT command of the Integrated Catalog Facility, or the IEHPROGM utility, can cause unpredictable results if such a data set is accessed through the catalog. The reason is that the catalog entry contains the EDT-index pointing to the esoteric. The order of the esoteric in the EDT is no longer determined by the order in which the esoterics are defined, because HCD arranges the esoterics alphabetically.

To avoid this problem, you can do one of the following:

- Specify a token for the esoterics.

  The esoteric token will be used by allocation to find the appropriate esoteric for a data set that has been cataloged using the esoteric. You no longer have to maintain a chronological order and may delete and add esoterics without getting access problems for data sets that are cataloged using esoterics. Tokens for system built esoterics (for example, SYSALLDA) are generated by allocation and always have the same value (for SYSALLDA 9999 decimal, for example). You cannot control the token for system built esoterics. To circumvent the problem, define a new user esoteric with a token that corresponds to the EDT index in the catalog entry and that contains the same device list as SYSALLDA.

  To get to the EDT index:

  – Use the LISTCAT command, or,
  – If you have your MVSCP deck, count the UNITNAME statements for esoterics up to the statement that defines the esoteric name to get to the number for the token.
- Re-catalog the data sets with a generic device type name (for example, 3380), before using HCD to migrate IOCP/MVSCP data.

To determine if you have any data sets that have been cataloged with an esoteric, use the scan utility that is provided in the SYS1.SAMPLIB member IEFESOJL. This utility scans a catalog and lists the data sets that were cataloged with esoteric device group names. The prologue of this SAMPLIB member contains information on the modifications you have to make to the JCL to run the job in your installation.

SMS-related considerations

In a system managed by the storage management subsystem (SMS) you need to choose one of the following alternatives:

- The IODF data set is not managed by SMS. You can then specify the IODF volume serial number when creating an IODF.
- The IODF data set is managed by SMS. The automatic class selection (ACS) routines must be set up to automatically place the IODFs on the IODF volume. In this case SMS ignores the specified volume serial number except to pass it as a symbol to the ACS routines. The ACS routines, especially the storage group ACS routine, can use the volume serial number and the unit name to decide the SMS classes and the storage group.

Note: These considerations are important only for a production IODF that is used for IPL.

You also have to consider that HCD dynamically allocates some data sets (with fixed naming conventions). These data sets are:

- The data set used for the activity log. For more information see “Activity logging and change logging” on page 54. If an ACTLOG data set does not yet exist, HCD dynamically allocates one, using ESOTERIC system defaults (ALLOCxx of SYS1.PARMLIB, respectively the UADS entry). You have to make sure that the entries in your ACS routines do not conflict with the SMS provided defaults. For example, if your ACTLOG data set name is *not* managed by SMS, whereas your default ESOTERIC defines an SMS managed volume, an allocation error might result. If you want to use a specific volume, specify a volume serial number to allocate a new activity log in the HCD profile (see “Defining an HCD profile” on page 25).

- The data sets used by HCD for the migration of IOCP/MVSCP/HCPRIO data (HCDPRINT, HCDASMP, HCDUT1, HCDUT2, HCDUT3). For detailed information refer to “Insufficient data set sizes” on page 305.
- The data sets used when building an HCPRIO or IOCP input data set (both named HCDDECK), and the data set used when creating JES3 Initialization Stream Checker data (named HCDJES3).

ISPF-related considerations

The usual ISPF facilities are available for the HCD dialog. For example, you can:
- Suppress the display of function key assignments.
- Display panel identifiers.
- Change the position of the command line.

HCD supports the ISPF split-screen facility with the F2=Split and F9=Swap keys. So, if necessary, you can perform other ISPF operations during an HCD session. HCD cannot be used in two parallel ISPF sessions.

Compared to traditional ISPF applications, HCD enables system programmers to control a great number of hardware configuration objects by their related actions.

VM-related considerations

HCD allows the definition of VM operating systems and their devices including their VM-specific parameters. This is triggered by the “operating system type - VM” when defining an operating system. Figure 132 shows the panel where you can enter the operating system type.

```
┌─────────────── Add Operating System Configuration ───────────────┐
│                                                                  │
│                                                                  │
│ Specify or revise the following values.                          │
│                                                                  │
│ OS configuration ID  . . . . . OPSYS02_                          │
│ Operating system type  . . . . VM        +                       │
│                                                                  │
│ Description  . . . . . . . . . z/VM operating system             │
│                                                                  │
│  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap  │
│ F12=Cancel                                                       │
└──────────────────────────────────────────────────────────────────┘
```

Figure 132. Define a VM operating system

When you attach a device to a VM operating system, the Define Device Parameters / Features panel displays the operating system-specific parameters. See Figure 133 on page 346 for an example of attaching a device to a VM operating system.

```
┌──────────────────── Define Device Parameters / Features ────────────────────┐
│                                                              Row 1 of 5     │
│                                                                             │
│ Specify or revise the values below.                                         │
│                                                                             │
│ Configuration ID . : OPSYS02      z/VM operating system                     │
│ Device number  . . : 0100         Number of devices  : 1                    │
│ Device type  . . . : 3370                                                   │
│                                                                             │
│ Parameter/                                                                  │
│ Feature     Value +          R Description                                  │
│ OFFLINE     No                 Device considered online or offline at IPL   │
│ SHARED      ________________   Device shared between multiple real systems  │
│ UIRATE      DEFAULT            Hot I/O Recovery Rate                        │
└─────────────────────────────────────────────────────────────────────────────┘
```

Figure 133. Define Device Parameters/Features for VM Device

The VM specific functions of HCD consist of:

- Defining an operating system of type 'VM'.
- Defining devices to a VM operating system.
- Defining VM consoles.
- Migrating an HCPRIO input data set to an IODF. For more details refer to Chapter 11, "How to migrate existing input data sets," on page 261.
- Creating an HCPRIO input data set from a production IODF. See "Build I/O configuration statements" on page 215 for a description how to create an HCPRIO input data set based on the definitions in the IODF.
- Issuing VM device reports (including VM console report).

In a mixed environment, running a z/OS system in one partition and z/VM in another partition, any change of the VM definitions (for example, add a device) can be done without a POR for the processor. The ***Dynamic I/O Reconfiguration*** function for the hardware can be used to add this device to the Channel Subsystem (CSS). In a second step, a device can be set online dynamically. You do not have to IPL the z/VM system image. For more details refer to *VM/ESA Planning and Administration*.

If you are running z/OS and z/VM on separate processors, you can configure both systems with HCD in the same IODF. You can export the IODF to the z/VM system and activate it there using z/VM HCD. See *z/VM: I/O Configuration* for more details.

Chapter 14. How to provide LDAP support for HCD

Overview

This information unit describes:
- the LDAP structure
- the structure of the HCD LDAP Backend plug-in
- how to plug the HCD LDAP Backend into the IBM Tivoli Directory Server for z/OS
- how to customize the HCD LDAP Backend
- how to access the IODF information
- the HCD LDAP Backend operational behavior
- how to handle the LDAP requests as transactions

Before reading this section we strongly recommend that you have copies of the following documents available:
- *IBM Tivoli Directory Server Administration and Use for z/OS*
- *IBM Tivoli Directory Server Client Programming for z/OS*
- *z/OS UNIX System Services Planning*

Together with the IBM Tivoli Directory Server for z/OS and the RACF backend SDBM, the HCD LDAP Backend can be used to access and update IODF data via the standardized Lightweight Directory Access Protocol (LDAP) based on TCP/IP.

The HCD LDAP Backend is optional. The HCD functionality is not limited if the HCD LDAP Backend is not used. If you do not want to use the HCD LDAP Backend, then you do not need to read this information and you do not need to take any further actions.

All operations on IODFs are performed on behalf of user IDs which have to be explicitly permitted for the HCD LDAP Backend. This does not affect your system security because the HCD LDAP Backend only supports LDAP clients who are bound to the SDBM backend using a user ID and the appropriate password.

The HCD LDAP Backend supports a subset of LDAP search requests and a subset of LDAP add, delete, and modify requests.

The HCD LDAP Backend is able to perform sequences of update requests as transactions. The LDAP client has to support LDAP V3 controls in order to use this transaction feature.

Updates to an IODF are performed via HCD. Thus, it is ensured that the HCD validation rules are applied.

Only existing IODFs can be used with the HCD LDAP Backend. The HCD LDAP Backend cannot be used to create or delete IODFs. It cannot be used, for example, to build a production IODF or perform dynamic activation.

Introduction to LDAP

The following is a brief introduction to the LDAP structure and function. For more information refer to *IBM Tivoli Directory Server Administration and Use for z/OS*.

LDAP is an Internet Protocol Standard based on the TCP/IP protocol. LDAP stands for Lightweight Directory Access Protocol.

LDAP is a protocol which makes directory information accessible. A directory can be considered to be a type of yellow pages. New entries can be added, existing entries can be altered or deleted, and it is possible to search for all matching entries using wildcards.

The LDAP directory is represented hierarchically in a so-called *Directory Information Tree* (DIT). The nodes of this tree are called *entries*. Every entry is an instance of an *object class*. An object class is a name which is associated with a collection of *attributes*.

Every attribute is either mandatory (required) or optional and either single valued or multi valued. Required attributes must have one or more values, optional attributes can have zero or more values. One required single valued attribute of every object class is `objectclass`: This attribute specifies the object class of which the entry is an instance.

Each entry has a *relative distinguished name* (RDN) which is specified when the entry is created. The RDN must identify the entry uniquely among its siblings (not necessarily in the whole tree); it consists of one or more attribute-value pairs. The *distinguished name* (DN) of an entry is the sequence of the RDNs starting from the entry itself and ending with the RDN of the root entry. The DN identifies a node uniquely within the whole DIT.

An example for a DN of a partition within a DIT for HCD IODFs would be the following:

```
hcdPartitionId=PART00,hcdProcessorConfigId=PROC00,
hcdIodfId=SYS1.IODF00,cn=HCD
```

This is illustrated in the following figure.

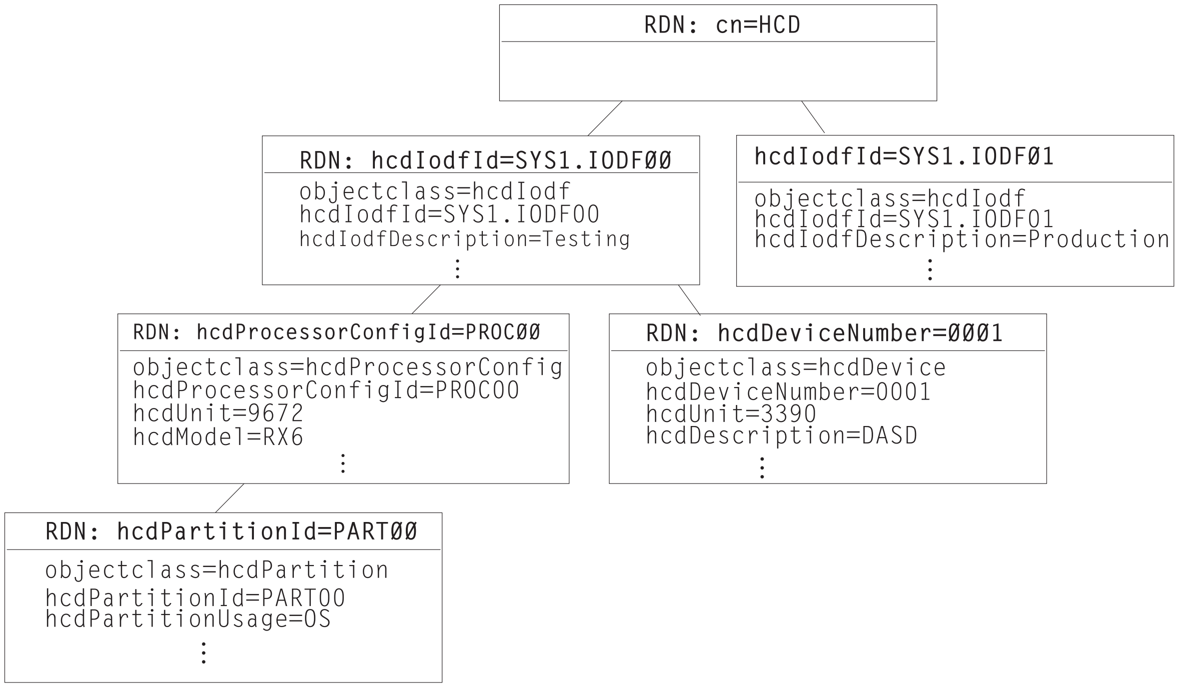


Figure 134. Sample DIT portion of the HCD LDAP Backend

IBM Tivoli Directory Server for z/OS owns a DIT which can be accessed by a client via the LDAP protocol. In the case of the IBM Tivoli Directory Server for z/OS, the task of storing the DIT is delegated to several so-called *backends* or *plug-ins*. Each *plug-in* holds a certain subtree portion and is responsible for carrying out the client's requests on this portion. The DN of the root entry of a plug-in is called a *suffix*. When the IBM Tivoli Directory Server for z/OS receives a request concerning an entry it extracts the suffix from the DN of that entry in order to determine which plug-in is responsible for the request.

HCD supports the IBM Tivoli Directory Server for z/OS by providing the HCD LDAP Backend plug-in which makes IODFs accessible via the LDAP protocol.

HCD LDAP Backend: Structure and mode of operation

The HCD LDAP Backend is plugged into the IBM Tivoli Directory Server for z/OS. It is configured using the IBM Tivoli Directory Server for z/OS configuration file (typically called `ds.conf`).

The HCD LDAP Backend is similar to the RACF backend SDBM. As with SDBM, the main function of the HCD LDAP Backend is to mediate between the IBM Tivoli Directory Server for z/OS and an external component, in this case HCD. HCD retains control over the IODFs; update requests are validated, processed, and the results stored by HCD in the appropriate IODF. Since it is HCD that processes the requests, updates through the IBM Tivoli Directory Server for z/OS preserve the integrity of the IODFs.

Thus, the HCD portion of the DIT must reflect the data structure of HCD exactly. For this reason, rather strict rules (as compared to the DB2 backend TDBM) have to be observed when requesting an update of IODF data through the IBM Tivoli Directory Server for z/OS.

Access control to the HCD LDAP Backend is based on RACF permissions for user IDs, not (as is the usual practice) on LDAP Access Control Lists (ACLs). The HCD LDAP Backend performs all services on behalf of a user ID. It accepts a service request only on condition that the associated user ID has previously been bound to (authenticated by) SDBM. If this condition is fulfilled, the HCD LDAP Backend switches to this user ID and tries to perform the request using only the RACF access rights granted to the user ID in question. In this way, access to IODFs through the LDAP interface and through the ISPF interface are both controlled by the same security mechanism. Note that this will have some consequences for the configuration of the IBM Tivoli Directory Server for z/OS.

The HCD LDAP Backend uses several instances of HCD to perform operations on IODFs. Each of these instances serves exactly one request at a time on behalf of a user ID. This strategy provides an easy method of handling the validation of modified configuration data and serialization of client requests. The HCD instances are managed according to the following principles:

1. After starting up, the HCD LDAP Backend opens a (configurable) minimum number of address spaces each of which contains exactly one HCD instance for handling requests. The minimum number of address spaces is controlled by the configuration file parameter **MinHcdInstances** (see "Configuration file parameters" on page 356).
2. When the HCD LDAP Backend receives a legitimate request on behalf of a user ID, it assigns this request to an HCD instance. This instance is then tied to the user in question, that is, all subsequent requests from this user will be routed to this same HCD instance.
3. If the number of available instances is not sufficient, the HCD LDAP Backend will open a new instance provided that a (configurable) maximum number of instances is not exceeded. The maximum number of address spaces is controlled by the configuration file parameter **MaxHcdInstances** (see "Configuration file parameters" on page 356).
4. In order that instances tied to a user can be switched to another user after having been idle for a certain time, two (configurable) timeout values can be defined:
   - The lower value specifies the time after which an instance can be switched to a user who requests a service and has not yet been tied to an HCD instance. The lower timeout value is controlled by the configuration file parameter **AllowSwitchTime** (see "Configuration file parameters" on page 356).
   - The higher value specifies the time after which the connection between an HCD instance and a user is dissolved in any case. The higher timeout value is controlled by the configuration file parameter **ForceSwitchTime** (see "Configuration file parameters" on page 356).

   The lower value provides additional flexibility: As long as there is no need to switch to a new user, the current connection can be maintained until the second timeout is reached.

A special feature of the HCD LDAP Backend is that it supports transactions. A transaction is a sequence of requests which is only executed as a whole. If one of the individual requests fails, the whole transaction is not carried out. This provides additional protection against inconsistency of data. Note, however, that transactions are only supported in conjunction with LDAP V3, not with LDAP V2.

Plugging the HCD LDAP Backend into the IBM Tivoli Directory Server for z/OS

The HCD LDAP Backend performs its services on behalf of user IDs and uses only the RACF access rights of these user IDs to determine the legitimacy of a request. This assumes that the plug-in runs under a user ID which is entitled to switch to the user ID of the respective bind request. Since the plug-in takes as its user ID that of the IBM Tivoli Directory Server for z/OS, the HCD LDAP Backend can only be plugged into the IBM Tivoli Directory Server for z/OS, if the latter runs as a started task under a user ID which is permitted to switch to another user ID. The HCD LDAP Backend uses the *pthread_security_np()* service for performing this switch (thread-level security model). For more details on this switch, see the section ″Preparing security for servers″ of the *z/OS UNIX System Services Planning* book.

The further setup depends on which security level you choose for the IBM Tivoli Directory Server for z/OS. There are two options:
- UNIX level security
- z/OS UNIX level security

With UNIX level security, the IBM Tivoli Directory Server for z/OS must run under the superuser. The superuser has on this security level total authority over the system; in particular, he is automatically entitled to assume the identity of any other user. With z/OS UNIX level security on the other hand, the right to switch user IDs must be explicitly granted, even to the superuser.

z/OS UNIX level security is more secure than UNIX level security, and we recommend that you choose this option. However, you must be aware that this is a global decision which may have consequences for every server on your system. For this reason, the steps required for both options are described below in detail. Warnings are issued whenever a step has repercussions for your system configuration.

For both options you must issue a number of RACF commands. In the example commands shown in the following descriptions, typical assumptions about the system configuration have been made. As these do not necessarily conform with your particular system configuration, you may need to modify the commands as required.

If you have already been using the IBM Tivoli Directory Server for z/OS and are adding the HCD LDAP Backend, check whether your setup conforms to the requirements of the HCD LDAP Backend. If it does not (for instance, you are not running the IBM Tivoli Directory Server for z/OS as a started task), then you must change your setup.

Performing the setup

It is recommended to divide the setup process into three parts. The first part consists of setting up the IBM Tivoli Directory Server for z/OS so that it is able to run with the HCD LDAP Backend. The second part consists of setting up the HCD LDAP Backend. The third part consists of integrating the HCD schema into the IBM Tivoli Directory Server for z/OS.

Setting up the IBM Tivoli Directory Server for z/OS

This section lists the prerequisites that the IBM Tivoli Directory Server for z/OS must comply with, so that it can run with the HCD LDAP Backend.

Prerequisites for IBM Tivoli Directory Server for z/OS setup:

- Set up the IBM Tivoli Directory Server for z/OS for running as a started task.
- Establish a separate user ID that runs the IBM Tivoli Directory Server for z/OS.
- Set up the IBM Tivoli Directory Server for z/OS for running in single-server mode without replication.
- Configure the IBM Tivoli Directory Server for z/OS with the SDBM backend. The HCD LDAP Backend requires the IBM Tivoli Directory Server for z/OS to run with this RACF backend. Therefore, SDBM must be included in the configuration file and all prerequisites for SDBM must be fulfilled.

Additional Prerequisites for z/OS UNIX level security:

Up to here, you have completed to set up the IBM Tivoli Directory Server for z/OS with UNIX level security. If you want to have z/OS UNIX level security, your environment must comply to the following prerequisites:

- Define the RACF FACILITY profile BPX.SERVER. Refer to *IBM Tivoli Directory Server Administration and Use for z/OS* and *z/OS UNIX System Services Planning* for details what this means for the setup of the IBM Tivoli Directory Server for z/OS.

> **Note:**
> Defining a profile named BPX.SERVER in the RACF class FACILITY switches system security from UNIX level security to z/OS UNIX level security. Other applications may be affected by this switch.

- Define libraries to program control. Under z/OS UNIX level security, every program that is loaded into a server address space must be marked as controlled (see section ″Defining Modules to Program Control″ of the *z/OS UNIX System Services Planning* book).

> **Note:**
> Changing profiles in RACF class PROGRAM can cause severe system problems if not done in a manner suitable for the system. If you are unsure ask your RACF administrator.

Setting up the HCD LDAP Backend

This section describes how to set up the HCD LDAP Backend. There is a sample REXX procedure CBDSLCUS in SYS1.SAMPLIB that contains the RACF commands listed in this section for the z/OS UNIX level security.

To set up the HCD LDAP Backend, perform the following steps. Steps 1 on page 352 through 3 on page 354 are only required for z/OS UNIX level security. If you have chosen UNIX level security, continue with step 4 on page 354.

1. *Authorize the HCD LDAP Backend to act on behalf of other user IDs*. With UNIX level security, the IBM Tivoli Directory Server for z/OS runs under a superuser (with UID 0) who is permitted to act on behalf of any user ID. Under z/OS UNIX level security, the HCD LDAP Backend (which receives no password from the IBM Tivoli Directory Server for z/OS) can only perform a service for a client user ID when it has been explicitly authorized to act on behalf of that user ID (see the section ″Defining Servers to Process Users without Password″ of *z/OS UNIX System Services Planning*).

In order to authorize the user ID of the server to act on behalf of another user ID, you must do the following:

a. Define a surrogate profile for the prospective client by issuing the following RACF commands (the second command updates the in-storage copy of the SURROGAT profiles):

```
RDEFINE SURROGAT BPX.SRV.userID UACC(NONE)
SETROPTS RACLIST(SURROGAT) REFRESH
```

b. Authorize the user ID of the IBM Tivoli Directory Server for z/OS for this profile by the following commands (the second command updates the in-storage copy of the SURROGAT profiles):

```
PERMIT BPX.SRV.userID CLASS(SURROGAT) ID(LDAPSRV) ACCESS(READ)
SETROPTS RACLIST(SURROGAT) REFRESH
```

These example commands are based on the following assumptions (which may not hold for your system!):

a. The RACF class SURROGAT has been activated.
b. There is no profile in that class with the name `BPX.SRV.`*`userID`*, where *`userID`* is the user ID of the prospective client.
c. The user ID of the IBM Tivoli Directory Server for z/OS is `LDAPSRV`.

2. *Define libraries to program control*. Under z/OS UNIX level security, every program that is loaded into a server address space must be marked as controlled (see section "Defining Modules to Program Control" of the *z/OS UNIX System Services Planning* book).

When using the HCD LDAP Backend, the libraries containing the following load modules must be defined to program control:

Table 10. Load Module Libraries to be defined to program control

Load Modules	**Typical Library**
HCD LDAP Backend	SYS1.LINKLIB on SYSRES
HCD	SYS1.LINKLIB on SYSRES
UIMs	SYS1.NUCLEUS on SYSRES
C++ RTL	CEE.SCEERUN on SYSRES
IBM Tivoli Directory Server for z/OS and SDBM backend	SYS1.SIEALNKE *and* SYS1.LPALIB on SYSRES

Note: If you use load modules from other libraries you have to define these libraries to program control as well.

To define these libraries to program control, issue the following RACF commands:

```
RDEFINE PROGRAM ** UACC(READ)
RALTER PROGRAM ** UACC(READ) ADDMEM('SYS1.LINKLIB'/'******'/NOPADCHK)
RALTER PROGRAM ** UACC(READ) ADDMEM('SYS1.NUCLEUS'/'******'/NOPADCHK)
RALTER PROGRAM ** UACC(READ) ADDMEM('CEE.SCEERUN'/'******'/NOPADCHK)
RALTER PROGRAM ** UACC(READ) ADDMEM('SYS1.SIEALNKE'/'******'/NOPADCHK)
RALTER PROGRAM ** UACC(READ) ADDMEM('SYS1.LPALIB'/'******'/NOPADCHK)
SETROPTS WHEN(PROGRAM) REFRESH
```

The first command defines a profile named `**` to the class PROGRAM. The other commands, except the last, define the libraries containing the load modules to program control. The last command refreshes the in-storage copy of the PROGRAM profiles.

The example commands are based on the following assumptions (which may not hold for your system!):

a. The RACF class PROGRAM has been activated.

b. GENERIC is enabled for the RACF class PROGRAM.
c. There is no profile in that class with the name `**`.
d. The load modules needed reside in their typical libraries as listed above.

3. When using the HCD LDAP Backend, the libraries containing the following load modules must be APF authorized:

Table 11. APF authorized Load Module Libraries

Load Modules	**Typical Library**
HCD LDAP Backend	SYS1.LINKLIB on SYSRES
C++ RTL	CEE.SCEERUN on SYSRES
IBM Tivoli Directory Server for z/OS and SDBM backend	SYS1.SIEALNKE *and* SYS1.LPALIB on SYSRES

The following steps apply to both security levels.

4. *Tailor the started task procedure*. This includes:
   - The HCD instances that have been started by the HCD LDAP Backend have the same region size as the IBM Tivoli Directory Server for z/OS started task. So, you may need to adjust the region size of the IBM Tivoli Directory Server for z/OS started task according to the region size suitable for the HCD instances.
   - You have to ensure that the IBM Tivoli Directory Server for z/OS and the HCD LDAP Backend are able to find the load modules in Table 10 on page 353 by using the z/OS search order. If the libraries containing these load modules are not searched by z/OS on your system, you must insert a `STEPLIB DD`, which contains the missing libraries, into the started task procedure.
5. *Tailor the IBM Tivoli Directory Server for z/OS configuration file*. You must include the definition of the HCD LDAP Backend in the configuration file `ds.conf`. A sample of how to define the HCD LDAP Backend as z/OS LDAP server plug-in in the server configuration file is delivered with HCD and is installed in `/usr/lpp/hcd/examples/ds.conf`. For this purpose you must do the following (the examples are taken from the sample file):

   A plug-in configuration statement must be added into the GLOBAL section of the configuration file `ds.conf` of the IBM Tivoli Directory Server for z/OS to define the HCD LDAP Backend as a plug-in:

```
plugin clientOperation CBDMLPLG hcd_plginit "<parameters>"
```

   The parameters that are recognized by the HCD LDAP Backend are described in "Configuration file parameters" on page 356. Here is an example of how to replace the <parameters> by acceptable keyword/value pairs (enclosed in double quotes). Note that the HCD suffix `cn=HCD` ***must*** be passed as parameter of the plug-in statement.

```
"suffix                   cn=HCD
 MinHcdInstances          1
 MaxHcdInstances          3
 AllowSwitchTime          30
 ForceSwitchTime          600
 TransactionRollbackTime  3600
 Trace                    off
 Profile                  off
 TraceDsnSuffix           HCD.TRACE
 ProfileDsnSuffix         HCD.PROFILE
 TransformAttributeValues off"
```

   Note: For the processing of the IBM Tivoli Directory Server for z/OS configuration file, the following general rules apply:

- A blank in column 1 indicates that this line is a continuation line.
- Trailing blanks are ignored.

The following syntax rules apply for specifying the parameters:
- A single parameter is defined by its keyword and its value, both separated by at least one blank.
- Parameters are delimited by blanks; for example, you may specify each parameter in a separate line.
- Extra imbedded blanks are ignored, but not allowed within values, for example, do not insert any blanks within `cn=HCD`.
- Continuation lines for the plug-in statement must start in column 3 (not in column 1, as for other statements).

6. *Run the HCD LDAP Backend*. To verify that your setup is working issue an LDAP request against the HCD LDAP Backend. You can use the LDAP operation utilities to do this. For this purpose, enter a command according to the following template:

```
ldapsearch -h ldaphost -p ldapport -D binddn -w passwd -s base
          -b "hcdIodfId=IodfName,suffix" "objectclass=*"
```

   This command performs a search on the specified IODF on behalf of the user ID specified by *binddn*. *binddn* must be a DN from within the SDBM name space representing a user ID, and *passwd* the appropriate password. *IodfName* must be the name of an existing IODF data set. *suffix* would be `cn=HCD` if you have kept the default value specified in the sample configuration file `ds.conf`.

   If the request returns a plausible result, the HCD LDAP Backend is working correctly.

Integrating the LDAP schema for HCD

HCD is shipped with a predefined schema file representing schema definitions which the LDAP server needs to evaluate incoming HCD requests issued via the LDAP interface. You must integrate this file into the IBM Tivoli Directory Server for z/OS after this server has been successfully installed and set up. It is recommended that this integration step is performed by the person who is responsible for the IBM Tivoli Directory Server for z/OS (usually the system administrator). The name of the HCD schema file is `schema.hcd.ldif` and is located in the `/usr/lpp/hcd/etc` directory.

Use the ***ldapmodify*** command to load the schema, for example:

```
ldapmodify -h ldaphost -p ldapport -D adminDN -w passwd
         -f /usr/lpp/hcd/etc/schema.hcd.ldif
```

See *IBM Tivoli Directory Server Client Programming for z/OS* for more information about ***ldapmodify***.

Customizing the HCD LDAP Backend

The HCD LDAP Backend can be customized in the following ways:
- Parameters which are recognized by the HCD LDAP Backend can be set in the IBM Tivoli Directory Server for z/OS's configuration file.
- LDAP debug levels can be set for the IBM Tivoli Directory Server for z/OS and apply to the HCD LDAP Backend also.
- HCD LDAP Backend can be run in English or Japanese.

Configuration file parameters

Configuration file parameters that apply to the HCD LDAP Backend are set in the database section of the HCD LDAP Backend in the IBM Tivoli Directory Server for z/OS configuration file `ds.conf`. Any parameter which is not known by the IBM Tivoli Directory Server for z/OS itself is handed over to the HCD LDAP Backend. The following list shows the supported parameters:

MinHcdInstances *int*

Specifies the minimum number of HCD instances started during startup of the HCD LDAP Backend.

Default:	`1`
Range:	`1-10`
Constraints:	Must be less than or equal to the numerical value of `MaxHcdInstances`

For example, `MinHcdInstances 1` causes the HCD LDAP Backend to start exactly one initial HCD instance.

MaxHcdInstances *int*

Specifies the maximum number of HCD instances which can be used simultaneously by the HCD LDAP Backend. The HCD LDAP Backend will start new HCD instances dynamically if they are needed and if the maximum number has not already been reached.

Default:	`3`
Range:	`1-10`
Constraints:	Must be greater than or equal to the numerical value of `MinHcdInstances`

For example, `MaxHcdInstances 3` will allow the HCD LDAP Backend to use a maximum of three HCD instances simultaneously.

AllowSwitchTime *int*

Specifies the idle time in seconds after which the user ID of an HCD instance may be changed.

Default:	`30`
Range:	`1-120`
Constraints:	Must be less than the numerical value of `ForceSwitchTime`.

For example, `AllowSwitchTime 30` will ensure that an HCD instance must be idle for at least thirty seconds before the HCD LDAP Backend is allowed to switch the HCD instance to a different user ID.

ForceSwitchTime *int*

Specifies the idle time in seconds after which the user ID of an HCD instance is unconditionally reset. If a new request on behalf of this user ID arrives, this or any other free HCD instance has to be switched to that user ID.

Default:	`600`
Range:	`60-3600`
Constraints:	Must be greater than the numerical value of `AllowSwitchTime`.
Exception:	If the value specified for `ForceSwitchTime` is `0`, a forced reset of the user ID will not be performed.

For example, `ForceSwitchTime 600` will ensure that the user ID of an HCD instance is reset by the HCD LDAP Backend after an idle time of 600 seconds (10 minutes) of the HCD instance

TransactionRollbackTime *int*
Specifies the idle time (in seconds) of an LDAP client after which a transaction, running on behalf of this LDAP client is rolled back automatically.
Default: `3600`
Range: `10-3600`

For example, `TransactionRollbackTime 3600` will ensure that the HCD LDAP Backend automatically rolls back a transaction which is still open on behalf of an LDAP client which has been idle for 3600 seconds (one hour).

Trace on|off
Determines whether the HCD instance running on behalf of the HCD LDAP Backend generates an HCD trace (see "HCD trace facility" on page 467). Each HCD instance generates its own trace.
Default: `off`

TraceDsnSuffix *name*
Specifies the suffix of the data set names where the traces of the HCD instances are to be written to. The effective name of the trace data set of one particular HCD instance is determined by concatenating the user ID associated with the HCD instance with the suffix.
Default: `HCD.TRACE`
Constraints: Only valid data set names with a maximum of 35 characters can be used. Note that the suffix must not be empty.

For example, assume you have set the `TraceDsnSuffix` to `LDAP.HCD.TRACE` and that you have specified `Trace on`. If an HCD instance now performs an LDAP request on behalf of user ID `TEST` and is, therefore, switched to this user ID, it will open the trace data set with name `'TEST.LDAP.HCD.TRACE'` and `DISP=OLD`. This data set is then used for tracing the operations of the HCD instance.

Profile on|off
Determines whether the HCD instances running on behalf of the HCD LDAP Backend will use an HCD profile on startup or user ID switch (see "Defining an HCD profile" on page 25). Each HCD instance uses its own profile, depending on the user ID which the HCD instance is currently related to.
Default: `off`

ProfileDsnSuffix *name*
Specifies the suffix of the profile data set name used by the HCD instances. The effective name of the profile data set of one particular HCD instance is determined by concatenating the user ID associated with the HCD instance with the suffix.
Default: `HCD.PROFILE`
Constraints: Only valid data set names with a maximum of 35 characters can be used. Note that the suffix must not be empty.

For example, assume you have set `ProfileDsnSuffix` to `LDAP.HCD.PROFILE` and you have specified `Profile on`, If an HCD instance now performs an LDAP request on behalf of user ID TEST and is thus switched to this user ID, it will open the profile data set with name 'TEST.LDAP.HCD.PROFILE' and DISP=SHR. The contents of the data set will be read and the HCD instance will be set up accordingly.

TransformAttributeValues on|off

Specifies whether the values of the attributes hcdIodfDescription and hcdDescription are interpreted as being in IBM-939 or not. In general, these values are interpreted as being in IBM-037. It is important to have the correct setting because the IBM Tivoli Directory Server for z/OS communicates with LDAP clients using UTF-8 representation and the HCD LDAP Backend has to convert attribute values appropriately.

Default: off

LDAP debug level

For a description of the debug levels see "LDAP problem determination" on page 462.

Message translation

The HCD LDAP Backend supports English and Japanese messages. To obtain English messages with the character representation IBM-1047, choose one of the following values for the environment variable LANG:

- C
- En_US
- En_US.IBM-1047

To obtain Japanese messages with the character representation IBM-939, choose one of the following values for the environment variable LANG:

- Ja_Jp
- Ja_Jp.IBM-939

For the values of LANG supported by the IBM Tivoli Directory Server for z/OS and for more information on how to specify the value of LANG, see the *IBM Tivoli Directory Server Administration and Use for z/OS*.

Note: The settings of the environment variable LANG do not control the language of the HCD messages which HCD LDAP Backend returns to LDAP clients upon their requests. In fact, all HCD messages returned to LDAP clients will always be in English.

Accessing IODF information

The HCD LDAP Backend provides access to IODF information via the LDAP protocol. You can, for instance, add or delete devices and control units, or modify operation system settings. It is also possible to automate complex updates, for instance a whole I/O configuration, by communicating with the IBM Tivoli Directory Server for z/OS through an application (see *IBM Tivoli Directory Server Client Programming for z/OS*).

The IODF directory information tree

In order to make HCD IODF information accessible via the LDAP protocol, the HCD LDAP Backend realizes a one-to-one mapping between the IODF data structure and the structure of the LDAP directory information tree (DIT). It is this one-to-one mapping that makes the update of IODFs through the IBM Tivoli Directory Server for z/OS possible.

The resulting HCD portion of the DIT has some special constraints as compared to an all purpose backend like TDBM:

- One important difference between the HCD portion and TDBM concerns the relation between object class and position in the (sub)tree. In TDBM, every object class can occur on every position. The HCD subtree, on the other hand, must correspond to the structure of the IODF. Accordingly, the object class of every entry managed by the HCD LDAP Backend uniquely determines the object class of its parent entry.

  Note, however, that this parent relation cannot be understood as in object oriented programming: Thus the object class `hcdPartition` has as its parent the object class `hcdProcessorConfig`, but `hcdPartition` is certainly not derived from `hcdProcessorConfig`.
- In addition, there are a number of HCD specific dependencies between entries that reside on different branches of the HCD subtree. In some cases, the HCD LDAP Backend takes these dependencies into account by automatically adding or deleting certain entries when certain other entries are added or deleted. In other cases you must ensure yourself that your request conforms with these interrelationships. For details, see "Restrictions for search and update requests" on page 361 and "Appendix F. IODF data model" on page 505.
- The schema of the HCD portion of the DIT is fixed. It cannot be extended or modified.

The object classes required for the IODF DIT and their interrelationships (parent relation and branch crossing interrelationships) are described in "Appendix F. IODF data model" on page 505. This appendix also contains descriptions of all the attributes that are needed for these object classes.

Performing LDAP requests on IODFs

In order to request a service from the HCD LDAP Backend you must always perform two steps:

1. *Authenticate yourself to the RACF Backend*. For authentication, you have to specify a so-called *bind* DN and a password. The authentication (called *binding* in LDAP terminology) is successful when the bind DN identifies an entry of the backend to which the suffix of the bind DN is assigned, and when the specified password is in fact associated with this entry. The HCD LDAP Backend does not perform this identity check itself, but uses the SDBM backend for that purpose. Thus, you must specify a user ID in the bind DN, and the bind DN must have the following structure:

   ```
   "racfid=user_ID,profileType=user,sysplex=Your_Sysplex,..."
   ```

   Here `sysplex=`*`Your Sysplex`* is the first element of the suffix. Note that `group` is not allowed as the value of the `profileType` attribute.

   If the binding to the RACF Backend fails, the HCD LDAP Backend will not support the subsequent requests.
2. *Access an IODF*. If you want to access an IODF with the data set name `IodfDsn`, the DN in your LDAP request must have the following form:

   ```
   "...,hcdIodfId=IodfDsn,suffix_of_HCD_LDAP_Backend"
   ```

Note that only IODFs that can be reached by the IBM Tivoli Directory Server for z/OS are accessible with the HCD LDAP Backend.

If you have issued your request as described, the HCD LDAP Backend will take the following actions:

- The user ID is extracted from the initial bind request.
- The IODF data set name is extracted from the LDAP request.
- A prepared address space is switched to the user ID, and HCD is started.
- HCD loads the specified IODF and performs the requested operations.
- The results are sent back to you.

Operational behavior

The operational behavior of the HCD LDAP Backend is basically the same as that for the RACF backend with some small differences. Information about the RACF Backend can be obtained from the *IBM Tivoli Directory Server Administration and Use for z/OS*.

The following gives an overview of the functional behavior of the HCD LDAP Backend:

1. The HCD LDAP Backend does not participate in extended group membership searching on a client request.
2. It is possible to run several HCD LDAP Backends on one IBM Tivoli Directory Server for z/OS simultaneously.
3. The root of a subtree (see Figure 134 on page 349) is denoted by a suffix in the configuration file. You can specify only one suffix per HCD LDAP Backend. Suffix names must be unique if you are running multiple HCD LDAP Backends.
4. The HCD LDAP Backend does not support Access Control Lists (ACLs) which are normally used to protect information stored in an LDAP directory from unauthorized access. The reason for this is that the DIT portions managed by the HCD LDAP Backend are based on IODF data sets for which all access control is performed by RACF.
5. The HCD LDAP Backend does not support the following LDAP request types and will answer these requests with the return code "Unwilling to Perform":
   - Bind
   - ModifyDN (also called ModifyRDN, or ModRdn)
   - Compare
   - Abandon
   - Extended Request
6. The following LDAP request types are supported by the HCD LDAP Backend:
   - Add
   - Delete
   - Modify
   - Search

   The following table shows how the HCD LDAP Backend behaves during these LDAP operations:

Target DN	Search	Add	Delete	Modify
suffix	Error: Inappropriate Matching	Error: Inappropriate Matching	Error: Inappropriate Matching	Error: Inappropriate Matching

Target DN	Search	Add	Delete	Modify
hcdIodfId= *IodfDsn,suffix*	Perform the appropriate search request. See "Search"	Error: Inappropriate Matching	Error: Inappropriate Matching	Perform the appropriate modify request. See "Modify" on page 363
...,hcdIodfId= *IodfDsn,suffix*	Perform the appropriate search request. See "Search"	Perform the appropriate add request. See "Add" on page 362	Perform the appropriate delete request. See "Delete" on page 363	Perform the appropriate modify request. See "Modify" on page 363

7. Multi-server or replication is not supported by the HCD LDAP Backend

Restrictions for search and update requests

This section describes the restrictions which the HCD LDAP Backend imposes on the search, add, delete and modify capabilities of LDAP. Many of these restrictions derive from the fact that the structure of HCD portion of the DIT is much more rigidly controlled than, for instance, the TDBM subtree.

| **Note:** Within a single request, references to an attribute name must either always be with the alias name or always with the full attribute name. A mix is not accepted.

In the following subsections, *suffix* stands for the suffix of the HCD LDAP Backend.

Search

Searching is restricted as follows:

- Only search bases ending with `hcdIodfId=`*`Iodf_dataset_name`*`,`*`suffix`* are supported. This implies that only one IODF can be searched at a time.
- The only search filters that are supported by the HCD LDAP Backend are `objectclass=*` and `objectclass=`*`name`*, where *name* has to be the name of an object class that is defined for the HCD LDAP Backend.
- Time or size limits are not supported.
- Controls are not supported.
- It is not possible to restrict the attributes of the matching entries that will be displayed. Every attribute that has at least one value will be shown in the search results.

Examples:

Following are two examples for retrieving information from an existing IODF with the command line search utility of LDAP.

The command

```
ldapsearch -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-s base -b "hcdIodfId=TEST.IODF00.WORK,suffix" "objectclass=hcdIodf"
```

retrieves the top entry of object class `hcdIodf` belonging to the IODF named TEST.IODF00.WORK on behalf of user ID TEST. The result may look as follows:

```
hcdIodfId=TEST.IODF00.WORK,suffix
objectClass=hcdIodf
hcdIodfId=TEST.IODF00.WORK
```

```
hcdIodfType=W
hcdIodfDescription=Testing purposes
hcdBlocksAllocated=20
hcdBlocksUsed=2
hcdCreationDate=1999-10-04
hcdLastUpdateDate=1999-12-16
hcdLastUpdateTime=09:25:50
1 matches
```

The same result could be obtained with the search filter `"objectclass=*"`.

The command

```
ldapsearch -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-s one -b "hcdIodfId=TEST.IODF00.WORK,suffix" "objectclass=hcdDevice"
```

retrieves all entries of object class `hcdDevice` belonging to the IODF named TEST.IODF00.WORK, again on behalf of user ID TEST. One of the retrieved entries may look as follows:

```
hcdDeviceNumber=000D,hcdIodfId=TEST.IODF00.WORK,suffix
objectClass=hcdDevice
hcdDeviceNumber=000D
hcdUnit=2540P
hcdModel=1
hcdDescription=Virt. Puncher
```

| **Note:** Attribute names in the search results may be in lower case only, depending
| on the LDAP server set up, for example, `hcdiodfid` instead of `hcdIodfId`.
| Also, there is no specific order of the attribute/value pairs in the returned
| result.

Add

Adding an entry is restricted as follows:

- Entries can only be added below `hcdIodfId=...,`*`suffix`*, that is, add is not supported on DN `hcdIodfId=...,`*`suffix`* or DN *`suffix`*.
- Since every object class of the HCD LDAP Backend except `hcdIodf` has a uniquely determined parent class, ensure that the object class of the new entry and that of the entry to which the new entry is appended are related as child and parent. Exactly one value must be specified for the objectclass attribute. See "Appendix F. IODF data model" on page 505 for parent-child relationships between object classes.
- If the RDN of the entry to be added is `attribute=value`, `value` must be specified as a value of `attribute` inside the entry.
- The attributes which are contained in the entry's RDN are determined by the object class of an entry. See "Appendix F. IODF data model" on page 505.
- There must be no entry in the DIT with the same DN as the entry to be added.
- If an add request fails because of a missing parent, the HCD LDAP Backend does not update the matched DN field of the result.
- Check "Appendix F. IODF data model" on page 505 to see which object classes can be added.
- Adding an entry may cause other entries to be created automatically using default values. See "Appendix F. IODF data model" on page 505.
- Two controls are supported for the LDAP add request. See "Transactions" on page 365 for details.

Example:

A new entry of the object class hcdControlUnit of type 3990 with a control unit number of 0100 can be appended to the entry hcdIodfId=TEST.IODF00.WORK,*suffix* as follows.

First create a data set member named TEST.LDIF(ADDCU100) with the content

```
dn:hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix
changetype:add
objectclass:hcdControlUnit
hcdControlUnitNumber:0100
hcdUnit:3990
```

Then call the LDAP command line utility ldapadd with the following parameters:

```
ldapadd -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-f //'TEST.LDIF(ADDCU100)'
```

The entry will be added on behalf of the user ID TEST.

You can then verify that the entry was created correctly by issuing

```
ldapsearch -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-s base -b "hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix"
"objectclass=*"
```

The search result should look like:

```
hcdcontrolunitnumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix
objectclass=hcdControlUnit
hcdcontrolunitnumber=0100
hcdunit=3990
1 matches
```

Delete

Deleting an entry is restricted as follows:

- Only entries below DN hcdIodfId=...,*suffix* can be deleted. Delete on DN hcdIodfId=..., *suffix* or DN *suffix* is not supported.
- Check "Appendix F. IODF data model" on page 505 to see which object classes can be deleted.
- Deleting one entry may cause other entries to be deleted automatically. See "Appendix F. IODF data model" on page 505.
- Two controls are supported for the LDAP delete request. See "Transactions" on page 365 for details.

Example:

To delete the entry added in the example shown in "Add" on page 362 you can call the LDAP command line utility ldapdelete with the following parameters:

```
ldapdelete -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
"hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix"
```

The entry will be deleted on behalf of the user ID TEST.

Modify

Modifying an entry is restricted as follows:

- Only the entry DN hcdIodfId=...,*suffix* and below can be modified. Modification of DN *suffix* is not supported.
- Check "Appendix F. IODF data model" on page 505 to see which object classes can be modified.

- The HCD LDAP Backend only supports the delete and replace subcommands of modify. The add subcommand is NOT supported.
- The value of the `object class` attribute cannot be deleted or replaced.
- The value(s) of the attributes which are contained in the entry's RDN cannot be deleted or replaced.
- One modify request to a single entry can contain a sequence of delete and replace subcommands. This sequence can be considered as atomic: Either the whole sequence is performed or nothing is performed.
- One attribute can only be referenced once in the whole modify request. It can only be deleted once, replaced once, and only *either* be deleted *or* replaced.
- Modify delete only supports the deletion of all values of an attribute. For this reason, you must not specify values in the modify delete request. If a value is specified, the whole modify request is rejected by the HCD LDAP Backend.
- Attributes described as mandatory in an object class must not be deleted
- Modify replace replaces all existing values of the given attribute with the new values listed, creating the attribute if it did not already exist. A replace with no value will delete the entire attribute if it exists, and is ignored if the attribute did not exist.
- All values must conform with the type specified in the attribute definition.
- Modifying an entry may cause other entries to be modified automatically. See "Appendix F. IODF data model" on page 505.
- Two controls are supported for the LDAP modify request. See "Transactions" on page 365 for details.

Example:

The entry created in "Add" on page 362 can be modified by adding the attribute `hcdDescription` as follows.

First create a data set member named `TEST.LDIF(REPCU100)` with the content

```
dn:hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix
changetype:modify
replace:x
hcdDescription:New description
```

Then call the LDAP command line utility `ldapmodify` with the following parameters:

```
ldapmodify -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-f //'TEST.LDIF(REPCU100)'
```

If the modify request completes successfully, the entry will look like:

```
hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix
objectClass=hcdControlUnit
hcdControlUnitNumber=0100
hcdUnit=3990
hcdDescription=New description
```

This `hcdDescription` can now be deleted again with the delete subrequest of modify. To do this, first create a data set member named `TEST.LDIF(DELCU100)` with the content

```
dn:hcdControlUnitNumber=0100,hcdIodfId=TEST.IODF00.WORK,suffix
changetype:modify
delete:hcdDescription
-
```

Then issue the following command:

```
ldapmodify -D "racfid=TEST,profiletype=user,sysplex=sysplex1" -w "passwd"
-f //'TEST.LDIF(DELCU100)'
```

Transactions

Transactions is a concept in which individual LDAP requests are handled collectively as a single unit such that if one of the requests within the transaction should fail, then the whole transaction with all its requests is not carried out. In this way, you do not have a situation where some requests are performed and others are not. Transactions can be helpful if you want to perform complex tasks which consist of LDAP request sequences. For example, if you want to define a coupling facility (which would require adding two entries of object class `hcdChannelPath`) you can perform the necessary LDAP requests within a transaction.

In general, arbitrary sequences of at least two update requests (i.e. add, delete, modify) can be performed as a transaction. A transaction cannot consist of a single update request as a single request by definition behaves like a transaction.

Prerequisites and method of functioning

The LDAP client marks a request for the HCD LDAP Backend as being part of a transaction by specifying an LDAP V3 control for the request. For this reason, transactions in the HCD LDAP Backend can only be used with LDAP clients supporting LDAP V3 controls.

LDAP V3 controls represent additional information which can be included with a request to, or to a response from the IBM Tivoli Directory Server for z/OS.

In order to use transactions offered by the HCD LDAP Backend, the following two LDAP V3 controls, both of which are supported by the HCD LDAP Backend, are required. Both controls must always be used with a valid value which determines how the HCD LDAP Backend will react to the control.

Examples of how to use these controls are shown on page 367

1. **hcdTransactionControl**:

   Name: hcdTransactionControl

   Description: This control is used on the first and last request of a transaction, to indicate either the start (via value NEW) and finish (via value COMMIT or ROLLBACK) of a transaction request sequence.

   Assigned Object Identifier: 1.3.18.0.2.10.3

   Target of Control: Server

   Control Criticality: Critical

   Values: Value is exactly one char 0 terminated string in UTF-8 encoding representing exactly one of the strings (words):

   ```
   NEW
   COMMIT
   ROLLBACK
   ```

   These strings are not case sensitive. The following byte values (shown as two digit hexadecimal numbers) represent these strings:

```
Value      Byte sequence

NEW      = 4E 45 57 00
COMMIT   = 43 4F 4D 4D 49 54 00
ROLLBACK = 52 4F 4C 4C 42 41 43 4B 00
```

2. **hcdTransactionId**:

   Name: hcdTransactionId

   Description: This control is used on all requests of a transaction except the first request. The value of this control indicates which particular transaction a request belongs to.

   If an LDAP client initiates a new transaction with an appropriate request, the HCD LDAP Backend answers the request with an LDAP response containing control `hcdTransactionId`. The LDAP client has to extract this control's value from the response and must specify the value for `hcdTransactionId` on all following requests belonging to the transaction.

   Assigned Object Identifier: 1.3.18.0.2.10.4

   Target of Control: Server

   Control Criticality: Critical

   Values: Value is exactly one char 0 terminated string in UTF-8 encoding representing a non-negative, non-zero long int value in decimal format which is the transaction ID. Only values previously received from the HCD LDAP Backend are allowed - all others are rejected.
   Example: Assuming a transaction has an ID of 238. Then, the following byte values (shown as two digit hexadecimal numbers) represent the appropriate `hcdTransactionId` control value:

   ```
   32 33 38 00.
   ```

   The 10 decimal digits have the following character representation in UTF-8 (shown as two digit hexadecimal numbers):

   ```
   0 = 30, 1 = 31, 2 = 32, 3 = 33, ..., 9 = 39.
   ```

In order to perform a transaction containing a sequence of LDAP requests R_1, R_2, ..., R_n, the LDAP client has to do the following:

1. Send the LDAP requests R_1, R_2, ..., R_n of the transaction one after another to the IBM Tivoli Directory Server for z/OS and wait for a response to each request before sending the next.
2. To initiate a new transaction (containing the requests R_1, R_2, ..., R_n) extend the first request R_1 with control `hcdTransactionControl` and specify `NEW` as value for this control. Control `hcdTransactionId` must not be used on the first request R_1. If the HCD LDAP Backend is able to open the new transaction, it will respond by returning the control `hcdTransactionControl` and the control `hcdTransactionId` with a transaction ID as *value*. In the case of failure neither controls will be returned.
3. Send all subsequent requests R_2, ..., R_n of the current transaction, with the control `hcdTransactionId` containing the valid transaction ID issued by the HCD LDAP Backend as a response to the first request R_1.
4. Commit (or if necessary rollback) the whole transaction using the control `hcdTransactionControl` and the *value* `COMMIT` (or `ROLLBACK`). This must be added to the last request (R_n) of the transaction. If, however, any request in between fails, you can use the `hcdTransactionControl` to initiate an immediate `ROLLBACK`. The control `hcdTransactionId` with the appropriate value must, of course, also be specified.

Note: Only update requests (i.e. add, delete and modify) can be part of a transaction.

All operations belonging to a transaction must act on the same IODF and must have been issued by the same LDAP client with the same LDAP handle bound to the same user ID.

The following section shows how to initiate a transaction, to add further LDAP requests to a transaction and to close a transaction.

How to initiate, extend and close a transaction

To use the transaction facility, you have to:

- Set up and run the IBM Tivoli Directory Server for z/OS and the HCD LDAP Backend as described previously in this information unit.
- Provide an LDAP V3 client program which uses the appropriate controls of the HCD LDAP Backend.

Refer to *IBM Tivoli Directory Server Administration and Use for z/OS*, *IBM Tivoli Directory Server Client Programming for z/OS*, and the IBM redbook *Understanding LDAP* for examples of LDAP client programs.

The following shows some examples of how to use the previously introduced controls on LDAP requests to take the following actions:
- Initiate a transaction
- Submit further transaction requests
- End a transaction

All the following examples written in C, are provided for the LDAP add request (here, we use the LDAP request `ldap_add_ext()` from the LDAP client API in C).

Please note that you must choose the version of the LDAP client API function which allows you to specify server controls. See the *IBM Tivoli Directory Server Client Programming for z/OS* for more information on the functions themselves, as well as on the parameters which have to be passed for particular requests.

Example 1: Initiate a new transaction

A transaction is initiated using the `hcdTransactionControl` with `NEW` as value. This control can be defined the following way:

```
static LDAPControl hcdTransactionControl_new =
      {
          "1.3.18.0.2.10.3",  /* -- hcdTransactionControl -- */
          { 3, "\x4E\x45\x57\x00" }, /* -- NEW ------------- */
          LDAP_OPT_ON         /* -- critical --------------- */
      } ;
static LDAPControl *hcdTC_new[2] = {  &hcdTransactionControl_new, NULL };
```

Note, as mentioned before, the value NEW (and also the values COMMIT and ROLLBACK, shown in example 3) have to be specified using UTF-8 encoding.

All controls to be passed to the IBM Tivoli Directory Server for z/OS are stored in an array. In this case, only one control is in the NULL-terminated array.

This array is now be passed to the function which sends the appropriate request to the IBM Tivoli Directory Server for z/OS. For example, `ldap_add_ext()` is used to request an add operation as follows:

```
rc = ldap_add_ext( ld, dn, pmods, hcdTC_new, NULL, &msgidp);
```

Here, the control `hcdTC_new` is used where the *value*`NEW` was specified in UTF-8.

If this request was successful and if a new transaction was started, the HCD LDAP Backend sends back the control `hcdTransactionId` which contains the transaction ID. Such control may look similar to the following (see also Example 2):

```
static LDAPControl hcdTransactionId =
       {
          "1.3.18.0.2.10.4",  /* -- hcdTransactionId ------ */
          { 1, "\x31\x00" },  /* -- TXN Id ---------------- */
          LDAP_OPT_ON         /* -- critical -------------- */
       };
static LDAPControl *hcdTC_Id[2] = { &hcdTransactionId, NULL };
```

In the above example, for the control `hcdTransactionId` the value indicates a transaction ID of 1.

Note, you should never generate a value for this control on your own. Instead, call the LDAP client API functions `ldap_result()` and `ldap_parse_result()` on the response of the first request to obtain the valid transaction ID.

After having issued `ldap_add_ext()`, calling `ldap_parse_result()` parses the results which were previously obtained by `ldap_result()`. Here, among other parameters, the LDAP control containing the transaction ID is provided.

The following code example demonstrates how to use both LDAP requests:

```
rc = ldap_result(ld, msgidp, 0, NULL, &LDAP_TXN_Msg);
rc = ldap_parse_result(ld, LDAP_TXN_Msg, &errcodep, &matcheddnp,
                       &errmsgp, &referralsp, &servctrlsp, freeit);
```

The interesting parameter as far as controls are concerned is `servctrlsp`. This pointer locates an array such as `hcdTC_new`. The appropriate values of the control have to be copied into the `hcdTransactionId` control which can be done in the following way (assuming that `servctrlsp[0]` contains the `hcdTransactionId` control and the control `servctrlsp[0]` is not freed):

```
hcdTransactionId.ldctl_value.bv_val = (servctrlsp[0])->ldctl_value.bv_val;
hcdTransactionId.ldctl_value.bv_len = (servctrlsp[0])->ldctl_value.bv_len;
```

After these values have been copied, the correct transaction ID can be provided for further LDAP requests which are part of this transaction. This is shown in Example 2 below.

Example 2: Submit further LDAP requests of the transaction.

After a transaction was successfully initiated, further LDAP requests can be added to the transaction. Here, the user must provide an `hcdTransactionId` control where *value* contains the correct transaction ID. As stated before, this control is provided by the HCD LDAP Backend and must be used for further requests belonging to this specific transaction.

If we assume that for the transaction we just initiated, the transaction ID number is 1, then, the control which was provided by the HCD LDAP Backend would be as follows:

```
static LDAPControl hcdTransactionId =
       {
          "1.3.18.0.2.10.4", /* -- hcdTransactionId ------ */
```

```
          { 1, "\x31\x00" }, /* -- TXN Id ---------------- */
          LDAP_OPT_ON        /* -- critical -------------- */
       };
static LDAPControl *hcdTC_Id[2] = { &hcdTransactionId, NULL };
```

In general, the values 1 and "\x31\x00" have to be replaced by the correct values of the control that is provided by the call of `ldap_parse_result()` (see example 1).

After the correct values for this transaction have been copied into the above control, further LDAP requests can be added to the transaction using this control. The call of such an LDAP request is just the same as in example 1 with the only exception that the controls have been exchanged as follows:

```
rc = ldap_add_ext( ld, dn, pmods, hcdTC_Id, NULL, &msgidp);
```

As the transaction ID does not change for a specific transaction, all further requests belonging to this transaction must use the same `hcdTransactionId` control.

Example 3: End a transaction

Here, two different cases must be considered. As stated before, a transaction can be committed for execution, or it can be aborted by the user using a rollback request.

It is recommended that you explicitly rollback a transaction if a single LDAP request returns a bad return code. The reason for this is that, transactions are intended to represent logical units of requests which belong together. In principal, both the actions - commit and rollback - are the same from an implementation point of view. The only difference is, which control is to be specified for the LDAP request that finishes the transaction. If the user wants to commit a transaction, the following control must be defined:

```
static LDAPControl hcdTransactionControl_commit =
       {
          "1.3.18.0.2.10.3",    /* -- hcdTransactionControl -- */
          { 6, "\x43\x4F\x4D\x4D\x49\x54\x00" },/* - COMMIT -- */
          LDAP_OPT_ON           /* -- critical --------------- */
       };
static LDAPControl *hcdTC_commit[3] = { &hcdTransactionControl_commit,
                                        &hcdTransactionId, NULL };
```

If the user want to rollback a transaction, the following control must be defined:

```
static LDAPControl hcdTransaction_rollback =
       {
          "1.3.18.0.2.10.3",    /* -- hcdTransactionControl -- */
          { 8, "\x52\x4F\x4C\x4C\x42\x41\x43\x4B\x00" }, /*ROLLBACK*/
          LDAP_OPT_ON           /* -- critical --------------- */
       };
static LDAPControl *hcdTC_rollback[3] = { &hcdTransactionControl_rollback,
                                          &hcdTransactionId, NULL };
```

Using these controls, the final request will, in the case of commit, now be:

```
rc = ldap_add_ext(ld, dn, pmods, hcdTC_commit, NULL, &msgidp);
```

and in the case of a rollback:

```
rc=ldap_add_ext(ld, dn, pmods, hcdTC_rollback, NULL, &msgidp);
```

If you look at the previous definition of `hcdTC_commit` and `hcdTC_rollback`, both parameters are control arrays that contain the commit or rollback control itself, and in addition, also contain the control `hcdTC_Id` for submitting the next request. Hence, one control indicates the end of the transaction, and the other control identifies the transaction on the basis of its ID. Once a transaction is closed, no further requests can be added to this control.

Appendix A. How to navigate through the dialog

This appendix illustrates the flow from the options on HCD Primary Task Selection Panel and the various actions that can be taken from each option. The panels that appear for option 1 have a Common User Access* (CUA*) action bar at the top and a context menu for each object. Figure 137 on page 372 shows the general action bar valid for the action list panels. Some action list panels offer special action bar choices that are not shown in the figure (for example the ***Show/Hide*** action bar choice on the Device List panel invoked from the Operating System List panel). Figure 138 on page 373 to Figure 142 on page 374 shows the options on the context menu and the navigation possibilities to other panels. Almost all of the options on the context menu can be directly selected by entering the action code next to the item in the list to be selected. Available action codes are shown in parentheses below the "Options Available" heading.

```
   Task     Action    Options Available
   Menu      Bar
                     1. Define, modify, or view configuration data
                     2. Activate or process configuration data
                     3. Print or compare configuration data
    HCD              4. Create or view graphical configuration report
  Primary            5. Migrate configuration data
   Task       N/A  ->6. Maintain I/O definition files
 Selection           7. Query supported hardware and installed UIMs
   Panel             8. Getting started with this dialog
                     9. What's new in this release
```

Figure 135. HCD Primary Task Selection Panel

```
   Task     Action    Options Available
   Menu      Bar
                       1. Operating system configurations
                             consoles
                             system-defined generics
                             EDTs
                                esoterics
1. Define,                      user-modified generics
   Modify,             2. Switches
   or View    N/A  ->        ports
   Config.                   switch configurations
   Data                         port matrix
                       3. Processors
                            channel subsystems
                              partitions
                              channel paths
                       4. Control units
                       5. I/O devices
```

Figure 136. HCD - Define, Modify, or View Configuration Data - Option 1

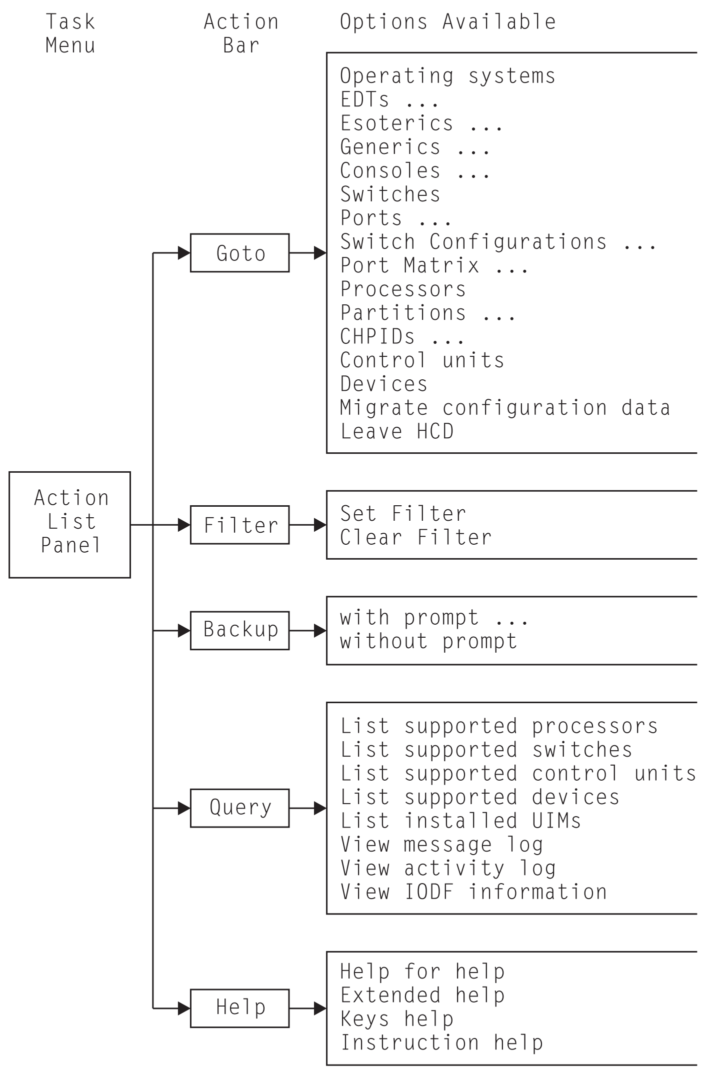


Figure 137. HCD - Generic Action Bar Options

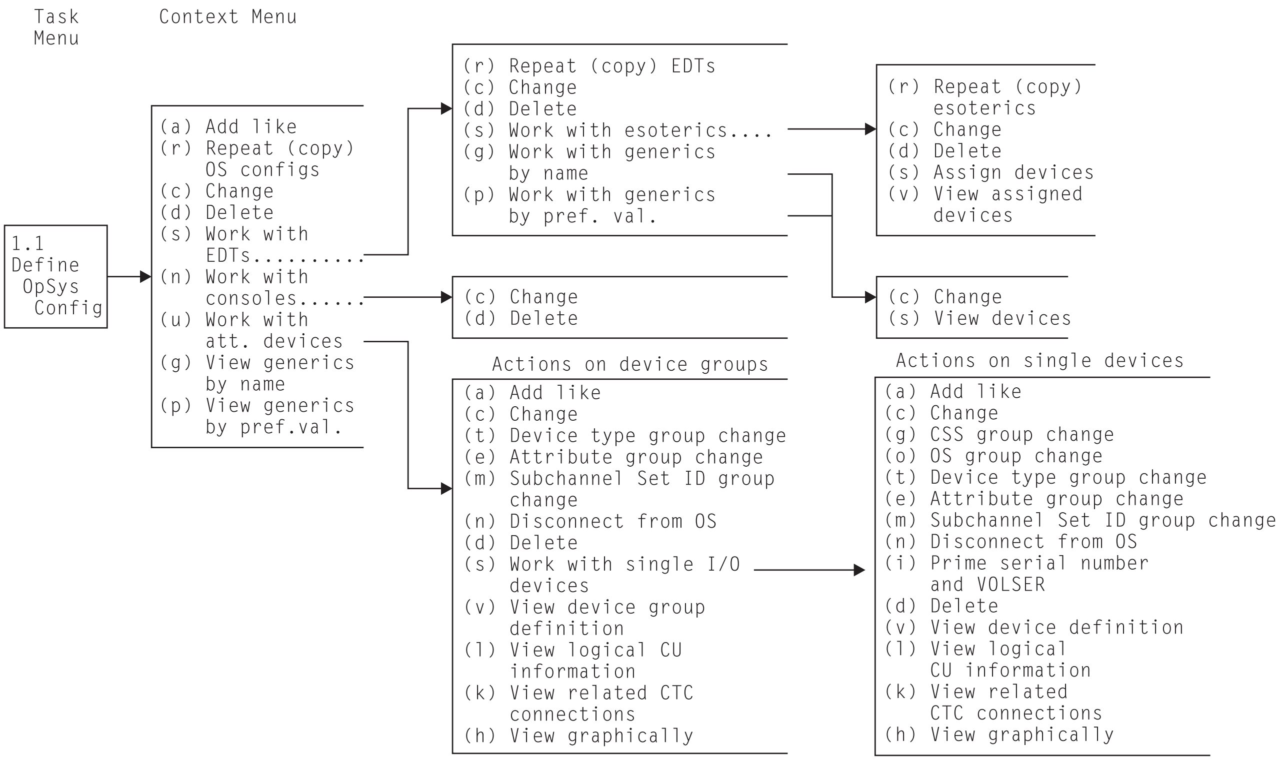


Figure 138. HCD - Define Operating System - Option 1.1

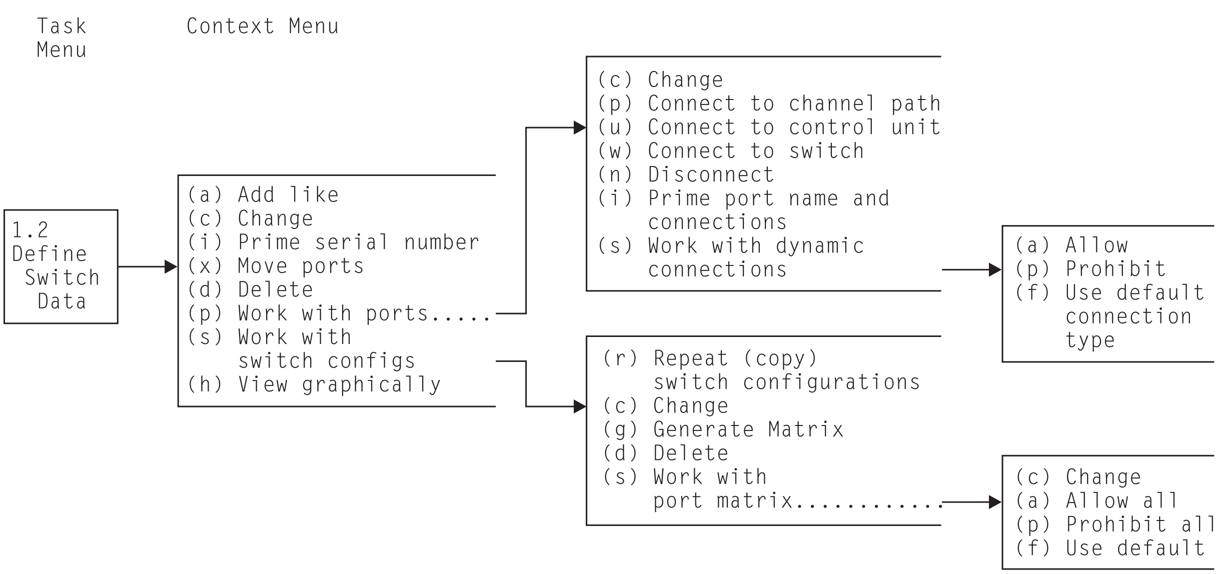


Figure 139. HCD - Define Switch - Option 1.2

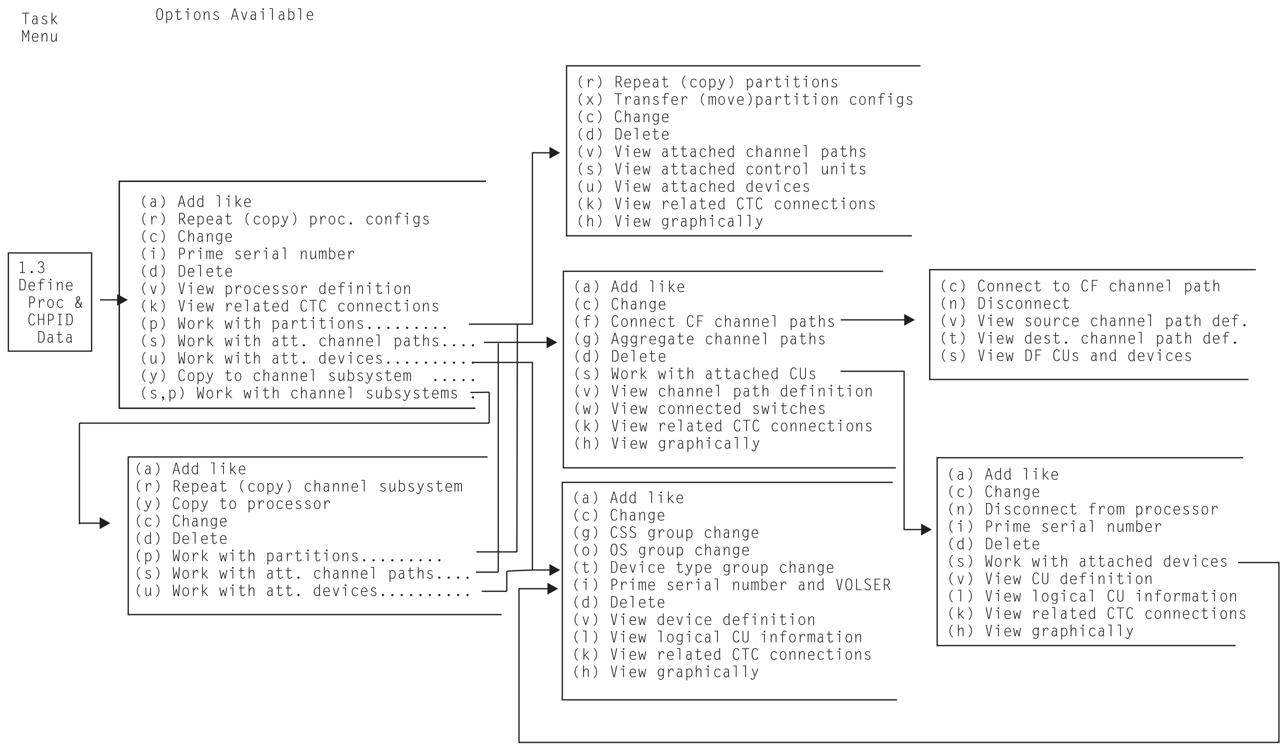


Figure 140. HCD - Define Processor and Channel Path - Option 1.3

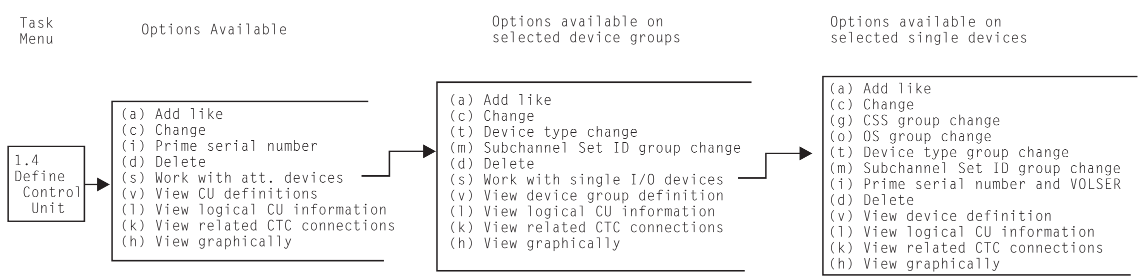


Figure 141. HCD - Define Control Unit - Option 1.4

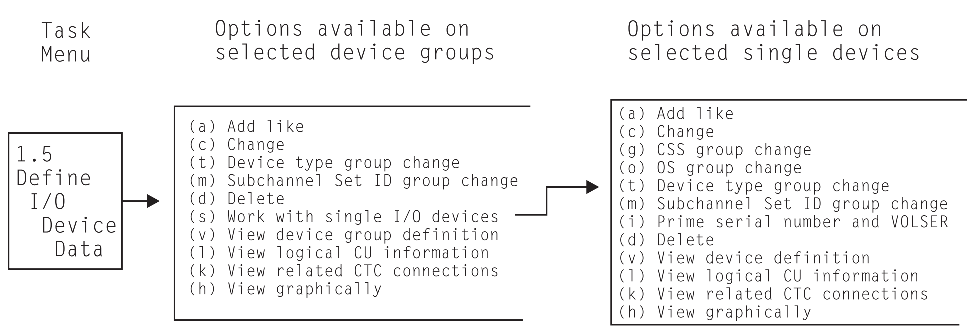


Figure 142. HCD - Define I/O Device - Option 1.5

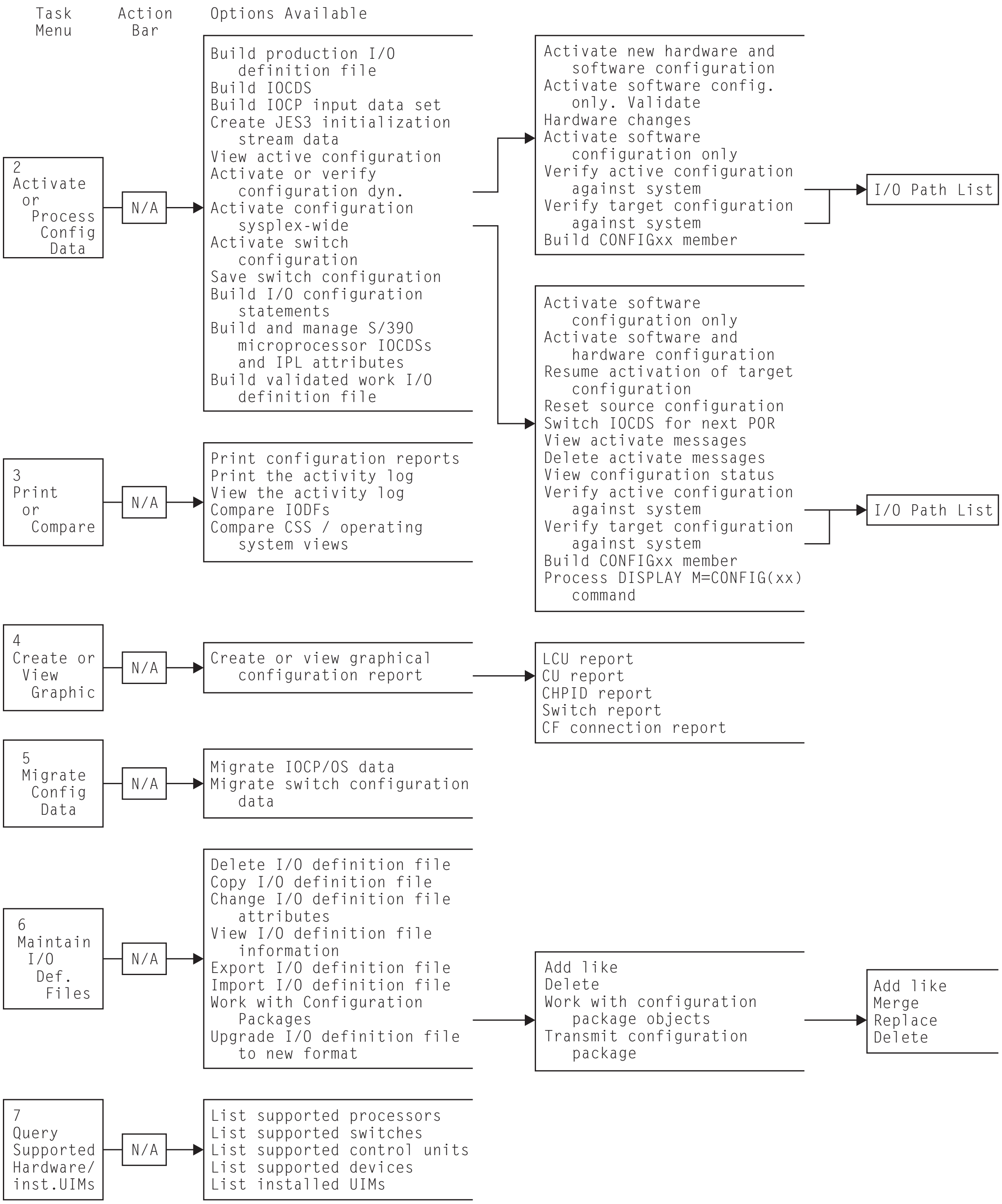


Figure 143. HCD - Utility Functions - Options 2 - 7

Appendix B. Configuration reports

This appendix shows examples of the configuration reports that can be produced by HCD:

- "Textual configuration reports"
- "Graphical configuration reports" on page 434
- "IODF compare reports" on page 435.

Textual configuration reports

This section shows examples for textual configuration reports. "Print configuration reports" on page 235 lists the different report types available and describes how to produce them.

Channel subsystem reports

The following channel subsystem reports are available:

- "Processor Summary Report"
- "Channel Subsystem Summary Report" on page 378
- "Partition Report" on page 378
- "IOCDS Report" on page 379
- "Channel Path Summary Report" on page 380
- "Channel Path Detail Report" on page 381
- "CF Channel Path Connectivity Report" on page 383
- "Control Unit Summary Report" on page 384
- "Control Unit Detail Report" on page 384
- "Device Summary Report" on page 386
- "Device Detail Report" on page 386

Processor Summary Report

```
                                        PROCESSOR SUMMARY REPORT                   TIME: 15:29  DATE: 2007-03-15  PAGE A-   1
PROCESSOR                         CONFIG.   SERIAL                                      ----- SNA ADDRESS -----
   ID      TYPE      MODEL        MODE      NUMBER      DESCRIPTION                     NETWORK NAME  CPC NAME   LSYSTEM
_________  ________  ________  ________  __________  ______________________________  __________________  ________
ERV01WWW   2094      S38       LPAR      1212122094  mix system                      ZZZZZZZZ      ERV01      ERV01
ERV02O1    9672      ZX7       LPAR      4434349672  old system 1                    IBM390PS      ERV02O1
ERV02O2    9672      ZX7       LPAR      1111119672  old system 2                    IBM390PS      ERV02O2
ERV05A1    2094      S28       LPAR      9912992094  Standalone FCTC CTC/CNC         IBM390PS      ERV05A1
ERV05A2    2094      S54       LPAR      9929912094  standalone FCTC CTC/CNC proc    IBM390PS      ERV05A2
NET01      2096      R07       LPAR      3322332096  Network System                  ZZZZZZZZ      NET01

PROCESSOR  ----SUPPORT LEVEL----
   ID        ID      DESCRIPTION
_________  ________  ________________________________________________________________
ERV01WWW   H050331   XMP, Basic 2094 support
ERV02O1    H990531   FCV, OSD, OSE, IC, ICB, CF, OSA, ESCON, Parallel
ERV02O2    H990531   FCV, OSD, OSE, IC, ICB, CF, OSA, ESCON, Parallel
ERV05A1    H050331   XMP, Basic 2094 support
ERV05A2    H050331   XMP, Basic 2094 support
NET01      H060930   XMP, 2096-R07 support
```

Figure 144. Processor Summary Report

CONFIG. MODE
Indicates the operation mode in which a processor may operate. These modes are:

BASIC The processor is not logically partitioned.

LPAR The processor is logically partitioned. Several operating systems may run concurrently in different partitions of the processor.

SNA ADDRESS
The SNA Address consists of Network name and CPC name and associates the CPC and the processor definition in the IODF.

SUPPORT LEVEL
Shows the ID of the processor support level and an enumeration of the provided functionality.

Channel Subsystem Summary Report

Only XMP processors will have a channel subsystem report which shows the defined channel subsystems.

```
                                      CHANNEL SUBSYSTEM SUMMARY REPORT              TIME: 13:33  DATE: 2004-11-29  PAGE A-   2
 PROCESSOR ID  GOLDENE1     TYPE  2094       MODEL S38
          DEVICES IN SS0   DEVICES IN SS1
  CSS ID   MAXIMUM ACTUAL   MAXIMUM ACTUAL   DESCRIPTION
  ______   _______ ______   _______ ______   ________________________________
   0          1000     32       300     32
   1          1000     32       300     32
   2           800     32       500     32
   3           900     32       400     32
```

Figure 145. Channel Subsystem Summary Report

Note: This report and the following channel subsystem reports show the processor token only if the IODF is a production IODF.

Partition Report

```
                                            PARTITION  REPORT                     TIME: 12:57  DATE: 2003-01-15  PAGE B-   3
 PROCESSOR ID  G33XMP       TYPE  2084       MODEL B16
 CSS ID  0
  PARTITION NAME  NUMBER  USAGE  DESCRIPTION
  ______________  ______  _____  ________________________________
  TCSS0LP2        2       CF/OS  OS/CF Partition number 2 CSS0
  TCSS0LP3        3       OS     OS    Partition number 3 CSS0
  *               4       CF/OS  reserved Partition number 4 CSS0

                                            PARTITION  REPORT                     TIME: 12:57  DATE: 2003-01-15  PAGE B-   4
 PROCESSOR ID  G33XMP       TYPE  2084       MODEL B16
 CSS ID  1
  PARTITION NAME  NUMBER  USAGE  DESCRIPTION
  ______________  ______  _____  ________________________________
  LIN1            7       OS     Linux
  LNXCM10         A       OS     Linux
  LNXCM3          6       OS     Linux
  LNXCM4          8       OS     Linux
  LNXCM9          9       OS     Linux
```

Figure 146. Partition Report

NUMBER
Is the partition number (MIF ID). This information is printed only for EMIF capable processors.

USAGE
Specifies the usage type of a partition: CF indicates a partition supporting coupling facility. OS indicates a partition running an operating system. CF/OS indicates a partition supporting coupling facility or running an operating system.

IOCDS Report

IOCDS data are retrieved from the support element when a SNA address is defined. Otherwise, the IOCDS data are retrieved from the IODF. An IOCDS status line at the end of the report indicates the source of the IOCDS data.

```
                                             I O C D S   REPORT                     TIME: 00:06  DATE: 2005-10-18  PAGE C-   1
    PROCESSOR ID  CFS         TYPE  9672       MODEL RX6
                                 -----Token Match---- Write   --Last Update--
 IOCDS NAME     FORMAT STATUS    IOCDS/HSA IOCDS/Proc Protect DATE       TIME  IOCDS Configuration Token Information
 _____ ________ ______ _________ _________ __________ _______ __________ _____ ________________________________________
 A0    316ACFS  LPAR   POR       Yes       No         Yes-POR 2004-11-12 06:14 CFS      16:27:52 04-11-11 SYS4     IODF71
 A1    063ACFS  LPAR   Alternate No        No         No      2004-03-03 16:49 CFS      16:23:49 04-03-03 SYS4     IODF72
 A2    091ACFS  LPAR   Alternate No        No         No      2004-04-01 00:01 CFS      16:08:02 04-03-31 SYS4     IODF73
 A3    296ACFS  LPAR   Alternate No        No         No      2004-10-22 11:45 CFS      14:59:05 04-10-21 SYS4     IODF71
                 IOCDS status retrieved from the support element
```

Figure 147. IOCDS Report

`NAME`	Represents the user-defined name of the IOCDS (derived from the MSG1 parameter)
`FORMAT`	IOCDS format (BASIC or LPAR)
`STATUS`	Indicates the status of the IOCDS: *Alternate, POR, Invalid* (see “Build S/390 microprocessor IOCDSs” on page 203).
`Token Match - IOCDS/HSA`	Indicates whether the IOCDS token matches the current HSA token
`Token Match - IOCDS/Proc`	Indicates whether the IOCDS token matches the current processor token in the IODF
`Write Protect`	Indicates whether the IOCDS is write-protected (*Yes*) or not (*No*), or currently write-protected because it is the POR IOCDS (*Yes-POR*).
`Last Update DATE/TIME`	Time stamp of IOCDS creation time
`IOCDS Configuration Token Information`	is the configuration token information stored in the support element and shows the relationship between the IOCDS and the production IODF from which it was created.

Channel Path Summary Report

If applicable, for spanned channels, there is a separate sub-report after the partition table of a processor which shows the connection of spanned channel paths to channel subsystems.

```
                                        CHANNEL PATH SUMMARY REPORT                  TIME: 16:54 DATE:  2004-01-28  PAGE D-   1
PROCESSOR ID  GOLDENE1 TYPE  2094     MODEL  S38      CONFIGURATION MODE: LPAR
    CSS ID  0
       PCHID      MFS DIS       I/O       DYN.   SWITCH                    PARTITION NUMBERS
 CHPID AID/P TYPE KB  QP  MNGD CLUSTER   SWITCH   ID   PORT  MODE  |1|3|9|F|                        DESCRIPTION
 _____ _____ ____ ___ ___ ____ ________  ______ ______ ____  ____  ______________________________   ________________________________
  00    300  FC           NO                                 SPAN  |A| | |A|
  01    301  FC           NO                                 SPAN  |A|A|C|C|
  02    302  FC           NO                                 SPAN  |A|A|A|A|
  10    310  FC           NO               50     50    03   SPAN  |A|A|A|A|
  11    311  FC           NO               50     50    04   SPAN  |A|A|A|A|
  30    330  FC           YES  TRXPLEX9    50     50    05   SHR   | | | | |                        managed chpids
  31    331  FC           YES  TRXPLEX9    50     50    06   SHR   | | | | |                        managed chpids
  50    555  OSD      YES NO                                 SPAN  |A|A|A|A|                        up to 1920 subchannels
  51         IQD  24      NO                                 SHR   |A| |C|A|
  BB    00/1 CIB          NO                                 SPAN  |A|A| | |

       PARTITION
    NUMBER    NAME
    ______    ________
      1       GECSS01X
      3       GECSS03X
      9       GECSS09X
      F       GECSS0FX


       SPANNED CHANNEL PATHS
    CHPID          CSS IDS
    NUMBER  TYPE  |0|1|2|3|
    ______  ____  _________
      00    FC    |X|X|X|X|
      01    FC    |X|X|X|X|
      02    FC    |X|X|X|X|
      10    FC    |X|X|X|X|
      11    FC    |X|X|X|X|
      50    OSD   |X|X| | |

    LEGEND FOR PARTITION NUMBERS FIELD:
    ___________________________________
     A     - PARTITION IS IN CHPID'S ACCESS LIST
     C     - PARTITION IS IN CHPID'S CANDIDATE LIST ONLY
     BLANK - PARTITION IS NOT IN CHPID'S ACCESS OR CANDIDATE LIST
```

Figure 148. Channel Path Summary Report

PCHID AID/P	For external channels: designates the physical channel identifier (PCHID) or, if applicable, designates the HCA adapter ID (AID) and the HCA port (P).
DIS QP	Indicates whether queue prioritization is disabled.
MFS	Designates the maximum frame size in KB.
MNGD	Indicates whether the channel path is managed.
I/O CLUSTER	The I/O cluster name for managed channel paths.
DYN. SWITCH	Designates the switch holding the dynamic connection.
SWITCH ID	Designates the switch the channel is physically plugged in (entry switch).
PORT	Designates the entry port on the entry switch.
MODE	Operation mode of the channel path.

Channel Path Detail Report

The Channel Path Detail Report lists the channel paths defined per processor with their attributes and attachment information.

In addition, the switch connections on the path between the CHPID and the control unit are shown if they can be determined by HCD. The entry switch and port of the CHPID are always shown.

For an entry switch of a CHPID which is defined as a dynamic switch, the control unit port is shown if it is compatible with the link address defined for the CHPID. For an entry switch of the CHPID which is defined as a dedicated switch, the control unit port or the ports connecting the switches are only shown if switch configurations are defined which allow HCD determining a valid path between CHPID and control unit.

In case of chained switches, the first print line for a channel path shows the switch the channel path is physically plugged in. The second print line shows the switch the control unit is connected to. In addition, the first print line shows the ID of the switch with the dynamic connection.

Each attached control unit of a specific channel path is separated by a line.

The first print line for an attached control unit shows the first unit address range defined for the control unit. If there are more unit address ranges defined for a control unit, these are shown in the following print lines. Together with the unit address range(s) of the control unit the attached devices of the control unit are shown grouped according to device types and consecutive numbers and unit addresses. The report shows the starting device number and range of the device group. The unit address describes the address of the first device in the range.

For FICON switches, the dynamic switch ID is empty. The control unit port ID is shown as a two-byte port address (the port ID prefixed by the switch address) when used in a cascaded switch environment, or as a one-byte port address otherwise. For cascaded FICON switches, only the channel path port ID and the control unit port ID are shown, but no connection between the switches.

Note: For a Coupling Facility control unit, all CF devices attached to this control unit are listed, not only those devices that are defined for the connected coupling facility channel path described in the row.

```
                                     CHANNEL PATH DETAIL REPORT                   TIME: 12:57  DATE: 2003-01-15  PAGE E-   1
PROCESSOR ID EVA      TYPE 2084     MODEL C24      CONFIGURATION MODE: LPAR
  CSS ID  0
                                 ---- SWITCH ----                                       UNIT ADDR                UNIT
      PCHID                      ID  PR  CU   DYN  --- CONTROL UNIT ---  CU-                 RANGE     -- DEVICE --  ADDR   DEVICE
CHPID AID/P  TYPE    MNGD   MODE     PN  PN    ID  NUMBER  TYPE-MODEL    ADD  PROTOCOL  FROM  TO     NUMBER,RANGE  START  TYPE-MODEL

 00   05F    CNC     NO     SHR  00  04     06  00  0000   2105           0                00   0F     0000         00     3390A
                                                                                                    0001,15      01     3390B

                                 00  04     0D  00  0003   3490                            00   0F     0100,2       00     3490

                                 00  04     FE  00  0B00   9032-5                          00   00     0B00         00     9032-5

 01   13A    CNC     NO     DED  00  05         00

 02   2D3    CNC     NO     DED  00  0C     0E  00  0005   2105                            00   3F     0700,16      00     3380B

 03   2E7    IQD     NO     SPAN                    000A   IQD                             00   FF     0300,3       00     IQD

 04   3A8    CBP     NO     DED                     FFFE   CFP                                         FFF9,7              CFP
```

Figure 149. Channel Path Detail Report

`SWITCH ID`
: Designates the entry switch the channel path is physically plugged in. For chained ESCON switches or cascaded FICON switches, a second line is shown with the ID of the switch to which the control unit is connected.

`SWITCH PR PN`
: Designates the entry port of the entry switch. In case of an ESCON chained switch, it designates the entry port of the chained switch.

`SWITCH CU PN`
: Designates the port the control unit is connected to. In case of an ESCON chained switch, it designates the port of the entry switch to which the chained switch is connected. For a cascaded FICON switch, the port ID is prefixed by the switch address.

`SWITCH DYN ID`
: For an ESCON environment, it designates the switch holding the dynamic connection.

CF Channel Path Connectivity Report

For XMP processors, there will be a single CF Channel Path Connectivity Report. The CHPID numbers are prefixed by the channel subsystem ID. For example `1.0C` denotes CHPID 0C from CSS 1. If a spanned channel path is used, the CHPIDs are reported from all channel subsystems together with the accessed partitions in the channel subsystems.

```
                                 CF CHANNEL PATH CONNECTIVITY REPORT                    TIME: 10:30  DATE: 2005-10-17  PAGE F-   1
  PROCESSOR ID T29      TYPE 2094     MODEL S18      CONFIGURATION MODE: LPAR
--------------- SOURCE ------------- --------------------- DESTINATION ------------------------ --- SOURCE ---- - DESTINATION -
                  ACCESS   CANDIDATE PROCESSOR                                ACCESS   CANDIDATE CNTRL DEVICE     CNTRL DEVICE     CNTL
CHPID TYPE MODE O LIST     LIST          ID      TYPE-MODEL    CHPID TYPE MODE LIST     LIST      UNIT  NUM,RANGE  UNIT  NUM,RANGE TYPE
_________________ ________ _________ ______________________  _________________ ________ _________ __________________ ______________ ____
1.00  ICP  SPAN N TRX1               T29       2094-S18        1.01  ICP  SPAN TRX1               FFDE  F977,28    FFDE  F977,28   CFP
3.00              TRX2                                         3.01            TRX2
                  T29CFA                                                       T29CFA
 -------------------------------------------------------------------------------------------------------------------------------
1.01  ICP  SPAN N TRX1               T29       2094-S18        1.00  ICP  SPAN TRX1               FFDE  F977,28    FFDE  F977,28   CFP
3.01              TRX2                                         3.00            TRX2
                  T29CFA                                                       T29CFA
 -------------------------------------------------------------------------------------------------------------------------------
1.02  ICP  SPAN N TRX1               T29       2094-S18        1.03  ICP  SPAN TRX1               FFDE  F977,28    FFDE  F977,28   CFP
3.02              TRX2                                         3.03            TRX2
                  T29CFA                                                       T29CFA
 -------------------------------------------------------------------------------------------------------------------------------
1.03  ICP  SPAN N TRX1               T29       2094-S18        1.02  ICP  SPAN TRX1               FFDE  F977,28    FFDE  F977,28   CFP
3.03              TRX2                                         3.02            TRX2
                  T29CFA                                                       T29CFA
```

Figure 150. CF Channel Path Connectivity Report

`SOURCE/DESTINATION CHPID`	The identifier of the source/destination channel path.
`SOURCE/DESTINATION TYPE`	Is the type of the source/destination channel path.
`SOURCE/DESTINATION MODE`	Is the operation mode of the source/destination channel path.
`SOURCE O`	CHPID is identified as occupied
`SOURCE/DESTINATION ACCESS LIST`	Shows those partitions the source/destination channel path has in its access list.
`SOURCE/DESTINATION CANDIDATE LIST`	Shows those partitions the source/destination channel path has in its candidate list.
`DESTINATION PROCESSOR ID`	Is the name of the processor the destination channel path is defined for.
`DESTINATION TYPE-MODEL`	Is the type-model of the destination processor.
`SOURCE CNTRL UNIT`	Is the number of the CF control unit used for the source CF channel path connection.
`SOURCE DEVICE NUM,RANGE`	Are the numbers of the CF devices and ranges of device groups defined for the source CF channel path connections via the source CF control unit.
`DESTINATION CNTRL UNIT`	Is the number of the CF control unit used for the destination CF channel path connection.
`DESTINATION DEVICE NUM,RANGE`	Are the numbers of the CF devices and ranges of device groups used for the destination CF channel path connections via the destination CF control unit.
`CNTL TYPE`	indicates the type of the connecting control unit(s).

Control Unit Summary Report

```
                                      CONTROL UNIT SUMMARY REPORT                     TIME: 13:23  DATE: 1997-03-02  PAGE G-   1
  CONTROL UNIT         SERIAL
NUMBER  TYPE-MODEL     NUMBER       DESCRIPTION                             CONNECTED SWITCH ID.PORT NUMBER
---------------------  ----------   --------------------------------  |--.--|--.--|--.--|--.--|--.--|--.--|--.--|--.--|
 0098   9033           55-9999      First switch                       98.FE
 0099   9032           55-8888      Second switch                      99.FE
 00C1   3480                        First tape control unit
 00C2   3480                        Backup tape control unit
 00D1   3990-3                      DASD control unit                  98.C2 99.E1
 00D2   3990-1
 00E1   3274                        Terminal control unit
 00E2   3174                        Terminal control unit              99.E4
 00E3   3174                                                           99.EF
 FFFE   CFS
```

Figure 151. Control Unit Summary Report

`CONNECTED SWITCH ID.PORT NUMBER` Describes where the CU is physically connected to (switch and port)

Control Unit Detail Report

The Control Unit Detail Report lists all control units defined in the currently accessed IODF, with their attributes and attachment information.

For each control unit all processors are shown, where the control unit is attached to. For each of those processors, all control units, that are part of the ″logical control unit″ the currently printed control unit belongs to, are printed. Also, the currently shown control unit is listed again to show information about switch connection, channel path attachment, and attached devices. The information about each logical control unit the currently printed control unit belongs to, is separated by a dotted line.

The switch connection information is shown in the Control Unit Detail Report even if no switch configuration is defined. For example:

If a control unit is connected to a switch, but no complete path is defined through the switch (that means, no valid path is defined through the switch, which allows a dynamic connection) the complete switch connection information with SWITCH ID, CU PN, and PR PN can be determined.

In case of chained switches, the first information in a print line is shown for the switch the control unit is connected to. The second set of switch information is for the switch that the channel path is connected to. Note that this is different from the Channel Path Detail report.

To get information about the switch with the dynamic connection (in case of chained ESCON switches), the Channel Path Detail Report has to be produced.

For each control unit belonging to a logical control unit, the channel path it is attached to, is printed together with the link address (if applicable).

For FICON cascade switching, the link address will be shown as a two-byte number. If a path from the control unit is via cascaded FICON switches, the link between the FICON switches is not shown. Instead, the control unit port of the switch connected to the control unit and the CHPID port of the switch connected to the channel path are shown. If no port connections are defined, switch data is extracted from the dynamic switch and the link address. Port IDs are shown as one-byte port addresses.

The last column of the report shows the devices which are attached to the control unit printed under column 'CNTL UNITS IN LOG CNTL UNIT'. If the control unit is attached to more than one channel path, the information about the attached devices is printed together with the last printed channel path. The devices attached to a control unit are grouped according to consecutive number. The report shows the starting device number and range of the device group.

```
                                    CONTROL UNIT DETAIL REPORT                    TIME: 12:57  DATE: 2003-01-15  PAGE H-   1
                                                                             -CHAINED/CASC-
  CONTROL UNIT          PROCESSOR.  CNTL UNITS IN        CU-   SWITCH  CU  PR    SWITCH  CU  PR   CHPID .      -- DEVICE --
NUMBER  TYPE-MODEL      CSS ID      LOG CNTL UNIT  IOCL  ADD     ID    PN  PN      ID    PN  PN   LINK ADDR    NUMBER,RANGE
______  ___________     ______      _____________  ____  ___   ______  __  __    ______  __  __   _________    ____________
 0000   2105            EVA.0           0000        2     0      00    06  04                     00 . 06        0000,16
------------------------------------------------------------------------------------------------------------------------
 0001   1288
------------------------------------------------------------------------------------------------------------------------
 0002   2105            R31SMP          0002        2            FF    03  00                     B0 . 0003      0210,8
------------------------------------------------------------------------------------------------------------------------
 0003   3490            EVA.0           0003        2            00    0D  04                     00 . 0D        0100,2
------------------------------------------------------------------------------------------------------------------------
 0004   2710            G33XMP.0        0004        2                                             03
                                                                                                  04             0400,4
------------------------------------------------------------------------------------------------------------------------
 0005   2105            EVA.0           0005        2            00    0E  0C                     02 . 0E        0700,16
------------------------------------------------------------------------------------------------------------------------
 0006   2105            EVA.0           0006        2                                             08 . 0A        0800,8
------------------------------------------------------------------------------------------------------------------------
 000A   IQD             EVA.0           000A        2                                             03             0300,3
                        --------------------------------------------------------------------------------------------------
                        EVA.2           000A        2                                             03             0300,3
                        --------------------------------------------------------------------------------------------------
                        G33XMP.0        000A        2                                             00             0300,3
------------------------------------------------------------------------------------------------------------------------
 001E   4245            G33XMP.1        001E        2                                             5D             001E
------------------------------------------------------------------------------------------------------------------------
 0023   SCTC            G33XMP.1        0023                     1F    85  94                     77 . 85        1120,128
                                                                                                                 B120,16
                                                                                                                 B160,16
------------------------------------------------------------------------------------------------------------------------
 00A0   3174            G33XMP.1        00A0        2                                             5D             00A0,32
------------------------------------------------------------------------------------------------------------------------
```

Figure 152. Control Unit Detail Report

`PROCESSOR.CSS ID`	Designates the processors, and in case of an XMP processor, the channel subsystem to which the CU is attached.
`CNTL UNITS IN LOG CNTL UNIT`	Designates which CUs belong to the logical CU.
`IOCL`	Designates I/O concurrency level (same as SHARED in IOCP). Specifies the level of concurrency of I/O requests that the parallel channel path allows for the control unit (CU). **1** One I/O request at a time. (SHARED=Y) **2** Multiple I/O requests at a time. (SHARED=N)
`CU-ADD`	Designates the CU address.
`SWITCH ID`	Designates the switch the CU is connected to.
`CU PN`	Designates the port the CU is physically connected to.
`PR PN`	Designates the entry port of the channel (except in the case of chained switches)
`CHAINED/CASC (SWITCH ID, CU PN, PR PN)`	Designates a possible second switch the CHPID is connected to.
`CHPID . LINK ADDR`	Designates the channel path and the one- or two-byte link address to which the control unit is connected. *n*(*) in this column indicates that the control unit is connected to *n* managed channel paths.

DEVICE NUMBER,RANGE — Specifies information about the devices that are attached to the processors by the control unit.

Device Summary Report

The Device Summary Report gives you an overview of the devices defined in the currently accessed IODF and their attaching control units. The devices are grouped according to the same characteristics. The report shows the starting device number and the range of the group.

For multi-exposure devices, the base devices are grouped separately from the non-base exposure devices.

```
                                   DEVICE SUMMARY REPORT                         TIME: 16:59  DATE: 1997-10-28  PAGE I-   1
  --- DEVICE ---    DEVICE                                                  SERIAL
   NUMBER,RANGE    TYPE-MODEL           ATTACHING CONTROL UNITS             NUMBER       DESCRIPTION                      VOLSER
  ______________   ____________   |____|____|____|____|____|____|____|____|   __________   ______________________________   ______
     0080,16       3174           0080                                                   Merian SNA Connection
     0090,2        RS6K           0110
     0092,2        RS6K           0112
     0094,2        RS6K           0114
     0096,2        RS6K           0116
     0110,2        RS6K           0110
     0112,2        RS6K           0112
     0114,2        RS6K           0114
     0116,2        RS6K           0116
     01C0          3270-X         01C0                                                   Console Real and Virt.
     01C1,31       3270-X         01C0                                                   Terminal
     0200,64       3390           200A 200B
     0300,32       9345           300A 300B
     0320,32       9345           320A 320B
     0340,32       9345           340A 340B                                              Real Dasd (9345 340-35f)         MVSLIB
     0360,32       9345           360A 360B                                              Real Dasd (9345 360-37f)         TSO001
```

Figure 153. Device Summary Report

Device Detail Report

The Device Detail Report lists all devices defined in the currently accessed IODF, with their attributes and attachment information. Each device is shown with the processors to which it is attached. The device - processor attachment attributes are also listed. If applicable, the subchannel set where the device is located, is also shown in column SS. If not applicable, this column shows a blank.

For each processor the device is attached to, the CUs for the attachment to the processor, as well as the channel path(s) the CU is attached to, are also listed.

The starting device number and the range of subsequent device numbers are shown in one row. A range value of 1 is omitted.

The Device Detail Report shows a partition matrix which indicates whether a logical partition of a corresponding processor has access to the device either via the channel path access list or the channel path candidate list, and whether a partition is excluded or included via the device candidate list. Devices with a null-device candidate list are excluded from the report.

At the end of the report, for SMP processors, the totals for the following items are listed for each processor:
- CHPIDS
- PHYSICAL CONTROL UNITS
- SUBCHANNELS
- LOGICAL CONTROL UNITS

For the CHPID total, the report lists separate values for the total shared and the total unshared. For the physical CU total, HCD reports the total shared (those attaching to shared channel paths) and the total unshared.

For the subchannel and logical CU totals, the report lists separate values for the shared, unshared, and additional unshared counts that are, respectively, assigned and unassigned to a logical partition. The shared count is the total number assigned to shared channel paths. The generated for LPAR unshared count is the total that would have been generated for a basic IOCDS. The additional unshared count contains the unshared values that were generated for the LPAR IOCDS.

The TOTAL value is the total that would have been contained in the generated IOCDS. The HSA TOTAL is the total that will exist in the HSA after POR. At the completion of POR, the HSA may contain more subchannels and logical CUs than does the IOCDS.

For XMP processors, the following totals are reported:
- CHPIDS
- PHYSICAL CONTROL UNITS
- DEVICES
- LOGICAL CONTROL UNITS

The column CSS TOTAL lists the number of CHPIDs, physical and logical control units and the maximum number of devices that are currently defined for that channel subsystem.

The column IOCDS TOTAL lists the number of CHPIDs, physical and logical control units and the maximum number of devices without definitions caused by over-defined CHPIDs.

Columns HSA TOTAL and HSA LIMIT are not applicable for XMP processors.

The column USER LIMIT lists the maximum number of devices defined by the user for that channel subsystem.

The column SUPPORTED LIMIT lists the maximum number of CHPIDs, physical and logical control units and the maximum number of devices that are supported for the processor for that channel subsystem.

```
                                       DEVICE DETAIL REPORT                          TIME: 13:33  DATE: 2004-11-29  PAGE J-   1
DEVICE      DEVICE        PROCESSOR. SS UNIT TIME STA PREFERRED      CNTL UNIT     CHPID.          PARTITION NUMBERS
NUMBER     TYPE-MODEL     CSS ID        ADDR OUT  DET   CHPID    PORT NUMBER CUADD LINK     |1|2|3|4|5|6|7|8|9|A|B|C|D|E|F|   SIDE
__________ _____________  __________ __ ____ ____ ___ _________  ____ ______ _____ __.____  _______________________________  ____
0000,8     3390A          GOLDENE1.0  0  00   NO  YES                  0000        00       |A| |A| | | | | |-| | | | | |A|
                                                                                   01       |A| |A| | | | | |-| | | | | |A|
                                                                                   02       |A| |A| | | | | |-| | | | | |A|
                          GOLDENE1.1  0  00   NO  YES                  0000        00       |A| |A| | | | | |A| | | | | |A|
                                                                                   02       |A| |A| | | | | |A| | | | | |A|
                          GOLDENE1.2  0  00   NO  YES                  0000        00       | | | | |C|A| | | | | | | | | |
                                                                                   01       | | | | |C|A| | | | | | | | | |
                          GOLDENE1.3  0  00   NO  YES                  0000        00       | |-| | |-| | | | | | | | |A| |
-----------------------------------------------------------------------------------------------------------------------------------
...
-----------------------------------------------------------------------------------------------------------------------------------
0020,16    3380A          GOLDENE1.0  1  30   NO  YES                  0000        00       |A| |A| | | | | |A| | | | | |A|
                                                                                   01       |A| |A| | | | | |A| | | | | |A|
                                                                                   02       |A| |A| | | | | |A| | | | | |A|
                          GOLDENE1.1  1  30   NO  YES                  0000        00       |A| |A| | | | | |A| | | | | |-|
                                                                                   02       |A| |A| | | | | |A| | | | | |-|
                          GOLDENE1.2  1  30   NO  YES                  0000        00       | | | | |C|A| | | | | | | | | |
                                                                                   01       | | | | |C|A| | | | | | | | | |
                          GOLDENE1.3  1  30   NO  YES                  0000        00       | |-| | |-| | | |+| | | | |A| |
-----------------------------------------------------------------------------------------------------------------------------------
                                       DEVICE DETAIL REPORT                          TIME: 13:33  DATE: 2004-11-29  PAGE J-   2
    LEGEND FOR PARTITION NUMBERS FIELD:
    ___________________________________
     A     - PARTITION IS IN CHPID'S ACCESS LIST
     C     - PARTITION IS IN CHPID'S CANDIDATE LIST ONLY
     BLANK - PARTITION IS NOT IN CHPID'S ACCESS OR CANDIDATE LIST
     -     - PARTITION IS IN CHPID'S ACCESS OR CANDIDATE LIST BUT PARTITION IS EXCLUDED FROM DEVICE'S CANDIDATE LIST
     +     - PARTITION IS NOT IN CHPID'S ACCESS OR CANDIDATE LIST BUT PARTITION IS INCLUDED IN DEVICE'S CANDIDATE LIST
                                       DEVICE DETAIL REPORT                          TIME: 13:33  DATE: 2004-11-29  PAGE J-   3
    PROCESSOR: GOLDENE1
      CSS ID:    0
          PARTITION
       NUMBER    NAME
       ______    ________
         1       GECSS01X
         3       GECSS03X
         9       GECSS09X
         F       GECSS0FX


       TOTALS FOR CHPIDS, DEVICES AND CONTROL UNITS

                                        CSS      IOCDS    USER     SUPPORTED
                                       TOTAL     TOTAL    LIMIT      LIMIT
                                       _____     _____    _____    _________
       CHPIDS _______________________      3        3      N/A          256
       PHYSICAL CONTROL UNITS _______      1        1      N/A         8192
       DEVICES IN SUBCHANNEL SET 1__      32       32     1000        64512
       DEVICES IN SUBCHANNEL SET 2__      32       32      300        65535
       LOGICAL CONTROL UNITS ________      1        1      N/A         4096

    ...
```

Figure 154. Device Detail Report

Switch reports

The following switch reports are available:

- "Switch Summary Report" on page 389
- "Switch Detail Report" on page 389
- "Switch Configuration Summary Report" on page 389
- "Switch Configuration Detail Report" on page 390

Switch Summary Report

```
                              SWITCH SUMMARY REPORT                              TIME: 14:54  DATE: 2001-09-11  PAGE K-   1
SWITCH                             SERIAL                                         CU        DEVICE    INSTALLED
  ID        TYPE             ADDR   NUMBER        DESCRIPTION                     NUMBER    NUMBER    PORTS
______     _____________    ____   __________    ________________________________ ______    ______    _________
  21        2032              41                  switch address 41 fabric a                                33
  98        9033                   55-9999        First switch                      0098      0098           9
  99        9032                   55-8888       Second switch                      0099      0099          29
```

Figure 155. Switch Summary Report

`ADDR` Shows the switch address, if available.

`CU NUMBER` Shows all switch control units attached to the switch CU port of the switch.

`DEVICE NUMBER` Shows all switch devices defined for a switch.

Switch Detail Report

If the switch is connected to an XMP processor, the processor ID is qualified with the channel subsystem ID. A spanned channel path is suffixed with an asterisk (*).

```
                                  SWITCH DETAIL REPORT                          TIME: 10:53  DATE: 2001-09-11  PAGE L-   3
SWITCH ID  01   TYPE  9032-3
                                         ------------- CONNECTION -----------------
PORT     PORT NAME                       UNIT  UNIT ID           UNIT TYPE           OCCUPIED
____     ________________________________ __________________________________________  ________
 AE                                       CU   053E              3490                NO
-------------------------------------------------------------------------------------------------
 AF      CHAIN_FROM_99                    SW   99       PORT  F0  9033                NO
-------------------------------------------------------------------------------------------------
 B0      CU_400                           CU   0400              3190                NO
-------------------------------------------------------------------------------------------------
 B1      PROCA_CP18                                                                  YES
-------------------------------------------------------------------------------------------------
 B2      PROCA_CP19                                                                  YES
-------------------------------------------------------------------------------------------------
 B3                                       CU   0900              3990                NO
-------------------------------------------------------------------------------------------------
 B4                                       PR   G29.1    CHPID 32  2084-C24            NO
                                          CU   1060              SCTC
-------------------------------------------------------------------------------------------------
```

Figure 156. Switch Detail Report

`CONNECTION UNIT` Specifies the type of the unit the port is connected to.
PR = Processor, CU = Control Unit, SW = Switch

`OCCUPIED` Indicates a port connection external to the IODF.

Switch Configuration Summary Report

```
                                     SWITCH CONFIGURATION SUMMARY REPORT          TIME: 17:24  DATE: 1997-03-02  PAGE M-   1
SWITCH         SWITCH         CONFIG      DEFAULT
  ID            TYPE            ID        CONNECTION     CONFIGURATION DESCRIPTION
------     --------------    --------    ----------     --------------------------------
  98        9033              BASIC       ALLOW          night-shift configuration
  99        9032              BASIC2      ALLOW
```

Figure 157. Switch Configuration Summary Report

`DEFAULT CONNECTION` Indicates what state a potential dynamic connection may have (allow or prohibit).

Switch Configuration Detail Report

The Switch Configuration Detail Report lists all supported ports of a switch with their dynamic connection attributes.

```
                                        SWITCH CONFIGURATION DETAIL REPORT              TIME: 14:59  DATE: 2003-01-17  PAGE N-   1
    SWITCH      SWITCH       CONFIGURATION   DEFAULT      INSTALLED
      ID         TYPE              ID        CONNECTION   PORTS
    ______   ____________    _____________   __________   _________
      00     9032-5             SW00ID00       ALLOW          29
PORT  PORT NAME                 BLOCKED  DEDICATED  ALLOWED CONNECTIONS                    PROHIBITED CONNECTIONS
____  ________________________  _______  _________  _____________________________________  _____________________________________

 04   PR EVA.0    CHP 00 2084   NO                  05-0A,0C-1F                            0B
 05   PR EVA.0    CHP 01 2084   NO                  04,06-1F
 06   CU 0000            2105   NO                  04-05,07-1F
 07   PR EVA.0    CHP 08        NO         10       04-06,08-1F
 08   PR R31SMP   CHP 00 2066   NO                  04-07,09-1F
 09   PR EVA.0    CHP 09        NO         0F       04-08,0A-1F
 0A   PR EVA.0    CHP 10 2084   NO                  04-09,0B-1F
 0B   SW 01       PO  04 9032   NO                  05-0A,0C-1F                            04
 0C   PR EVA.0    CHP 02 2084   NO                  04-0B,0D-1F
 0D   CU 0003            3490   NO                  04-0C,0E-1F
 0E   CU 0005            2105   NO                  04-0D,0F-1F
 0F   SW 01       PO  05        NO         09       04-0E,10-1F
 10   SW 01       PO  06        NO         07       04-0F,11-1F
 11                             NO                  04-10,12-1F
 12                             NO                  04-11,13-1F
```

Figure 158. Switch Configuration Detail Report

Operating System reports

The following operating system reports are available:

- "Operating System Summary Report"
- "MVS Device Report"
- "MVS Device Detail Report" on page 392
- "Eligible Device Table Report" on page 392
- "NIP Console Report" on page 393
- "VM Device Report" on page 394
- "VM Device Detail Report" on page 394
- "VM Console Report" on page 395

Operating System Summary Report

```
                                    OPERATING SYSTEM SUMMARY REPORT                TIME: 13:37  DATE: 1997-03-02  PAGE O-   1
OPERATING
SYSTEM ID   TYPE        DESCRIPTION
--------    --------    --------------------------------
OPSYS01     MVS         MVS operating system
OPSYS02     VM          VM operating system
```

Figure 159. Operating System Summary Report

MVS Device Report

The MVS Device Report gives an overview of the devices defined to an MVS-type operating system in the currently accessed IODF.

The devices are grouped according to same characteristics. The report shows the starting device number and the range of a group.

```
                                        MVS DEVICE REPORT                             TIME: 13:27  DATE: 2004-11-29  PAGE P-   1
   OPERATING SYSTEM CONFIGURATION ID:  OS000001
DEV#,RANGE  TYPE-MODEL   SS  BASE  UCB-TYPE  ERP-NAME  DDT-NAME  MLT-NAME  OPT  UIM-NAME  ATI  AL  SH  SW  MX  MI
__________  ___________  __  ____  ________  ________  ________  ________  ___  ________  ___  __  __  __  __  __
0000,16     3390A         0        3010200F  IECVDERP  IGGDDTA1  IEAMLT02       CBDUS002  00            Y
0010,16     3390A         1        3010200F  IECVDERP  IGGDDTA1  IEAMLT02       CBDUS002  00            Y
0020,16     3380A         0        3010200E  IECVDERP  IGGDDT01  IEAMLT02       CBDUS002  00            Y
0020,16     3380A         1        3010200E  IECVDERP  IGGDDT01  IEAMLT02       CBDUS002  00            Y
                                        MVS DEVICE REPORT                             TIME: 13:27  DATE: 2004-11-29  PAGE P-   2
        KEY           KEY DESCRIPTION
        ---           ---------------
        DEV#,RANGE  -  DEVICE NUMBER, COUNT OF DEVICES (DECIMAL)
        TYPE-MODEL  -  DEVICE NAME
        SS          -  SUBCHANNEL SET ID
        BASE        -  BASE DEVICE NUMBER FOR MULTIPLE EXPOSURE DEVICES
        UCB-TYPE    -  UCB TYPE BYTES
        ERP-NAME    -  ERROR RECOVERY PROGRAM
        DDT-NAME    -  DEVICE DESCRIPTOR TABLE
        MLT-NAME    -  MODULE LIST TABLE
        OPT         -  OPTIONAL MLT INDICATOR
        UIM-NAME    -  UNIT INFORMATION MODULE SUPPORTING THE DEVICE
        ATI         -  ATTENTION TABLE INDEX (UCBATI)
        AL          -  ALTERNATE CONTROL UNIT (UCBALTCU)
        SH          -  SHARED UP OPTION (UCBSHRUP)
        SW          -  DEVICE CAN BE SWAPPED BY DDR (UCBSWAPF)
        MX          -  DEVICE HAS MULTIPLE EXPOSURES (UCBMTPXP)
        MI          -  MIH PROCESSING SHOULD BE BYPASSED (UCBMIHPB)
        O           -  MLT IS OPTIONAL
        Y           -  DEVICE SUPPORTS THIS FEATURE
        BLANK       -  DEVICE DOES NOT SUPPORT THIS FEATURE

                TOTAL NUMBER OF DEVICES BY CLASS
                --------------------------------
        CLASS NAME            CLASS TYPE    DEVICE COUNT
        ----------            ----------    ------------
        TAPE                    80                0
        COMMUNICATION DEVICES   40                0
        C-T-C                   41                0
        DASD                    20               64
        GRAPHICS                10                0
        UNIT RECORD             08                0
        CHARACTER READERS       04                0
        TOTAL NUMBER OF I/O DEVICES DEFINED BY THIS I/O CONFIGURATION       64
```

Figure 160. MVS Device Report

MVS Device Detail Report

```
                                        MVS DEVICE DETAIL REPORT                    TIME: 15:11  DATE: 2005-01-26  PAGE Q-   1
OPERATING SYSTEM CONFIGURATION ID:  OS000001
--- DEVICE ---      DEVICE
 NUMBER,RANGE    TYPE - MODEL    SS    PARAMETER                                    FEATURE
______________   _____________   __    ___________________________________________  ______________________________________
   0000,16        3390A           0    WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   0010,16        3390A           1    WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   0020,16        3380A           1    WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   0020,16        3380A           0    WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   0040,8         3380A           1    WLMPAV=NO
-----------------------------------------------------------------------------------------------------------------------------
   0048,8         3380A           1    WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   0100,8         3390B                OFFLINE=NO,DYNAMIC=YES,LOCANY=YES,           SHARED
                                       WLMPAV=YES
-----------------------------------------------------------------------------------------------------------------------------
   FFFE           3179                 OFFLINE=NO,DYNAMIC=YES,LOCANY=YES            DOCHAR
-----------------------------------------------------------------------------------------------------------------------------
   FFFF           3179                 OFFLINE=YES,DYNAMIC=YES,LOCANY=YES           DOCHAR
-----------------------------------------------------------------------------------------------------------------------------
```

Figure 161. MVS Device Detail Report

PARAMETER
: Shows the parameter values specified for the devices. If you do not specify ″Yes″ or ″No″ for devices that support the dynamic capability, the DYNAMIC parameter will not be displayed.

FEATURE
: Shows the features given to these devices.

Eligible Device Table Report

```
                                               E D T   REPORT                          TIME: 14:40  DATE: 2004-10-21  PAGE R-   1
   OPERATING SYSTEM CONFIGURATION ID:  OPSYS01
   EDT IDENTIFIER: A1   DESCRIPTION: special
                                             AFFINITY  ALLOCATION   ASSOCIATED
 NAME        NAME TYPE  VIO  TOKEN  PREF   INDEX    DEVICE TYPE  GENERICS                DEVICE NUMBER LIST
 ---------   ---------  ---  -----  ----  --------  -----------  ----------  ------------------------------------------------------
 3390        GENERIC                 280    FFFF     3010200F                01D1-01D8
 ------------------------------------------------------------------------------------------------------------------------------------
 3480        GENERIC                1100    0008     78008080                00C1
 ------------------------------------------------------------------------------------------------------------------------------------
 3277-2      GENERIC                3800    FFFF     12001009                0001
 ------------------------------------------------------------------------------------------------------------------------------------
 SWCH        GENERIC                0500    FFFF     0000083A                0098
 ------------------------------------------------------------------------------------------------------------------------------------
 ES001       ESOTERIC               3800    FFFF     12001009    3277-2      0001
 ------------------------------------------------------------------------------------------------------------------------------------
 ES002       ESOTERIC                280    FFFF     3010200F    3390        01D1-01D8
                                    1100    0008     78008080    3480        00C1
 ------------------------------------------------------------------------------------------------------------------------------------
 3400-9      G/GENERIC              1100    0008     78008080    3480        00C1
 ------------------------------------------------------------------------------------------------------------------------------------
 SYSALLDA    G/ESOTERIC              280    FFFF     3010200F    3390        01D1-01D8
 ------------------------------------------------------------------------------------------------------------------------------------
 SYS3480R    G/ESOTERIC             1100    0008     78008080    3480        00C1
```

Figure 162. Eligible Device Table Report

NAME TYPE	describes the type of the device groups contained in the EDT: **GENERIC** generic device type group; **ESOTERIC** esoteric device group; **G/GENERIC** system generated generic device type group; **G/ESOTERIC** system generated esoteric device group
VIO	Eligible for virtual I/O, designates temporary data sets that exist in paging storage only.
PREF	Preference value, indicates the order the system should follow when attempting allocation.
AFFINITY INDEX	This index is used by the system allocation programs to determine which devices have affinity to each other. Devices have affinity if either of the following statements are true: • The devices have the same affinity index. • The affinity index for one of the devices is a subset of the other devices' affinity index. An affinity index is a subset of another if both of the following statements are true: • Neither index has a value of X'FFFF'. • One or more bits in one index are set to a binary ″one″ and one or more corresponding bits in the other index are set to a binary ″one″.
ALLOCATION DEVICE TYPE	UCB device table for allocation entry.
ASSOCIATED GENERICS	Indicates the relation of a device type to generics.
DEVICE NUMBER LISTS	Lists the devices that are included in the group. The devices are grouped according to subsequent device numbers. The report shows the range of the device group.

NIP Console Report

```
                                     N I P C O N   REPORT                           TIME: 13:37  DATE: 1997-03-02  PAGE S-   1
OPERATING SYSTEM CONFIGURATION ID:  OPSYS01
                                  NIP CONSOLE DEVICES
                                  -------------------
                        DEVICE #       TYPE-MODEL
                        --------      -------------
                        0001          3278-3
```

Figure 163. NIP Console Report

VM Device Report

The VM Device Report gives an overview of the devices defined to a VM operating system in the currently accessed IODF.

The devices are grouped according to same characteristics. The report shows the starting device number and the range of a group.

```
                                        VM  DEVICE REPORT                            TIME: 13:48  DATE: 2004-11-29  PAGE P-   1
   OPERATING SYSTEM CONFIGURATION ID:  VMXXL001
DEV#,RANGE   TYPE-MODEL   SS       BASE     CLASS                       VIRT   UIM-NAME   MX   DO   US
__________   __________   __       ____     ________________            ____   _________  __   __   __
0002         3279-2                                                      Y
01D1,4       3390
0020,16      3380A         0                DASD                               CBDUS258

                                        VM  DEVICE REPORT                            TIME: 13:48  DATE: 2004-11-29  PAGE P-   2
        KEY            KEY DESCRIPTION
        ---            ---------------
        DEV#,RANGE  -  DEVICE NUMBER, COUNT OF DEVICES (DECIMAL)
        TYPE-MODEL  -  DEVICE TYPE AND MODEL
        SS          -  SUBCHANNEL SET ID
        BASE        -  BASE DEVICE NUMBER FOR MULTIPLE EXPOSURE DEVICES
        CLASS       -  VM DEVICE CLASS
        VIRT        -  DEVICE IS NOT DEFINED TO CHANNEL SUBSYSTEM
        UIM-NAME    -  UNIT INFORMATION MODULE SUPPORTING THE DEVICE
        MX          -  DEVICE HAS MULTIPLE EXPOSURES
        DO          -  DEVICE IS SUPPORTED DEDICATED-ONLY
        US          -  DEVICE IS UNSUPPORTED
        Y           -  DEVICE SUPPORTS THIS FEATURE
        BLANK       -  DEVICE DOES NOT SUPPORT THIS FEATURE

                TOTAL NUMBER OF DEVICES BY CLASS
                --------------------------------
        CLASS NAME                           DEVICE COUNT
        ----------                           ------------
        TERMINAL                                     0
        GRAPHIC                                      0
        REMOTE GRAPHIC                               0
        SPOOL                                        0
        TAPE                                         0
        DASD                                        16
        SPECIAL                                      0
        TOTAL NUMBER OF I/O DEVICES DEFINED BY THIS I/O CONFIGURATION       16
```

Figure 164. VM Device Report

VM Device Detail Report

```
                                           VM  DEVICE DETAIL REPORT                     TIME: 15:06  DATE: 2004-10-21  PAGE Q-   1
 OPERATING SYSTEM CONFIGURATION ID:  OPSYS02
 --- DEVICE ---      DEVICE
  NUMBER,RANGE    TYPE - MODEL    SS    PARAMETER                                  FEATURE
 ______________   _____________   __    ___________________________________________  ______________________________________
    0000,16       3390A            0    WLMPAV=YES
 ----------------------------------------------------------------------------------------------------------------------------
    0100          3278-3                OFFLINE=NO,OFFLINE=NO
    -------------------------------------------------------------------------------------------------------------------------
    0200          3279-2                OFFLINE=NO,OFFLINE=NO
    -------------------------------------------------------------------------------------------------------------------------
    02D1,4        3390                  OFFLINE=NO,OFFLINE=NO,OFFLINE=NO
    -------------------------------------------------------------------------------------------------------------------------
```

Figure 165. VM Device Detail Report

`PARAMETER` Shows the parameter values specified for the devices.

`FEATURE` Shows the features given to these devices.

VM Console Report

```
                                     VM CONSOLE REPORT                              TIME: 13:45  DATE: 1997-03-02  PAGE S-   1
OPERATING SYSTEM CONFIGURATION ID:  OPSYS02
                                  VM CONSOLE DEVICES
                                  -------------------
                        DEVICE #       TYPE-MODEL
                        --------      -------------
                        0002          3279-2         PRIMARY SYSTEM CONSOLE
```

Figure 166. VM Console Report

CTC Connection Report

```
                                           CTC CONNECTION REPORT                     TIME: 14:28  DATE: 2003-01-14  PAGE T-   1
       ------------------------- SIDE 1 ----------------------- - COMMON -- ------------------------- SIDE 2 -----------------------
       PROC.CSSID PART.    DEVICE --CHPID--- ENTRY -----CU----- --DEVICE--- PROC.CSSID PART.    DEVICE ---CHPID-- ENTRY -----CU-----
LINE              NAME     NUM OS ID MOD TYP SW PO ID   LA   #  RNG TYPE UA            NAME     NUM OS ID MOD TYP SW PO ID   LA   #
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
     1 G33XMP.0   TCSS0LP2 8004 Y 20 SHR FC  FF 06 8004 0007 22   2 FCTC 20 G33XMP.2   TCSS2LP2 8000 Y 21 SHR FC  FF 07 8000 0006 2
     2 G33XMP.0   TCSS0LP2 8006 Y 20 SHR FC  FF 06 8006 0007 25   2 FCTC 20 G33XMP.2   TCSS2LP5 8000 Y 21 SHR FC  FF 07 8000 0006 2
     3 G33XMP.0   TCSS0LP2 9000 Y 20 SHR FC  FF 06 9000 0005 4    2 FCTC 00 R31SMP     RAPOS4   9004 Y 10 SHR FC  FF 05 9004 0006 2
     4 G33XMP.0   TCSS0LP2 9002 Y 20 SHR FC  FF 06 9002 0005 9    2 FCTC 00 R31SMP     RAPMIX9  9004 Y 10 SHR FC  FF 05 9004 0006 2
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
     5 G33XMP.0   TCSS0LP3 8004 Y 20 SHR FC  FF 06 8004 0007 22   2 FCTC 20 G33XMP.2   TCSS2LP2 8002 Y 21 SHR FC  FF 07 8002 0006 3
     6 G33XMP.0   TCSS0LP3 8006 Y 20 SHR FC  FF 06 8006 0007 25   2 FCTC 20 G33XMP.2   TCSS2LP5 8002 Y 21 SHR FC  FF 07 8002 0006 3
     7 G33XMP.0   TCSS0LP3 9000 Y 20 SHR FC  FF 06 9000 0005 4    2 FCTC 00 R31SMP     RAPOS4   9006 Y 10 SHR FC  FF 05 9006 0006 3
     8 G33XMP.0   TCSS0LP3 9002 Y 20 SHR FC  FF 06 9002 0005 9    2 FCTC 00 R31SMP     RAPMIX9  9006 Y 10 SHR FC  FF 05 9006 0006 3
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
     9 G33XMP.2   TCSS2LP2 8000 Y 21 SHR FC  FF 07 8000 0006 2    2 FCTC 20 G33XMP.0   TCSS0LP2 8004 Y 20 SHR FC  FF 06 8004 0007 22
    10 G33XMP.2   TCSS2LP2 8002 Y 21 SHR FC  FF 07 8002 0006 3    2 FCTC 20 G33XMP.0   TCSS0LP3 8004 Y 20 SHR FC  FF 06 8004 0007 22
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
    11 G33XMP.2   TCSS2LP5 8000 Y 21 SHR FC  FF 07 8000 0006 2    2 FCTC 20 G33XMP.0   TCSS0LP2 8006 Y 20 SHR FC  FF 06 8006 0007 25
    12 G33XMP.2   TCSS2LP5 8002 Y 21 SHR FC  FF 07 8002 0006 3    2 FCTC 20 G33XMP.0   TCSS0LP3 8006 Y 20 SHR FC  FF 06 8006 0007 25
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
    13 R31SMP     RAPMIX9  9004 Y 10 SHR FC  FF 05 9004 0006 2    2 FCTC 00 G33XMP.0   TCSS0LP2 9002 Y 20 SHR FC  FF 06 9002 0005 9
    14 R31SMP     RAPMIX9  9006 Y 10 SHR FC  FF 05 9006 0006 3    2 FCTC 00 G33XMP.0   TCSS0LP3 9002 Y 20 SHR FC  FF 06 9002 0005 9
------ ---------- -------- ------ -- --- --- -- -- ---- ---- -- --- ---- -- ---------- -------- ------ -- --- --- -- -- ---- ---- --
    15 R31SMP     RAPOS4   9004 Y 10 SHR FC  FF 05 9004 0006 2    2 FCTC 00 G33XMP.0   TCSS0LP2 9000 Y 20 SHR FC  FF 06 9000 0005 4
    16 R31SMP     RAPOS4   9006 Y 10 SHR FC  FF 05 9006 0006 3    2 FCTC 00 G33XMP.0   TCSS0LP3 9000 Y 20 SHR FC  FF 06 9000 0005 4
                                           CTC CONNECTION REPORT                     TIME: 14:28  DATE: 2003-01-14  PAGE T-   2
        KEY                 KEY DESCRIPTION
        ---                 ---------------
        LINE NR         -  LINE NUMBER USED TO REFER TO CTC MESSAGES - A MESSAGE IS INDICATED BY AN ASTERIX (*)
        SIDE 1 / SIDE 2
        PROC.CSSID      -  PROCESSOR ID RESPECTIVELY CHANNEL SUBSYSTEM ID
        PARTITION NAME  -  PARTITION NAME
        DEVICE NUM      -  DEVICE NUMBER
        DEVICE OS       -  INDICATION, IF FIRST DEVICE OF RANGE IS DEFINED TO AN OPERATING SYSTEM
        CHPID ID        -  CHANNEL PATH ID IN CHANNEL SUBSYSTEM
        CHPID MOD       -  CHANNEL PATH MODE
        CHPID TYPE      -  CHANNEL PATH TYPE
        ENTRY SW        -  ENTRY SWITCH OF THE CHANNEL PATH
        ENTRY PO        -  ENTRY PORT OF THE CHANNEL PATH
        CU ID           -  CONTROL UNIT NUMBER
        CU LA           -  LINK ADDRESS OF CONTROL UNIT RELATED TO THE CHANNEL PATH
        CU #            -  LOGICAL ADDRESS (CUADD) RELATED TO THE PROCESSOR
        COMMON
        DEVICE RNG      -  DEVICE RANGE FOR DEVICES ON SIDE 1 AND SIDE 2
        DEVICE TYPE     -  DEVICE TYPE COMMON TO DEVICES ON SIDE 1 AND SIDE 2 (IF MESSAGE G751 THEN DEVICE TYPE OF SIDE 1)
        DEVICE UA       -  UNIT ADDRESS OF DEVICES RELATED TO THE PROCESSOR (COMMON TO SIDE 1 AND SIDE 2)
```

Figure 167. CTC Connection Report

Diagnostic messages

The following example shows you messages that might be returned with the report. The diagnostic messages are sorted by severity. For each connection, HCD displays only one messages, even if the connection includes several errors. You first have to correct the first error before the next message is displayed. HCD displays the messages according to the priority as described in “Displaying diagnostic messages” on page 166.

```
                                       CTC CONNECTION REPORT                    TIME: 17:42  DATE: 1997-08-03  PAGE U-   3

 LINE  SEV MSGID     MESSAGE TEXT

    1   E  CBDG750I  Logical address (CUADD) is specified for CU 1010, but CHPID 20 of processor PROC001A is
                     not defined as shared.

    3   E  CBDG750I  Logical address (CUADD) is specified for CU 1010, but CHPID 20 of processor PROC001A is
                     not defined as shared.


    4   E  CBDG752I  Channel path type error. CHPID 20 of processor PROC001A is connected to a CHPID 11 of
                     processor PROC002 with the same type.

    8   E  CBDG752I  Channel path type error. CHPID 11 of processor PROC002 is connected to a CHPID 20 of processor
                     PROC001A with the same type.

   11   E  CBDG751I  Device type of device 0805 connected to processor PROC002, CHPID 22 does not match with device
                     type of device 0405 on the other side.

   13   E  CBDG750I  Logical address (CUADD) is specified for CU 0108, but CHPID 21 of processor PROC003 is
                     not defined as shared.

   18   E  CBDG750I  Logical address (CUADD) is specified for CU 0108, but CHPID 21 of processor PROC003 is
                     not defined as shared.

   21   E  CBDG751I  Device type of device 0405 connected to processor PROC003, CHPID 11 does not match with device
                     type of device 0805 on the other side.

    6   W  CBDG753I  Wrap around connection detected for processor PROC002 (partition - none -) via CHPID 11 and
                     CHPID 13.

    7   W  CBDG753I  Wrap around connection detected for processor PROC002 (partition - none -) via CHPID 13 and
                     CHPID 11.


   15   W  CBDG754I  HCD cannot determine connection. No control units and devices match to processor PROC003,
                     partition PART1, CU 1012 and device 1012.

   19   W  CBDG754I  HCD cannot determine connection. No control units and devices match to processor PROC003,
                     partition PART2, CU 1012 and device 1012.

    5   I  CBDG757I  HCD cannot determine connection. CHPID 10 of processor PROC002 has no dynamic switch defined.

   14   I  CBDG756I  HCD cannot determine connection. CHPID 24 of processor PROC002 is connected via chained
                     switches.

Total Messages  Terminating     Error     Warning  Informational
         14                       8          4          2
```

Figure 168. Sample of Diagnostic Messages coming with the CTC connection report

I/O Path Report

The I/O Path report shows the physically sensed I/O paths (with physical types) of the active system compared with the logical definitions of the paths (also the object types) of a specific IODF.

- If the sensed I/O path reports a switch, the verification assumes that this is a dynamic switch. It checks whether the defined I/O path in the IODF contains a dynamic switch, and whether the link address corresponds to the output port of the sensed data. If the IODF contains defined switch data, it is verified whether the defined data correspond to the sensed data. If dedicated switches are defined, the I/O Path report always shows differences in the `D` column.
- When you compare between the sensed and defined data, not all fields are used to determine if there is a difference between the two sides (either an `*`, or `@` is shown in the column `D` of the report). The data that is used are the CHPID, the

control unit number, the device number, and the switch information of the defined dynamic switches and the sensed dynamic switches.

The I/O path verification checks if the actual system contains the same paths as in the defined I/O configuration. Differences are indicated in the I/O Path report in column D with the following characters:

1 The * indicates that differences are found between the sensed and the defined I/O path. Either
- only sensed data is available, or
- only defined data in the IODF is available, or
- the sensed and defined switch data differ.

2 The C indicates that the defined and the sensed I/O path are the same, but the defined I/O path is defined to the CSS only.

3 An @ is a combination of * and C, and indicates that differences are found between the sensed and the defined I/O path, and that the I/O path is defined to the CSS only.

4 The O indicates that the defined I/O path in the IODF is defined to the operating system only.

```
                                          I/O PATH REPORT                       TIME: 14:06    DATE: 2005-01-13  PAGE V-   1
 SYSTEM:          SYSPLEX:                      PROCESSOR: G29      CSS ID: 0   PARTITION: TRX1      OS CONFIG: XXY
<--------------------- Sensed data ----------------------> <-------------------------- IODF data ------------------------------> D
--CHP--- DYN.SWITCH CONTROL UNIT- ------DEVICE------- PATH  -CHP-- -SWITCH- CHAINED- DYNSW   --CONTROL UNIT-- ------DEVICE-------
ID TYPE  PI SW PO   NUMB TYPE     NUMBER   TYPE     O STAT  ID TYP PI SW PO PI SW PO DS LA   NUMB TYPE     L  NUMBER   TYPE     S
-- ----- -- -- --   ---- -------- -------- -------- - ----  -- --- -- -- -- -- -- -- -- ----  ---- -------- -- -------- -------- - -
00 OSA              0230 9676     0230,2                    00 OSA                           0230 OSA          0230,2   OSA
00 OSA              0230 9676     023F     9676-2           00 OSA                           0230 OSA          023F     OSAD
                                                            04 CFS                           FFF7 CFS          FF00,2   CFS        @ 3
04 CFS              FFF7 9672-E03 FFE2,2   CFS                                                                                     *
05 CFS              FFF8 9672-E03 FFE6,2   CFS              05 CFS                           FFF8 CFS         FFE6,2   CFS         C 2
                                                             09 BL                            0910 3880-3      0910,8   3380       *
                                                             09 BL                            0920 3880-3      0920,8   3380       * 1
10 CTC_S EE AC C3   4010 9672-R72 4010,4   9672-CTC         10 CTC EE AC C3          AC C3   4010 SCTC      1 4010,4   SCTC
10 CTC_S EE AC C3   4020 9672-R72 4020,4   9672-CTC         10 CTC EE AC C3          AC C3   4020 SCTC      2 4020,4   SCTC
10 CTC_S EE AC CB   4030 9672-R72 4030,4   9672-CTC         10 CTC EE AC CB          AC CB   4030 SCTC      1 4030,4   SCTC
10 CTC_S EE AC CB   4040 9672-R72 4040,4   9672-CTC                                                                            * 1
11 CNC_S D0 AE FE   001E 9032-3   001E     9032-3           11 CNC D0 AE FE          AE FE   001E 9032-3      001E     9032-3
11 CNC_S D0 AE D8   2000 9394-3   2000,14  9395-B13         11 CNC D0 AE D8          AE D8   2000 3990-6      2000,14  3390
11 CNC_S D0 AE D8   2000 9394-3   200E,18                   11 CNC D0 AE D8          AE D8   2000 3990-6      200E,18  3390
12 CNC_?                                             OFFL   12 CNC
13 CNC_?                                             OFFL   13 CNC
14 CNC_S ED AA D8   0B30 3490-A20 0B30,16  3490-B40         14 CNC ED AA D8          AA D8   0B30 3490        0B30,16  3490
14 CNC_S ED AA EA   0B50 3490-C2A 0B50,2   3490-C2A         14 CNC ED AA EA          AA EA   0B50 3490        0B50,2   3490
                                                            15 CVC                           0BA0 3480        0BA0,16  3480        *
15 CNC_S 10 01 FA   2540 2105-E20 2540,37  2105     Y       15 CNC 10 01             01 FA   2540 2105      5 2540,37  3390B       C
                                                            15 CNC 10 01             01 FA   2540 2105      5 2565,27  3390A     0 @
15 CNC_S 10 01 FB   3A40 2105-F20 3A40,32  2105     Y       15 CNC 10 01             01 FB   3A40 2105      5 3A40,32  3390B       C
15 CNC_S 10 01 FB   3A40 2105-F20 3A60,4            Y       15 CNC 10 01             01 FB   3A40 2105      5 3A60,4   3390B       C
                                                            15 CNC 10 01             01 FB   3A40 2105      5 3A64,28  3390A     0 @
15 CNC_S 10 01 DA   3E80 2105-E20 3E80,13  2105     Y       15 CNC 10 01             01 DA   3E80 2105      A 3E80,13  3390B       C
                                                            15 CNC 10 01             01 DA   3E80 2105      A 3EA0,32  3390A     1 @
18 CNC_S E5 AA FE   001A 9032     001A     9032             18 CNC E5 AA FE          AA FE   001A 9032        001A     9032
18 CNC_S E5 AA E4   0CC0 3990-6   0CC0,8   3390-A28         18 CNC E5 AA E4          AA E4   0CC0 3990-6      0CC0,8   3390
18 CNC_S E5 AA E4   0CC0 3990-6   0CC8,24  3390-B2C         18 CNC E5 AA E4          AA E4   0CC0 3990-6      0CC8,24  3390
19 CNC_S F5 AA FE   001A 9032     001A     9032             19 CNC F5 AA FE          AA FE   001A 9032        001A     9032
1C CNC_S            0F00          0F00,2                    1C CNC                   77 96   0F00 3174      1 0F00,2   3791L       * 1
1C CNC_S            0F02          0F02,2                    1C CNC                   77 95   0F02 3174      2 0F02,2   3791L       *
20 OSA              0210 9676     0214,11                   20 OSA                           0210 OSA         0214,11  OSA
20 OSA              0210 9676     021F     9676-2           20 OSA                           0210 OSA         021F     OSAD
2C CNC_S ED AC D8   5100          5100,4                    2C CNC ED AC D8          AC D8   5100 SCTC      2 5100,4   SCTC
2F CNC_S A0 01 81   200A 3990-6   0219,2   3390-B3C                                                                            *
2F CNC_S A0 01 81   200A 3990-6   021B              Y UNKN                                                                     *
40 CNC_S 8F 70 E5   9101 3990-L03 9100,4   3380-AK4         40 CNC B6 6F 8F 8F 70 E5 70 E5   9101 3990        9100,4   3380
                                                                                             01B0 3172        01B0,16  3172        O 4
                                                                                             0640 3990        0640,8   3380        O
                                                                                             0740 SCTC        0740,16  SCTC        O
```

Figure 169. Example and Legend of an I/O Path Report (Part 1 of 2)

```
KEY                 KEY DESCRIPTION
---                 ---------------
SENSED DATA      -  I/O CONFIGURATION DATA RETRIEVED BY SENSING I/O
CHP ID           -  SENSED CHANNEL PATH ID
CHP TYPE         -  SENSED CHANNEL PATH TYPE
DYN.SWITCH PI    -  SENSED DYN. SWITCH INPUT PORT (CHANNEL PATH SIDE)
DYN.SWITCH SW    -  SENSED DYNAMIC SWITCH ID
DYN.SWITCH PO    -  SENSED DYN. SWITCH OUTPUT PORT (CONTROL UNIT SIDE)
CONTROL UNIT NUMB-  SENSED CONTROL UNIT NUMBER
CONTROL UNIT TYPE-  SENSED CONTROL UNIT TYPE
DEVICE NUMBER    -  SENSED DEVICE NUMBER AND RANGE
DEVICE TYPE      -  SENSED DEVICE TYPE
DEVICE O         -  SENSED DEVICE(S) OFFLINE INDICATOR
                    Y - OFFLINE
                    BLANK - NOT OFFLINE
PATH STAT        -  IF BLANK, SENSED I/O PATH IS ONLINE
                    IF OFFL, SENSED I/O PATH IS OFFLINE
                    IF UNKN, STATUS OF SENSED I/O PATH IS UNKNOWN
IODF DATA        -  I/O CONFIGURATION DEFINITIONS IN IODF
CHP ID           -  DEFINED CHANNEL PATH ID
CHP TYPE         -  DEFINED CHANNEL PATH TYPE
SWITCH PI        -  DEFINED SWITCH INPUT PORT (CHANNEL PATH SIDE)
SWITCH SW        -  DEFINED SWITCH ID
SWITCH PO        -  DEFINED SWITCH OUTPUT PORT (CONTROL UNIT SIDE)
CHAINED PI       -  DEFINED CHAINED SWITCH INPUT PORT
CHAINED SW       -  DEFINED CHAINED SWITCH ID
CHAINED PO       -  DEFINED CHAINED SWITCH OUTPUT PORT
DYNSW SW         -  DEFINED DYNAMIC SWITCH FOR CHANNEL PATH
DYNSW LA         -  DEFINED DYNAMIC LINK ADDRESS FOR CONTROL UNIT
CONTROL UNIT NUMB-  DEFINED CONTROL UNIT NUMBER
CONTROL UNIT TYPE-  DEFINED CONTROL UNIT TYPE
CONTROL UNIT L   -  DEFINED CONTROL UNIT LOGICAL ADDRESS
DEVICE NUMBER    -  DEFINED DEVICE NUMBER AND RANGE
DEVICE TYPE      -  DEFINED DEVICE TYPE
DEVICE S         -  DEFINED DEVICE SUBCHANNEL SET ID
D                -  IF C, ONLY DEFINED TO CHANNEL SUBSYSTEM
                    IF O, ONLY DEFINED TO OS CONFIGURATION
                    IF *, DIFFERENCES WERE FOUND BETWEEN THE 2 SIDES
                    IF @, INDICATES C AND * FROM ABOVE
```

Figure 169. Example and Legend of an I/O Path Report (Part 2 of 2)

`DYN.SWITCH`
: Contains either the switch information for the dynamic switch in the path or the dedicated switch if there is no dynamic switch.

`PATH STAT`
: Represents the status of the I/O path between the CHPID and the devices that it is connected to.

  OFFL Represents the situations where there is no I/O path to be found or when the I/O path is offline.

  UNKN Represents the situations where the I/O path is currently in a pending state or when the MVS-type environment is running as a guest on a VM system and the path status can not be obtained from the system.

Supported Hardware Report

The Supported Hardware Report shows the actual status of the hardware supported in your installation. It shows the following supported hardware:

- Processors
- Control units
- Devices including:
  - Device characteristics
  - Control unit attachments
- MVS devices including:
  - Device capabilities
  - Parameters (with selection values) / features
- VM devices including
  - device capabilities
  - parameters/features

The following figure shows you an example of a supported hardware report. The example may differ from the report you get on your system, because the data depend on the installed processor support modules and UIMs.

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TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
2003-1C5	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-102	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-102	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-103	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-103	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-104	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-104	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-105	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-105	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-106	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-106	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-107	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-115	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-115	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-116	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-116	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-124	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-125	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-125	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-126	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-126	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-135	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-135	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-136	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-136	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-146	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-146	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-156	167	H960703	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-156	177	H970513	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-2C5	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-202	177	H980430	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-203	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-204	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-205	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-206	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-207	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-215	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-216	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-224	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-225	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-227	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-237	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-246	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-247	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2003-257	177	H971001	IZP	2003,1	BL,BY,CNC,CTC,CVC,CBY,OSA,ISD	N	N	N	Y	N	128	6144	3072	24576	10		
2064-1C1	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C1	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C2	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C2	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C3	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C3	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C4	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C4	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C5	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP,	Y	N	Y	Y	N	256	8192	4096	64512	15		

Figure 170. Supported Hardware Report (Part 1 of 29)

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TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
					ICP,IQD,FCP												
2064-1C5	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C6	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C6	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C7	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C7	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C8	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C8	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-1C9	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-1C9	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-100	201	H000931	IYP	2064,2	CFR,CFS,CBR,CBS,CFP,CBP,ICP	N	N	Y	Y	N	64	8192	4096	64512	15		
2064-101	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-101	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-102	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-102	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-103	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-103	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-104	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-104	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-105	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-105	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-106	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-106	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-107	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-107	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		

Figure 170. Supported Hardware Report (Part 2 of 29)

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TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
2064-108	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-108	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-109	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-109	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-110	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-110	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-111	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-111	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-112	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-112	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-113	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-113	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-114	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-114	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-115	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-115	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-116	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-116	202	H010931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C1	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C1	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C2	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C2	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		

Figure 170. Supported Hardware Report (Part 3 of 29)

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TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
2064-2C3	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C3	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C4	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C4	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C5	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C5	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C6	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C6	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C7	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C7	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C8	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C8	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-2C9	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-2C9	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-210	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-210	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-211	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-211	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-212	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-212	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-213	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-213	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-214	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		

Figure 170. Supported Hardware Report (Part 4 of 29)

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TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
2064-214	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-215	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-215	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2064-216	200	H000931	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2064-216	202	H020415	IYP	2064,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,OSD,OSE,CFP,CBP, ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0A1	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0A1	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0A2	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0A2	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0B1	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0B1	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0CF	207	H020331	IYP	2066,2	CFR,CFS,CFP,CBP,ICP	N	N	Y	Y	N	64	8192	4096	64512	15		
2066-0C1	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0C1	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0E1	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0E1	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0LF	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0LF	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-0X2	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-0X2	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-001	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-001	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-002	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-002	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-003	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-003	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2066-004	206	H020331	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	N	Y	Y	N	256	8192	4096	64512	15		
2066-004	208	H020731	IYP	2066,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, OSD,OSE,CFP,CBP,ICP,IQD,FCP	Y	Y	Y	Y	N	256	8192	4096	64512	15		
2084-A08	210	H030530	ICP	2084,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD, FCP	Y	Y	Y	Y	N	512	8192	4096	64512	30	2	
2084-A08	211	H040331	ICP	2084,1	CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV, CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD, FCP,OSC	Y	Y	Y	Y	Y	1024	8192	4096	64512	30	4	

Figure 170. Supported Hardware Report (Part 5 of 29)

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                                                SUPPORTED HARDWARE - PROCESSORS              TIME: 12:45  DATE: 2008-02-15  PAGE X-   6
TYPE-MODEL MOD SUPLEVID IOCP SYSTEM   SUPPORTED CHPID TYPES              DCM CAS WI RI DP CHPID CU   LCU  SUBCH LPAR CSS SCHS
__________ ___ ________ ____ ________ __________________________________ ___ ___ __ __ __ _____ ____ ____ _____ ____ ___ ____
2084-B16   210 H030530  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  N   512  8192 4096 64512  30   2
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP
2084-B16   211 H040331  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  Y  1024  8192 4096 64512  30   4
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP,OSC
2084-C24   210 H030530  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  N   512  8192 4096 64512  30   2
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP
2084-C24   211 H040331  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  Y  1024  8192 4096 64512  30   4
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP,OSC
2084-D32   210 H030530  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  N   512  8192 4096 64512  30   2
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP
2084-D32   211 H040331  ICP  2084,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  Y  1024  8192 4096 64512  30   4
                                      CBR,CBS,OSD,OSE,CFP,CBP,ICP,IQD,
                                      FCP,OSC
2086-A04   212 H040331  ICP  2086,1   CNC,CTC,CVC,CFR,CFS,CBY,FC,FCV,     Y   Y  Y  Y  Y   512  8192 4096 64512  30   2
                                      OSD,OSE,CFP,CBP,ICP,IQD,FCP,OSC
2094-S08   213 H050331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2094-S08   216 H070331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2094-S18   213 H050331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2094-S18   216 H070331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2094-S28   213 H050331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2094-S28   216 H070331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2094-S38   213 H050331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2094-S38   216 H070331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2094-S54   213 H050331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2094-S54   216 H070331  ICP  2094,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2096-R07   214 H060930  ICP  2096,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y   512  8192 4096 65280  15   2   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2096-R07   218 H070331  ICP  2096,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y   512  8192 4096 65280  15   2   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2096-S07   215 H060930  ICP  2096,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y   512  8192 4096 65280  30   2   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN
2096-S07   219 H070331  ICP  2096,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y   512  8192 4096 65280  30   2   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E12   217 H080130  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E12   241 H080131  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E26   217 H080130  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E26   241 H080131  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E40   217 H080130  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E40   241 H080131  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E56   217 H080130  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E56   241 H080131  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
2097-E64   217 H080130  ICP  2097,1   CNC,CTC,CVC,CBY,FC,FCV,OSD,OSE,     Y   Y  Y  Y  Y  1024  8192 4096 65280  60   4   2
                                      CFP,CBP,ICP,IQD,FCP,OSC,OSN,CIB
3000-A10   179 H971001  IZP  3000,1   BL,BY,CNC,CTC,CVC,CBY,OSA,ISD       N   N  N  Y  N    32  6144 3072 24576  10
3000-A20   179 H971001  IZP  3000,1   BL,BY,CNC,CTC,CVC,CBY,OSA,ISD       N   N  N  Y  N    32  6144 3072 24576  10
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Figure 170. Supported Hardware Report (Part 6 of 29)

SUPPORTED HARDWARE - PROCESSORS TIME: 12:45 DATE: 2008-02-15 PAGE X- 7

TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
7060-H30	189	H990930	IZP	7060,1	BL,BY,CNC,CTC,CVC,CBY,DSD,ICR,ICS, EIO	N	N	N	Y	N	256	8192	4096	36864	15		
7060-H50	189	H990930	IZP	7060,1	BL,BY,CNC,CTC,CVC,CBY,DSD,ICR,ICS, EIO	N	N	N	Y	N	256	8192	4096	36864	15		
7060-H55	187	H010131	IZP	7060,2	BL,BY,CNC,CTC,CVC,CBY,OSA,FC,FCV, ICR,ICS,OSD,OSE	N	N	N	Y	N	256	8192	4096	36864	15		
7060-H70	189	H990930	IZP	7060,1	BL,BY,CNC,CTC,CVC,CBY,DSD,ICR,ICS, EIO	N	N	N	Y	N	256	8192	4096	36864	15		
7060-H75	187	H010131	IZP	7060,2	BL,BY,CNC,CTC,CVC,CBY,OSA,FC,FCV, ICR,ICS,OSD,OSE	N	N	N	Y	N	256	8192	4096	36864	15		
7060-P30	189	H990930	IZP	7060,1	BL,BY,CNC,CTC,CVC,CBY,DSD,ICR,ICS, EIO	N	N	N	Y	N	256	8192	4096	36864	15		
9672-E01	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E02	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E03	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E04	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E05	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E06	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E07	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-E08	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-P01	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-P02	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-P03	160	H940318	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-RA2	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-RA4	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RA5	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RA6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RA6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RB4	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RB5	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RB6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RB6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RC4	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RC5	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RC6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RC6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RD6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RD6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RX3	162	H950426	IZP	9672,3	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	192	6144	3072	24576	10		
9672-RX4	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RX5	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RX6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RX6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-RY4	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-RY5	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R06	181	H980730	IZP	9672,5	CFR,CFS,CBR,CBS,ICR,ICS	N	N	Y	Y	N	32	8192	4096		15		
9672-R11	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R12	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R14	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R15	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R16	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R16	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R21	160	H950303	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-R21	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R22	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R24	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		

Figure 170. Supported Hardware Report (Part 7 of 29)

SUPPORTED HARDWARE - PROCESSORS TIME: 12:45 DATE: 2008-02-15 PAGE X- 8

TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
9672-R25	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R26	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R26	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R31	160	H950303	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-R31	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R32	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R34	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R35	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R36	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R36	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R41	160	H950303	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-R41	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R42	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R44	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R45	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R46	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R46	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R51	160	H950303	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-R51	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R52	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R53	162	H950426	IZP	9672,3	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	192	6144	3072	24576	10		
9672-R54	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R55	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R56	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R56	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R61	160	H950303	IZP	9672,1	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	56	4096	2048	16384	10		
9672-R61	163	H940623	IZP	9672,1	BL,BY,CNC,CTC,CVC,CBY,OSA	N	N	N	Y	N	48	4096	2048	16384	10		
9672-R63	162	H950426	IZP	9672,3	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	192	6144	3072	24576	10		
9672-R64	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R65	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R66	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R66	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R72	161	H950425	IZP	9672,2	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	128	6144	3072	24576	10		
9672-R73	162	H950426	IZP	9672,3	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	192	6144	3072	24576	10		
9672-R74	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R75	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R76	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R76	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R83	162	H950426	IZP	9672,3	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	192	6144	3072	24576	10		
9672-R84	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R85	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R86	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R86	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R94	166	H960703	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R95	169	H970610	IZP	9672,4	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA	N	N	N	Y	N	256	6144	3072	24576	15		
9672-R96	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-R96	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-T16	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-T16	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-T26	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-T26	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		

Figure 170. Supported Hardware Report (Part 8 of 29)

SUPPORTED HARDWARE - PROCESSORS TIME: 12:45 DATE: 2008-02-15 PAGE X- 9

TYPE-MODEL	MOD	SUPLEVID	IOCP	SYSTEM	SUPPORTED CHPID TYPES	DCM	CAS	WI	RI	DP	CHPID	CU	LCU	SUBCH	LPAR	CSS	SCHS
9672-XX7	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-XX7	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-XY7	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-XY7	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-XZ7	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-XZ7	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X17	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X17	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X27	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X27	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X37	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X37	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X47	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X47	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X57	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X57	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X67	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X67	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X77	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X77	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X87	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X87	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X97	182	H990531	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-X97	186	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-YX6	180	H980730	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-YX6	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y16	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y16	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y26	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y26	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y36	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y36	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y46	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y46	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y56	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y56	184	H991130	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		
9672-Y66	180	H981015	IZP	9672,6	BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA, FCV,CBR,CBS,ICR,ICS,OSD,OSE	N	N	Y	Y	N	256	8192	4096	36864	15		

Figure 170. Supported Hardware Report (Part 9 of 29)

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                                           SUPPORTED HARDWARE - PROCESSORS              TIME: 12:45  DATE: 2008-02-15  PAGE X-   10
TYPE-MODEL MOD SUPLEVID IOCP SYSTEM      SUPPORTED CHPID TYPES               DCM CAS WI RI DP CHPID CU    LCU  SUBCH LPAR CSS SCHS
__________ ___ ________ ____ ________   ________________________________  ___ ___ __ __ __ _____ ____ ____ _____ ____ ___ ____
9672-Y66   184 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y76   180 H980730  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y76   184 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y86   180 H980730  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y86   184 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y96   180 H980730  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Y96   184 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZX7   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZX7   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZY7   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZY7   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZZ7   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-ZZ7   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z17   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z17   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z27   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z27   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z37   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z37   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z47   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z47   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z57   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z57   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z67   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z67   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z77   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z77   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z87   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z87   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z97   182 H990531  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FCV,CBR,CBS,ICR,ICS,OSD,OSE
9672-Z97   186 H991130  IZP  9672,6     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA,  N   N  Y  Y  N   256  8192 4096 36864  15
                                        FC,FCV,CBR,CBS,ICR,ICS,OSD,OSE
9673-001   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-002   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-003   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-004   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-005   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-006   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-007   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9673-008   165 H941102  IZP  9673,1     BL,BY,CNC,CTC,CVC,CFR,CFS,CBY,OSA   N   N  N  N  N    56  4096 2048 16384  10
9674-C01   171 H940318  IZP  9674,1     CFR                                 N   N  N  Y  N    32     0    0         10
9674-C02   172 H950427  IZP  9674,2     CFR                                 N   N  N  Y  N    32     0    0         10
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Figure 170. Supported Hardware Report (Part 10 of 29)

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                                        SUPPORTED HARDWARE - PROCESSORS               TIME: 12:45  DATE: 2008-02-15  PAGE X-   11
TYPE-MODEL MOD SUPLEVID IOCP SYSTEM    SUPPORTED CHPID TYPES             DCM CAS WI RI DP CHPID CU   LCU  SUBCH LPAR CSS SCHS
__________ ___ ________ ____ ________  ________________________________  ___ ___ __ __ __ _____ ____ ____ _____ ____ ___ ____
9674-C03   173 H950427  IZP  9674,3    CFR                                N   N  N  Y  N    32     0    0        10
9674-C04   174 H960703  IZP  9674,4    CFR                                N   N  N  Y  N    32     0    0        10
9674-C05   175 H970610  IZP  9674,4    CFR                                N   N  N  Y  N    32     0    0        10

        KEY                      KEY DESCRIPTION
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        TYPE-MODEL             - SUPPORTED PROCESSOR TYPE
        MOD                    - INDEX OF PROCESSOR SUPPORT MODULE
        SUPLEVID               - SUPPORT LEVEL ID
        IOCP                   - PREFIX OF IOCP PROGRAM FOR THIS SUPPORT LEVEL
        SYSTEM                 - IOCP SYSTEM VALUE
        SUPPORTED CHPID TYPES  - LIST OF CHANNEL PATH TYPES WHICH ARE SUPPORTED BY THIS CONTROL UNIT
        DCM                    - DYNAMIC CHPID MANAGEMENT SUPPORT
        CAS                    - SUPPORT OF FICON 2-SWITCH CASCADED SWITCHING
        WI                     - WRITE IOCDS REGARDLESS OF CPC TYPE
        RI                     - RECEIVE IOCDS WRITTEN REGARDLESS OF CPC TYPE
        DP                     - SUPPORT OF DYNAMIC PARTITIONS
        CHPID                  - MAXIMUM NUMBER OF SUPPORTED CHPIDS
        CU                     - MAXIMUM NUMBER OF ATTACHABLE CONTROL UNITS
        LCU                    - MAXIMUM NUMBER OF LOGICAL CONTROL UNITS (PER CHANNEL SUBSYSTEM)
        SUBCH                  - MAXIMUM NUMBER OF SUBCHANNELS (PER CHANNEL SUBSYSTEM)
        LPAR                   - MAXIMUM NUMBER OF LOGICAL PARTITIONS
        CSS                    - MAXIMUM NUMBER OF CHANNEL SUBSYSTEMS (XMP PROCESSOR ONLY)
        SCHS                   - MAXIMUM NUMBER OF SUBCHANNEL SETS
        Y                      - PROCESSOR HAS THE CAPABILITY
        N                      - CAPABILITY IS NOT AVAILABLE
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Figure 170. Supported Hardware Report (Part 11 of 29)

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                                          SUPPORTED HARDWARE - CONTROL UNITS  (1)       TIME: 12:45  DATE: 2008-02-15  PAGE X-  12
TYPE-MODEL    UIM U PROTCL DP IO SUPPORTED CHPID TYPES      ATTACHABLE DEVICES
_____________ ___ _ ______ __ __ __________________________ ________________________________________________________________________
AFP1          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO  AFP1,AFP1-0,2710,3160,3170,3300,3825,3827,3828,3829,3831,3835,3900,3935,
                                                            4000,4370
CTC           014 N D      D  2  BL,CVC,EIO                 CTC,CTCA
DUMMY         050 N D,S,S4 D  2  BL,BY,CNC,CTC,CVC,CBY,FCV,
                                 EIO                        DUMMY
FCP           254 N              FCP                        FCP
FCTC          014 N           2  FC                         FCTC
IQD           058 N              IQD                        IQD
NOCHECK       256 N D,S,S4 S  2  BL,BY,CNC,CTC,CVC,IOC,CBY,
                                 FC,FCV,EIO                 AFP1-0,BCTC,BSC1,BSC2,BSC3,CTC,CTCA,DUMMY,FB512,FCTC,HFGD,ICABSCA,
                                                            ICAELAN,ICAHDLC,ICAILAN,ICASDLC,ICATELE2,RS6K,SCTC,SWCH,TWX,WTTA,1030,
                                                            1050,1050X,115A,1287,1288,1403-N1,1403-2,1403-3,1403-5,1403-7,2032,
                                                            2250-3,2305-2,2501-B1,2501-B2,2540P-1,2540R-1,2701,2710,2740,2740C,
                                                            2741C,2741P,3088,3151,3160,3161,3162,3163,3167,3170,3172,3174,3178,3179,
                                                            3180,3180-1,3190,3191,3192,3192-F,3193,3194,3203-4,3203-5,3211,3215,
                                                            3250,3251,3262-13,3262-3,3262-5,3268-2,3270,3270-X,3272,3274,3277-1,
                                                            3277-2,3278-1,3278-2,3278-2A,3278-3,3278-4,3278-5,3279-S2B,3279-S3G,
                                                            3279-2,3279-2A,3279-2B,3279-2C,3279-2X,3279-3,3279-3A,3279-3B,3279-3X,
                                                            3284-1,3284-2,3286-1,3286-2,3287-1,3287-1C,3287-2,3287-2C,3288,3289-1,
                                                            3289-2,3290,3300,3330-1,3330-11,3330-2,3330V,3333-1,3333-11,3340,3344,
                                                            3350,3370,3375,3380,3380-CJ2,3380A,3380B,3390,3390A,3390B,3390D,3390S,
                                                            3420-3,3420-4,3420-5,3420-6,3420-7,3420-8,3422,3423,3424,3430,3471,3472,
                                                            3480,3481,3482,3483,3490,3505,3525,3540,3590,3704,3705,3720,3725,3737,
                                                            3745,3746,3767-1,3767-2,3791L,3800-1,3800-3,3800-6,3800-8,3812,3816,
                                                            3825,3827,3828,3829,3831,3835,3851,3886,3890,3895,3900,3935,3995,
                                                            3995-SDA,3995-151,3995-153,4000,4224,4245,4248,4250,4370,5080,5081,5210,
                                                            6090,6091,6262,7171,7770-3,8232,83B3,9032,9032-3,9032-5,9033,9332-40,
                                                            9332-42,9332-60,9332-62,9335-B1,9336-10,9336-20,9345,9348-1
OSA           058 N              OSA,OSD,OSE                CONTROL,OSA,OSAD
OSC           058 N              OSC                        3215,3270-X,3286,3287,3287-1,3287-1C,3287-2,3287-2C
OSN           058 N              OSN                        OSAD,OSN,3745
RS6K          056 N D,S,S4 S4 2  BL,CNC,CVC,FCV,EIO         RS6K
RS6K-2        056 N           2  CNC,FCV                    RS6K
SCTC          014 N           2  CNC,CTC,FCV                BCTC,CTCA,SCTC
SWCH          051 Y           2  CNC,FCV                    SWCH
1287          032 N D      D  2  BL,BY,CVC,CBY,EIO          1287
1288          032 N D      D  2  BL,BY,CVC,CBY,EIO          1288
1750          002 Y S,S4   S  2  FC                         3380,3380A,3380B,3390,3390A,3390B,3390D,3390S
2032          051 Y           2  FC                         SWCH,2032
2105          002 Y S,S4   S  2  CNC,FC,FCV                 3380,3380A,3380B,3390,3390A,3390B,3390D,3390S
2107          002 Y S,S4   S  2  CNC,FC,FCV                 3380,3380A,3380B,3390,3390A,3390B,3390D,3390S
2501          012 N D      D  2  BL,BY,CBY,EIO              2501
2701          024 N D      D  2  BL,BY,CVC,CBY,EIO          BSC1,BSC2,BSC3,TWX,WTTA,1030,1050,1050X,115A,2701,2740,2740C,2740X,2741,
                                                            2741C,2741P,3151,3161,3162,3163,3167,3767-1,3767-2,83B3
2710          278 N D,S,S4 S  2  BL,CNC,CVC,FCV,EIO         AFP1-0,2710
2821          012 N D      D  2  BL,BY,CVC,CBY,EIO          1403,2540,2540P-1,2540R-1
2835-2        269 N D      D  2  BL,CVC,EIO                 2305-2
2840-2        277 N D      D  2  BL,BY,CBY,EIO              2250-3
3088          014 N D,S,S4 S  2  BL,CVC,EIO                 CTC,CTCA,3088
3160          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO  AFP1-0,3160
3170          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO  AFP1-0,3170
3172          057 N D,S,S4 S4 2  BL,CNC,CVC,FCV,EIO         3172
3174          027 N D,S    D  2  BL,BY,CNC,CVC,CBY,FCV,EIO  3151,3174,3178,3179,3180,3190,3191,3192,3193,3194,3262,3262-13,3262-3,
                                                            3268,3270,3270-X,3278,3279,3286,3287,3289,3290,3471,3472,3481,3482,3483,
                                                            3791L,3812,3816,4201,4202,4207,4208,4224,4234,4245-D12,4245-D20,4250,
                                                            5210
3203          012 N D      D  2  BL,BY,CVC,CBY,EIO          3203
3258          277 N D      D  1  BL,CVC,EIO                 2250-3,3250,3251
3262          268 N D      D  2  BL,BY,CVC,CBY,EIO          3262-5
3272          027 N D      D  2  BL,BY,CVC,CBY,EIO          3151,3178,3179,3180,3190,3191,3192,3193,3194,3262,3262-13,3262-3,3268,
                                                            3270,3270-X,3272,3274,3277,3278,3279,3284,3284-1,3284-2,3286,3287,3288,
                                                            3289,3290,3791L,3812,3816,4224,4234,4245-D12,4245-D20,4250,5210
3274          027 N D      D  2  BL,BY,CVC,CBY,EIO          3151,3178,3179,3180,3190,3191,3192,3193,3194,3262,3262-13,3262-3,3268,
                                                            3270,3270-X,3274,3277,3278,3279,3284,3284-1,3284-2,3286,3287,3288,3289,
                                                            3290,3471,3472,3481,3482,3483,3791L,3812,3816,4224,4234,4245-D12,
                                                            4245-D20,4250,5210
3300          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO  AFP1-0,3300
3380-CJ2      002 N S      S  2  BL,CVC,EIO                 3380,3380-CJ2
3422          005 N D,S    D  1  BL,CVC,EIO                 3422
3423          005 N D,S,S4 D  1  BL,CVC,EIO                 3423
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Figure 170. Supported Hardware Report (Part 12 of 29)

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                                        SUPPORTED HARDWARE - CONTROL UNITS  (1)       TIME: 12:45  DATE: 2008-02-15  PAGE X-  13
TYPE-MODEL    UIM U PROTCL DP IO SUPPORTED CHPID TYPES      ATTACHABLE DEVICES

_____________ ___ _ ______ __ __ _________________________ _________________________________________________________________________
3424          005 N S      S  2  BL,CVC,EIO                3424
3430          005 N D      D  1  BL,CVC,EIO                3430
3480          005 Y D,S,S4 S  2  BL,CNC,CVC,FCV,EIO        3480
3490          005 Y D,S,S4 S  2  BL,CNC,CVC,ISD,FC,FCV,EIO 3490
3490-C1A      005 Y D,S,S4 S  2  BL,CNC,CVC,FC,FCV,EIO     3490
3490-C10      005 Y D,S,S4 S  2  BL,CNC,CVC,ISD,FC,FCV,EIO 3490
3490-C11      005 Y D,S,S4 S  2  BL,CNC,CVC,ISD,FC,FCV,EIO 3490
3490-C2A      005 Y D,S,S4 S  2  BL,CNC,CVC,FC,FCV,EIO     3490
3490-C22      005 Y D,S,S4 S  2  BL,CNC,CVC,FC,FCV,EIO     3490
3505          012 N D      D  2  BL,BY,CVC,CBY,EIO         3505,3525
3540          032 N D      D  2  BL,BY,CVC,CBY,EIO         3540
3590          005 Y D,S,S4 S  2  BL,CNC,CVC,FC,FCV,EIO     3590
3704          023 N D      D  2  BY,CBY                    BSC1,BSC2,BSC3,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3151,3161,3162,3163,3167,3174,3232,3271,3274,3276,3704,3767-1,
                                                           3767-2,3791L,83B3
3705          023 N D      D  2  BL,BY,CNC,CVC,CBY,FCV,EIO BSC1,BSC2,BSC3,NCP,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3151,3161,3162,3163,3167,3174,3232,3271,3274,3276,3705,3767-1,
                                                           3767-2,3791L,83B3
3720          023 N D      D  2  BL,BY,CVC,CBY,EIO         BSC1,BSC2,BSC3,NCP,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3151,3161,3162,3163,3167,3174,3232,3271,3274,3276,3720,3767-1,
                                                           3767-2,3791L,83B3
3725          023 N D      D  2  BL,BY,CVC,CBY,EIO         BSC1,BSC2,BSC3,NCP,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3161,3162,3163,3167,3174,3232,3271,3274,3276,3725,3767-1,3767-2,
                                                           3791L,83B3
3737          014 N D,S    S  2  BL,CVC,EIO                CTC,CTCA,3737,4753
3745          023 N D,S    D  2  BL,BY,CNC,CVC,CBY,FCV,EIO BSC1,BSC2,BSC3,NCP,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3161,3162,3163,3167,3174,3232,3271,3274,3276,3745,3767-1,3767-2,
                                                           3791L,83B3
3746          023 N D,S    D  2  BL,BY,CNC,CVC,CBY,FCV,EIO BSC1,BSC2,BSC3,NCP,TWX,WTTA,1030,1050,1050X,115A,2740,2740C,2740X,2741C,
                                                           2741P,3174,3232,3271,3274,3276,3745,3767-1,3767-2,3791L,83B3
3791L         027 N D,S    D  2  BL,BY,CNC,CVC,CBY,FCV,EIO 3151,3178,3179,3180,3190,3191,3192,3193,3194,3262,3262-13,3262-3,3268,
                                                           3270,3270-X,3272,3277,3278,3279,3284-1,3284-2,3286,3287,3288,3289,3290,
                                                           3791L,3812,3816,4224,4234,4245-D12,4245-D20,4250,5210
3800-1        011 N D,S    D  2  BL,BY,CVC,CBY,EIO         3800-1
3800-3        011 N D,S    D  2  BL,BY,CVC,CBY,EIO         AFP1,3800-3
3800-6        011 N D,S    D  2  BL,BY,CVC,CBY,EIO         AFP1,3800-6
3800-8        011 N D,S    D  2  BL,BY,CVC,CBY,EIO         AFP1,3800-8
3803          005 N D      D  1  BL,CVC,EIO                3420
3811          012 N D      D  2  BL,BY,CVC,CBY,EIO         3211,3216
3820          022 N D,S4   D  2  BL,BY,CNC,CVC,CBY,FCV,EIO AFP1,3820
3825          022 N D,S    S  2  BL,BY,CVC,CBY,EIO         AFP1,AFP1-0,3825
3827          022 N D,S    S  2  BL,BY,CVC,CBY,EIO         AFP1,AFP1-0,3827
3828          022 N D,S    S  2  BL,BY,CVC,CBY,EIO         AFP1,AFP1-0,3828
3829          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO AFP1-0,3829
3830-2        257 N D      D  2  BL,CVC,EIO                3330-1,3330-11,3330-2,3333-1,3333-11,3340,3344,3350
3830-3        271 N D      D  2  BL,CVC,EIO                3330-11,3330V,3350
3831          022 N D,S    S  2  BL,BY,CVC,CBY,EIO         AFP1-0,3831
3835          022 N D,S    S  2  BL,BY,CVC,CBY,EIO         AFP1,AFP1-0,3835
3851          271 N D      D  2  BL,BY,CVC,CBY,EIO         3851
3880-1        258 N D,S    S  2  BL,CVC,EIO                3330-1,3330-11,3330-2,3333-1,3333-11,3340,3344,3350,3370,3375
3880-11       259 N D,S    S  2  BL,CVC,EIO                3370,3375
3880-13       002 N D,S    S  2  BL,CVC,EIO                3380
3880-2        002 N D,S    S  2  BL,CVC,EIO                3330-1,3330-11,3330-2,3333-1,3333-11,3340,3350,3370,3375,3380
3880-23       002 N D,S,S4 S  2  BL,CVC,EIO                3380
3880-3        002 N D,S    S  2  BL,CVC,EIO                3380
3880-4        258 N D,S    S  2  BL,CVC,EIO                3375
3886          032 N D      D  2  BL,BY,CVC,CBY,EIO         3886
3890          032 N D      D  2  BL,BY,CVC,CBY,EIO         3890
3895          032 N D      D  2  BL,BY,CVC,CBY,EIO         3895
3900          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO AFP1,AFP1-0,3900
3935          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO AFP1-0,3935
3990          002 Y S,S4   S  2  BL,CNC,CVC,ISD,DSD,FCV,EIO 3380,3390
3990-1        002 N S      S  2  BL,CVC,EIO                3380
3990-2        002 Y S,S4   S  2  BL,CNC,CVC,ISD,DSD,FCV,EIO 3380,3390
3990-3        002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO        3380,3390
3990-6        002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO        3380,3390
3995          053 Y D,S,S4 S4 2  BL,CNC,CVC,FCV,EIO        3995
3995-SDA      053 Y D,S,S4 S4 2  BL,CNC,CVC,FCV,EIO        3995
3995-151      002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO        3995-151
3995-153      002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO        3995-153
4000          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO AFP1-0,4000
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Figure 170. Supported Hardware Report (Part 13 of 29)

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                                        SUPPORTED HARDWARE - CONTROL UNITS  (1)       TIME: 12:45  DATE: 2008-02-15  PAGE X-  14
TYPE-MODEL    UIM U PROTCL DP IO SUPPORTED CHPID TYPES      ATTACHABLE DEVICES
_____________ ___ _ ______ __ __ __________________________ ________________________________________________________________________
4245          012 N D      D  2  BL,BY,CVC,CBY,EIO          4245
4248          012 N D      D  2  BL,BY,CVC,CBY,EIO          3262,4248,6262
4370          022 N D,S,S4 S  2  BL,BY,CNC,CVC,CBY,FCV,EIO  AFP1-0,4370
5088-1        291 N D,S    D  2  BL,CVC,EIO                 HFGD,3251,3279-2B,3279-3B,5080,5081,6090,6091
5088-2        291 N D,S    D  2  BL,CVC,EIO                 HFGD,3251,3279-2B,3279-3B,5080,5081,6090,6091
6098          291 N S,S4   S  2  BL,CVC,EIO                 HFGD,3251,3279-2B,3279-3B,5080,5081,6090,6091
6120          308 N           2  IOC,EIO                    3101,3151,3174,3178,3179,3180,3190,3191,3192,3193,3194,3262,3268,3270,
                                                            3277,3278,3279,3286,3287,3289,3290,3812,3816,4224,4245,4250,5210
6135          308 N           1  IOC,EIO                    ICAELAN
6139          308 N           1  IOC,EIO                    ICAILAN
6140          308 N           1  IOC,EIO                    ICAILAN
6241          308 N           1  IOC,EIO                    ICATELE2
6242          308 N           1  IOC,EIO                    ICATELE2
6243          308 N           1  IOC,EIO                    ICATELE2
6244          308 N           1  IOC,EIO                    ICATELE2
6251          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6252          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6253          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6254          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6255          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6256          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6257          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6258          308 N           1  IOC,EIO                    ICABSCA,ICAHDLC,ICASDLC,ICATELE2
6262          268 N D      D  2  BL,BY,CVC,CBY,EIO          6262
6310          308 N           2  IOC,EIO                    FB512,9332,9335,9336
6311          308 N           2  IOC,EIO                    9348
7171          027 N D      D  2  BL,CVC,EIO                 3161,3162,3163,3277,3278,3279,3286,3791L,7171
7770-3        023 N D      D  2  BY,CBY                     7770-3
8232          014 N D,S,S4 S  2  BL,CVC,EIO                 8232
9032          051 Y           2  CNC                        SWCH,9032
9032-3        051 Y           2  CNC                        SWCH,9032-3
9032-5        051 Y           2  CNC,FCV                    SWCH,9032-5
9033          051 Y           2  CNC                        SWCH,9033
9340          002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO         9345
9341          002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO         9345
9343          002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO         9345
9343-1        002 Y S,S4   S  2  BL,CNC,CVC,FCV,EIO         9345

        KEY                      KEY DESCRIPTION
        ---                      ---------------
        TYPE-MODEL             - SUPPORTED CONTROL UNIT TYPE
        UIM                    - INDEX OF UNIT INFORMATION MODULE SUPPORTING THIS CONTROL UNIT TYPE
        U                      - If Y, INDICATES THAT THE UNIT ADDRESS RANGE MUST START WITH 00
                                 WHEN THE CONTROL UNIT IS CONNECTED TO AN ESCON CHANNEL PATH
        DP                     - DEFAULT PROTOCOL FOR PARALLEL CONTROL UNIT
        IO                     - DEFAULT I/O CONCURRENCY LEVEL FOR PARALLEL CONTROL UNIT
        PROTCL                 - PROTOCOL SUPPORTED BY THE CONTROL UNIT TYPE
        SUPPORTED CHPID TYPES -  LIST OF CHANNEL PATH TYPES WHICH ARE SUPPORTED BY THIS CONTROL UNIT TYPE
        ATTACHABLE DEVICES    -  LIST OF ATTACHABLE DEVICE TYPES
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Figure 170. Supported Hardware Report (Part 14 of 29)

SUPPORTED HARDWARE - CONTROL UNITS (2)   TIME: 12:45 DATE: 2008-02-15 PAGE X- 15

--CONTROL UNIT--		-ATTACHMENT COUNTS--			-UNIT ADDRESSES--				----LOGICAL ADDRESSING---					--------LOGICAL PATH --------					DCM
TYPE-MODEL	MD	CHPMAX	DEVMIN	DEVMAX	MIN	MAX	REC	RANGE	LA	MIN	MAX	MULTHOST	MAXCU	MAXPATH	MINGRP	SH	MXESC	MXFIC	
AFP1	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
CTC	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
DUMMY	-	-	-	-	-	-	-	-	Y	0	F	N	-	-	-	-			N
FCP	-	1	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
FCTC	-	1	-	-	-	-	-	-	Y	-	-	Y	-	-	-	-			N
IQD	-	1	3	256	-	-	-	1	Y	-	-	Y	-	-	-	-			N
NOCHECK	-	8	-	-	-	-	-	-	Y	00	FF	Y	-	-	-	-			Y
OSA	-	1	1	255	-	-	-	1	Y	-	-	Y	-	-	-	-			N
OSC	-	1	-	254	-	-	-	1	N	-	-	-	-	-	-	-			N
OSN	-	1	-	255	-	-	-	1	N	-	-	-	-	-	-	-			N
RS6K	-	1	-	-	-	-	-	-	Y	-	-	Y	-	-	-	-			N
RS6K-2	N	1	-	-	-	-	-	-	Y	-	-	Y	-	-	-	-			N
SCTC	-	1	-	-	-	-	-	-	Y	-	-	Y	-	-	-	-			N
SWCH	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
1287	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
1288	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
1750	-	-	-	256	-	-	-	-	Y	00	3F	Y	-	128	2	-		1024	Y
2032	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
2105	-	-	-	256	-	-	-	-	Y	00	FF	Y	-	256	2	-	64	256	Y
2107	-	-	-	256	-	-	-	-	Y	00	FE	Y	-	512	2	-	64	2048	Y
2501	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
2701	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
2710	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
2821	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
2835-2	N	-	-	2	-	-	16	-	N	-	-	-	-	-	-	-			N
2840-2	N	-	-	4	-	-	-	-	N	-	-	-	-	-	-	-			N
3088	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3160	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3170	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3172	-	2	-	-	-	-	-	-	Y	-	-	Y	-	-	-	-			N
3174	-	-	-	256	-	-	32	-	Y	0	F	Y	8	-	-	-			N
3203	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3258	-	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
3262	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
3272	-	-	-	32	-	-	32	-	N	-	-	-	-	-	-	-			N
3274	-	-	-	32	-	-	-	-	N	-	-	-	-	-	-	-			N
3300	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3380-CJ2	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3422	-	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
3423	-	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
3424	-	-	-	8	-	-	8	-	N	-	-	-	-	-	-	-			N
3430	-	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
3480	-	-	-	16	16	16	-	-	N	-	-	-	-	-	-	-			N
3490	-	-	-	16	16	16	-	-	Y	00	10	Y	-	-	-	-			N
3490-C1A	N	-	-	16	2	16	-	-	Y	00	10	Y	-	-	-	-			N
3490-C10	N	-	-	16	2	16	-	-	Y	00	10	Y	-	-	-	-			N
3490-C11	N	-	-	16	2	16	-	-	Y	00	10	Y	-	-	-	-			N
3490-C2A	N	-	-	16	2	16	-	-	Y	00	10	Y	-	-	-	-			N
3490-C22	N	-	-	16	2	16	-	-	Y	00	10	Y	-	-	-	-			N
3505	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3540	-	-	-	2	-	-	-	-	N	-	-	-	-	-	-	-			N
3590	-	-	-	16	1	16	-	-	Y	00	FF	Y	-	-	-	-			N
3704	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3705	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3720	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3725	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3737	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3745	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3746	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3791L	-	-	-	256	-	-	32	-	Y	0	F	Y	8	-	-	-			N
3800-1	Y	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3800-3	N	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3800-6	N	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3800-8	N	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3803	-	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
3811	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
3820	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N

Figure 170. Supported Hardware Report (Part 15 of 29)

SUPPORTED HARDWARE - CONTROL UNITS (2) TIME: 12:45 DATE: 2008-02-15 PAGE X- 16

--CONTROL UNIT--		-ATTACHMENT COUNTS--			-UNIT ADDRESSES--				----LOGICAL ADDRESSING---					--------LOGICAL PATH --------					DCM
TYPE-MODEL	MD	CHPMAX	DEVMIN	DEVMAX	MIN	MAX	REC	RANGE	LA	MIN	MAX	MULTHOST	MAXCU	MAXPATH	MINGRP	SH	MXESC	MXFIC	
3825	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3827	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3828	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3829	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3830-2	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3830-3	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3831	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3835	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3851	-	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-1	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-11	N	-	-	64	-	-	32	-	N	-	-	-	-	-	-	-			N
3880-13	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-2	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-23	Y	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-3	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3880-4	N	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
3886	-	-	-	2	-	-	-	-	N	-	-	-	-	-	-	-			N
3890	-	-	-	2	-	-	-	-	N	-	-	-	-	-	-	-			N
3895	-	-	-	2	-	-	-	-	N	-	-	-	-	-	-	-			N
3900	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3935	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
3990	-	-	-	-	-	-	-	-	Y	0	F	Y	-	-	-	-			Y
3990-1	N	-	-	64	-	-	-	-	N	-	-	-	-	8	8	-			N
3990-2	N	-	-	256	-	-	-	-	Y	0	F	Y	-	16	8	-			Y
3990-3	N	-	-	64	-	-	-	-	Y	0	F	Y	-	16	8	-			Y
3990-6	N	-	-	256	-	-	-	-	Y	0	F	Y	-	128	8	-			Y
3995	-	2	-	-	-	-	-	-	N	-	-	-	-	-	-	Y			N
3995-SDA	N	2	-	256	2	256	16	1	N	-	-	-	-	-	-	Y			N
3995-151	N	-	-	96	-	-	-	-	Y	0	F	Y	-	-	-	-			Y
3995-153	N	-	-	96	-	-	-	-	Y	0	F	Y	-	-	-	-			Y
4000	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
4245	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
4248	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
4370	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
5088-1	N	-	-	16	-	-	-	-	N	-	-	-	-	-	-	-			N
5088-2	Y	-	-	32	-	-	-	-	N	-	-	-	-	-	-	-			N
6098	-	-	-	192	-	-	-	-	N	-	-	-	-	-	-	-			N
6120	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6135	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6139	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6140	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6241	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6242	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6243	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6244	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6251	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6252	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6253	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6254	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6255	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6256	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6257	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6258	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
6262	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
6310	-	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
6311	-	-	-	64	-	-	-	-	N	-	-	-	-	-	-	-			N
7171	-	-	-	64	-	-	32	-	N	-	-	-	-	-	-	-			N
7770-3	N	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
8232	-	-	-	-	-	-	-	-	N	-	-	-	-	-	-	-			N
9032	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
9032-3	N	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
9032-5	N	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
9033	-	-	-	1	-	-	-	-	N	-	-	-	-	-	-	-			N
9340	-	-	-	256	-	-	-	-	N	-	-	-	-	64	64	-			Y
9341	-	-	-	16	-	-	-	-	N	-	-	-	-	2	2	-			Y
9343	-	-	-	64	-	-	-	-	N	-	-	-	-	64	64	-			Y
9343-1	N	-	-	64	-	-	-	-	N	-	-	-	-	64	64	-			Y

Figure 170. Supported Hardware Report (Part 16 of 29)

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                                SUPPORTED HARDWARE - CONTROL UNITS  (2)      TIME: 12:45  DATE: 2008-02-15  PAGE X-  17

KEY                       KEY DESCRIPTION
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TYPE-MODEL             -  SUPPORTED CONTROL UNIT TYPE
MD                     -  IF Y, MODEL IS DEFAULT
ATTACHMENT CNT CHPMAX -  MAXIMUM NUMBER OF CHANNEL PATHS THAT CAN BE CONNECTED TO C/U
               DEVMIN -  MINIMUM NUMBER OF DEVICES THAT MUST BE CONNECTED TO C/U
               DEVMAX -  MAXIMUM NUMBER OF DEVICES THAT CAN BE CONNECTED TO C/U
UNIT ADDRESSES    MIN -  MINIMUM NUMBER OF UNIT ADDRESSES THAT MUST BE DEFINED TO C/U
                  MAX -  MAXIMUM NUMBER OF UNIT ADDRESSES THAT CAN BE DEFINED TO C/U
                  REC -  RECOMMENDED NUMBER OF UNIT ADDRESSES
                RANGE -  MAXIMUM NUMBER OF UNIT ADDRESS RANGES THAT CAN BE DEFINED TO C/U
LOGICAL ADDRESSING LA -  IF Y, C/U SUPPORTS LOGICAL ADDRESSING (CUADD)
                  MIN -  MINIMUM VALUE OF ALLOWED LOGICAL ADDRESS (CUADD)
                  MAX -  MAXIMUM VALUE OF ALLOWED LOGICAL ADDRESS (CUADD)
             MULTHOST -  IF Y, MULTIPLE HOSTS CAN CONNECT TO THE SAME LOGICAL ADDRESS (CUADD)
                MAXCU -  MAXIMUM NUMBER OF LOGICAL CONTROL UNITS SUPPORTED (CUADD)
LOGICAL PATHS MAXPATH -  MAXIMUM NUMBER OF LOGICAL PATHS SUPPORTED BY C/U
               MINGRP -  MINIMUM GROUP ATTACHMENT VALUE FOR LOGICAL PATHS
                   SH -  IF Y, ONLY SINGLE HOST CAN ATTACH TO CONTROL UNIT AT A TIME
                MXESC -  MAXIMUM NUMBER OF LOGICAL PATHS PER ESCON PORT
                MXFIC -  MAXIMUM NUMBER OF LOGICAL PATHS PER FICON PORT
DCM                    -  DYNAMIC CHPID MANAGEMENT SUPPORT

Y                      -  CONTROL UNIT HAS THE CAPABILITY
N                      -  CONTROL UNIT DOES NOT HAVE THE CAPABILITY
-                      -  UIM DOES NOT DEFINE A VALUE OR VALUE IS NOT APPLICABLE
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Figure 170. Supported Hardware Report (Part 17 of 29)

SUPPORTED HARDWARE - DEVICES TIME: 12:45 DATE: 2008-02-15 PAGE X- 18

TYPE-MODEL	UIM	MVS	VM	MX	GR	RL	RH	RD	TM	ST	ATTACHABLE TO CU
AFP1-0	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,2710,3160,3170,3300,3800-3,3800-6,3800-8,3820,3825,3827,3828,3829,3831,3835,3900,3935,4000,4370
BCTC	014	Y	Y	N	N	1	4095	1	N	Y	NOCHECK,SCTC
BSC1	026	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
BSC2	026	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
BSC3	026	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
CTC	014	Y	Y	N	N	1	4095	1	N	Y	CTC,NOCHECK,3088,3737
CTCA	270	N	Y	N	N	1	4095	1	N	Y	CTC,NOCHECK,SCTC,3088,3737
DUMMY	050	Y	Y	N	N	1	4095	1	Y	Y	DUMMY,NOCHECK
FBASCSI	254	N	Y	N	N	1	4095	1	Y	Y	
FB512	258	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6310
FCP	254	N	Y	N	N	1	4095	1	N	N	FCP
FCTC	014	Y	Y	N	N	1	4095	1	N	Y	FCTC,NOCHECK
HFGD	291	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,5088-1,5088-2,6098
ICABSCA	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6251,6252,6253,6254,6255,6256,6257,6258
ICAELAN	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6135
ICAHDLC	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6251,6252,6253,6254,6255,6256,6257,6258
ICAILAN	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6139,6140
ICASDLC	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6251,6252,6253,6254,6255,6256,6257,6258
ICATELE2	308	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,6241,6242,6243,6244,6251,6252,6253,6254,6255,6256,6257,6258
IQD	058	Y	Y	N	N	3	4095	10	N	Y	IQD
OSA	058	Y	Y	N	N	1	4095	2	N	Y	OSA
OSAD	058	Y	Y	N	N	1	4095	1	N	Y	OSA,OSN
OSN	058	Y	Y	N	N	1	4095	1	N	N	OSN
RS6K	056	Y	Y	N	N	1	4095	1	N	Y	NOCHECK,RS6K,RS6K-2
SCTC	014	Y	Y	N	N	1	4095	1	N	Y	NOCHECK,SCTC
SWCH	051	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,SWCH,2032,9032,9032-3,9032-5,9033
TWX	025	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
WTTA	025	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
1030	024	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
1050	024	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
1050X	024	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
115A	024	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
1287	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,1287
1288	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,1288
1403-N1	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
1403-2	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
1403-3	268	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
1403-5	268	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
1403-7	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
2032	051	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2032
2250-3	277	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2840-2,3258
2305-2	269	N	Y	Y	N	1	1	1	Y	Y	NOCHECK,2835-2
2501-B1	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2501
2501-B2	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2501
2540P-1	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
2540R-1	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2821
2701	279	N	Y	N	N	1	4095	1	Y	N	NOCHECK,2701
2710	278	N	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,2710
2740	024	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
2740C	024	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
2740X	024	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
2741C	025	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
2741P	025	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
3088	014	Y	Y	N	N	1	4095	32	N	Y	NOCHECK,3088
3151	281	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3174,3272,3274,3704,3705,3720,3791L,6120
3160	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3160
3161	281	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,7171
3162	281	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,7171
3163	281	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,7171
3167	281	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745
3170	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3170
3172	057	Y	Y	N	N	1	4095	1	N	Y	NOCHECK,3172
3174	027	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3174,3704,3705,3720,3725,3745,3746,6120
3178	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3179	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3180	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3180-1	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3190	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3191	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3192	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120

Figure 170. Supported Hardware Report (Part 18 of 29)

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TYPE-MODEL	UIM	MVS	VM	MX	GR	RL	RH	RD	TM	ST	ATTACHABLE TO CU
3192-F	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3193	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3194	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3203-4	012	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3203
3203-5	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3203
3211	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3811
3215	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC
3216	278	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3811
3250	277	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3258
3251	277	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3258,5088-1,5088-2,6098
3262-13	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,4248,6120
3262-3	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,4248,6120
3262-5	268	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3262,3272,3274,3791L,4248,6120
3268-2	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3270	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3270-X	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120
3272	027	Y	N	N	N	1	4095	1	Y	N	NOCHECK,3272,3791L
3274	027	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3272,3274,3704,3705,3720,3725,3745,3746
3277-1	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3272,3274,3791L,6120,7171
3277-2	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3272,3274,3791L,6120,7171
3278-1	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3278-2	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3278-2A	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3278-3	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3278-4	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3278-5	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-S2B	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-S3G	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-2	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-2A	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-2B	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,5088-1,5088-2,6098,6120,7171
3279-2C	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-2X	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-3	260	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-3A	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3279-3B	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,5088-1,5088-2,6098,6120,7171
3279-3X	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120,7171
3284-1	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3272,3274,3791L
3284-2	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3272,3274,3791L
3286-1	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120,7171
3286-2	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120,7171
3287-1	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120
3287-1C	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120
3287-2	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120
3287-2C	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,OSC,3174,3272,3274,3791L,6120
3288	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3272,3274,3791L
3289-1	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3289-2	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3290	004	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3300	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3300
3330-1	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1,3880-2
3330-11	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3830-3,3880-1,3880-2
3330-2	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1,3880-2
3330V	271	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3830-3
3333-1	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1,3880-2
3333-11	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1,3880-2
3340	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1,3880-2
3344	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3880-1
3350	257	N	Y	N	N	1	4095	2	Y	Y	NOCHECK,3830-2,3830-3,3880-1,3880-2
3370	258	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3880-1,3880-11,3880-2
3375	258	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3880-1,3880-11,3880-2,3880-4
3380	002	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107,3380-CJ2,3880-13,3880-2,3880-23,3880-3,3990,3990-1,3990-2, 3990-3,3990-6
3380-CJ2	002	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107,3380-CJ2,3880-13,3880-2,3880-23,3880-3,3990,3990-1,3990-2, 3990-3,3990-6
3380A	002	Y	Y	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107
3380B	002	Y	Y	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107
3390	002	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107,3990,3990-2,3990-3,3990-6
3390A	002	Y	Y	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107
3390B	002	Y	Y	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107
3390D	002	Y	N	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107

Figure 170. Supported Hardware Report (Part 19 of 29)

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TYPE-MODEL	UIM	MVS	VM	MX	GR	RL	RH	RD	TM	ST	ATTACHABLE TO CU
3390S	002	Y	N	Y	N	1	4095	1	Y	Y	NOCHECK,1750,2105,2107
3420-3	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3420-4	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3420-5	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3420-6	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3420-7	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3420-8	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3803
3422	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3422
3423	005	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3423
3424	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3424
3430	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3430
3471	004	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3274
3472	004	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3274
3480	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3480
3481	004	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3274
3482	004	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3274
3483	004	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3274
3490	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3490,3490-C1A,3490-C10,3490-C11,3490-C2A,3490-C22
3505	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3505
3525	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3505
3540	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3540
3590	005	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3590
3704	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3704
3705	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3705
3720	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3720
3725	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3725
3737	014	Y	Y	N	N	1	4095	1	N	Y	NOCHECK,3737
3745	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,OSN,3745,3746
3746	023	Y	Y	N	N	1	4095	1	Y	N	NOCHECK
3767-1	024	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
3767-2	024	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746
3791L	027	Y	N	N	N	1	4095	1	Y	N	NOCHECK,3174,3272,3274,3704,3705,3720,3725,3745,3746,3791L,7171
3800-1	011	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3800-1
3800-3	011	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3800-3
3800-6	011	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3800-6
3800-8	011	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3800-8
3812	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3816	287	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
3820	022	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,3820
3825	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3825
3827	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3827
3828	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3828
3829	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3829
3831	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3831
3835	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3835
3851	271	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,3851
3886	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3886
3890	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3890
3895	032	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3895
3900	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3900
3935	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,3935
3995	053	Y	Y	N	Y	1	1	1	N	Y	NOCHECK,3995,3995-SDA
3995-SDA	053	Y	Y	N	N	1	256	16	N	Y	NOCHECK,3995-SDA
3995-151	002	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3995-SDA,3995-151
3995-153	002	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3995-SDA,3995-153
4000	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,4000
4224	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
4245	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,4245,6120
4248	012	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,4248
4250	031	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
4370	022	Y	Y	N	N	1	4095	1	Y	Y	AFP1,NOCHECK,4370
5080	291	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,5088-1,5088-2,6098
5081	291	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,5088-1,5088-2,6098
5210	031	Y	Y	N	N	1	4095	1	Y	Y	NOCHECK,3174,3272,3274,3791L,6120
6090	291	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,5088-1,5088-2,6098
6091	291	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,5088-1,5088-2,6098
6262	268	N	Y	N	N	1	4095	1	Y	Y	NOCHECK,4248,6262
7171	027	Y	Y	N	N	1	4095	1	Y	N	NOCHECK,7171
7770-3	023	Y	N	N	N	1	4095	1	Y	N	NOCHECK,7770-3
8232	014	Y	Y	N	N	1	4095	32	N	Y	NOCHECK,8232
83B3	025	Y	N	N	N	1	4095	1	Y	Y	NOCHECK,2701,3704,3705,3720,3725,3745,3746

Figure 170. Supported Hardware Report (Part 20 of 29)

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                                                        SUPPORTED HARDWARE - DEVICES                TIME: 12:45  DATE: 2008-02-15  PAGE X-  21
TYPE-MODEL    UIM MVS VM  MX GR RL RH   RD TM ST ATTACHABLE TO CU

_____________ ___ ___ __  __ __ __ ____ __ __ __ ________________________________________________________________________________
9032          051  Y   Y  N  N   1 4095  1 Y  Y  NOCHECK,9032
9032-3        051  Y   Y  N  N   1 4095  1 Y  Y  NOCHECK,9032,9032-3
9032-5        051  Y   Y  N  N   1 4095  1 Y  Y  NOCHECK,9032,9032-5
9033          051  Y   Y  N  N   1 4095  1 Y  Y  NOCHECK,9033
9332-40       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9332-42       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9332-60       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9332-62       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9335-B1       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9336-10       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9336-20       258  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6310
9345          002  Y   Y  N  N   1 4095  1 Y  Y  NOCHECK,9340,9341,9343,9343-1
9348-1        261  N   Y  N  N   1 4095  1 Y  Y  NOCHECK,6311


        KEY                  KEY DESCRIPTION
        ---                  ---------------
        TYPE-MODEL        -  SUPPORTED DEVICE TYPE
        UIM               -  INDEX OF UNIT INFORMATION MODULE SUPPORTING THIS DEVICE TYPE
        MVS               -  DEVICE IS SUPPORTED FOR MVS DEFINITION
        VM                -  DEVICE TYPE IS SUPPORTED FOR VM DEFINITION
        MX                -  DEVICE IS A MULTI-EXPOSURE DEVICE OR A PARALLEL  ACCESS VOLUME DEVICE
        GR                -  DEVICE IS A GROUP DEVICE
        RL                -  MINIMUM NUMBER OF DEVICES TO BE DEFINED
        RH                -  MAXIMUM NUMBER OF DEVICES TO BE DEFINED
        RD                -  DEFAULT NUMBER OF DEVICES TO BE DEFINED
        TM                -  DEFAULT TIMEOUT VALUE
        ST                -  DEFAULT STADET VALUE
        ATTACHABLE TO CU  -  LIST OF CONTROL UNIT TYPES TO WHICH DEVICE TYPE IS ATTACHABLE
        Y                 -  DEVICE TYPE HAS THE CAPABILITY
        N                 -  CAPABILITY IS NOT AVAILABLE
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Figure 170. Supported Hardware Report (Part 21 of 29)

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                                            SUPPORTED HARDWARE - MVS DEVICES             TIME: 12:45  DATE: 2008-02-15  PAGE X-  22
TYPE-MODEL    UIM GENERIC  DPREF DYN 4DIG UCB NIP SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ ________ _____ ___ ____ ___ ___ ________________________________________________________________________________
AFP1-0        022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
BCTC          014 BCTC      8350  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
BSC1          026 AAA9      6900  N   N    N   N  (R)ADAPTER(BSCA),FEATURE,OFFLINE,(R)TCU(2701,2702,2703) / DUALCODE,DUALCOMM
BSC2          026 AAAA      7000  N   N    N   N  (R)ADAPTER(BSCA),FEATURE,OFFLINE,(R)TCU(2701,2702,2703) / AUTOANSR,AUTOCALL,
                                                  DUALCODE,DUALCOMM
BSC3          026 AAAB      7100  N   N    N   N  (R)ADAPTER(BSCA),FEATURE,OFFLINE,(R)TCU(2701,2702,2703) / AUTOPOLL,DUALCODE,
                                                  DUALCOMM
CTC           014 CTC       8400  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / 370
DUMMY         050 DUMMY    99991  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
FCTC          014 FCTC      8301  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
IQD           058 IQD       8362  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
OSA           058 OSA       8360  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
OSAD          058 OSAD      8361  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
OSN           058 OSN       8363  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
RS6K          056 RS6K      8389  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
SCTC          014 SCTC      8300  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
SWCH          051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
TWX           025 AAA7      6700  N   N    N   N  (R)ADAPTER(TELE2),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR,AUTOCALL
WTTA          025 AAAD      7300  N   N    N   N  (R)ADAPTER(TELEW),OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,2703)
1030          024 AAA1      6100  N   N    N   N  (R)ADAPTER(IBM2),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOPOLL
1050          024 AAA2      6200  N   N    N   N  (R)ADAPTER(IBM1,IBMT),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOPOLL,AUTOANSR,AUTOCALL
1050X         024 AAAG      9700  N   N    N   N  (R)ADAPTER(IBM1,IBMT),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR,AUTOCALL
115A          024 AAA5      6500  N   N    N   N  (R)ADAPTER(TELE1),OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,2703)
1287          032 1287      5000  N   N    N   N  OFFLINE
1288          032 1288      5100  N   N    N   N  OFFLINE
1403-N1       012 1403      2100  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / UNVCHSET
1403-2        012 1403      2100  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / UNVCHSET
1403-7        012 1403      2100  Y   Y    N   N  OFFLINE,DYNAMIC
2032          051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
2501-B1       012 2501      2300  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / CARDIMAGE
2501-B2       012 2501      2300  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / CARDIMAGE
2540P-1       012 2540-2    2900  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / CARDIMAGE
2540R-1       012 2540      2800  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / CARDIMAGE
2740          024 AAA8      6800  N   N    N   N  (R)ADAPTER(IBM1),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOPOLL,AUTOANSR,AUTOCALL,CHECKING,INTERRUPT,OIU,SCONTROL,XCONTROL
2740C         024 AAAI      9900  N   N    N   N  (R)ADAPTER(IBM1),(R)FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR,AUTOCALL,CHECKING
2740X         024 AAAH      9800  N   N    N   N  (R)ADAPTER(IBM1),(R)FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR,AUTOCALL,CHECKING
2741C         025 AAAF      7500  N   N    N   N  (R)ADAPTER(IBM1),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR
2741P         025 AAAE      7400  N   N    N   N  (R)ADAPTER(IBM1),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,
                                                  2703) / AUTOANSR
3088          014 CTC       8400  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / 370
3160          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3170          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3172          057 3172      8398  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
3174          027 3174      7650  Y   Y    N   N  OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3178          004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
3179          004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
3180-1        004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
3191          004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
3192          004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
3192-F        004 3277-2    3800  Y   Y    Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                  UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                  KB70KEY,KB78KEY,KB81KEY
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Figure 170. Supported Hardware Report (Part 22 of 29)

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                                             SUPPORTED HARDWARE - MVS DEVICES           TIME: 12:45  DATE: 2008-02-15  PAGE X-  23
TYPE-MODEL    UIM GENERIC  DPREF DYN 4DIG UCB NIP SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ ________ _____ ___ ____ ___ ___ _______________________________________________________________________________
3193          004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3194          004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3203-4        012 3203      2000  Y   Y     N   N  OFFLINE,DYNAMIC
3203-5        012 3203      2000  Y   Y     N   N  OFFLINE,DYNAMIC
3211          012 3211      1900  Y   Y     N   N  OFFLINE,DYNAMIC
3262-13       031 3286-2    4400  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3262-3        031 3286-2    4400  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3268-2        031 3286-2    4400  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3270-X        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3272          027 3791L     7700  Y   Y     N   N  OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3274          027 3274      7675  Y   Y     N   N  OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3277-1        004 3277-1    3700  Y   Y     Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3277-2        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-1        004 3277-1    3700  Y   Y     Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-2        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-2A       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-3        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-4        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3278-5        004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-S2B      004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-S3G      004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-2A       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-2B       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-2C       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-2X       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-3A       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-3B       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3279-3X       004 3277-2    3800  Y   Y     Y   Y  FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR,
                                                   UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277,
                                                   KB70KEY,KB78KEY,KB81KEY
3284-1        031 3284-1    4100  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3284-2        031 3284-2    4200  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3286-1        031 3286-1    4300  N   N     N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
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Figure 170. Supported Hardware Report (Part 23 of 29)

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TYPE-MODEL	UIM	GENERIC	DPREF	DYN	4DIG	UCB	NIP	SUPPORTED PARAMETERS (VALUES) / FEATURES
3286-2	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3287-1	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3287-1C	031	3286-1	4300	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3287-2	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3287-2C	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3288	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3289-1	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3289-2	031	3286-2	4400	N	N	N	N	FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3290	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3300	022	AFP1	1750	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / BURSTER
3380	002	3380	290	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP
3380-CJ2	002	3380	290	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP
3380A	002	3380	290	Y	Y	Y	N	PRIVATE: WLMPAV
3380B	002	3380	290	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY,PRIVATE: WLMPAV / SHARED,SHAREDUP
3390	002	3390	280	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP
3390A	002	3390	280	Y	Y	Y	N	PRIVATE: WLMPAV
3390B	002	3390	280	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY,PRIVATE: WLMPAV / SHARED,SHAREDUP
3390D	002	3390	280	Y	Y	Y	N	FEATURE,DYNAMIC,LOCANY,PRIVATE: WLMPAV / SHARED
3390S	002	3390	280	Y	Y	Y	N	FEATURE,DYNAMIC,LOCANY,PRIVATE: WLMPAV / SHARED
3420-3	005	3400-3	1210	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / DATACONV,DUALDENS,SHARABLE,7-TRACK,9-TRACK
3420-4	005	3400-5	1200	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARABLE,9-TRACK,OPT1600
3420-5	005	3400-3	1210	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / DATACONV,DUALDENS,SHARABLE,7-TRACK,9-TRACK
3420-6	005	3400-5	1200	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARABLE,9-TRACK,OPT1600
3420-7	005	3400-3	1210	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / DATACONV,DUALDENS,SHARABLE,7-TRACK,9-TRACK
3420-8	005	3400-5	1200	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARABLE,9-TRACK,OPT1600
3422	005	3400-6	1220	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARABLE,9-TRACK,OPT1600
3423	005	3423	1380	Y	Y	Y	N	OFFLINE,DYNAMIC,LOCANY
3424	005	3400-6	1220	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARABLE
3430	005	3400-6	1220	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / 9-TRACK,OPT1600
3471	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3472	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3480	005	3480	1100	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY,PRIVATE: LIBRARY,AUTOSWITCH,LIBRARY-ID,LIBPORT-ID, MTL / SHARABLE,COMPACT
3481	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3482	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3483	004	3277-2	3800	Y	Y	Y	Y	FEATURE,OFFLINE,DYNAMIC,LOCANY / ASCACHAR,ASCBCHAR,DOCHAR,FRCHAR,GRCHAR,KACHAR, UKCHAR,AUDALRM,MAGCDRD,NUMLOCK,PTREAD,SELPEN,ASKY3277,DEKY3277,EBKY3277,OCKY3277, KB70KEY,KB78KEY,KB81KEY
3490	005	3490	1000	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY,PRIVATE: LIBRARY,AUTOSWITCH,LIBRARY-ID,LIBPORT-ID, MTL / SHARABLE,COMPACT
3505	012	3505	2400	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / CARDIMAGE
3525	012	3525	2500	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / CARDIMAGE,TWOLINE,MULTILINE
3540	032	3540	5600	N	N	N	N	OFFLINE
3590	005	3590-1	950	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY,PRIVATE: LIBRARY,AUTOSWITCH,LIBRARY-ID,LIBPORT-ID, MTL / SHARABLE,COMPACT
3704	023	3704	7800	Y	Y	N	N	ADAPTER(CA1),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3705	023	3705	7600	Y	Y	N	N	(R)ADAPTER(TYPE1,TYPE2,TYPE3,TYPE4),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3720	023	3720	7575	Y	Y	N	N	(R)ADAPTER(TYPE5),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3725	023	3725	7550	Y	Y	N	N	(R)ADAPTER(TYPE5),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3737	014	CTC	8400	Y	Y	Y	N	FEATURE,OFFLINE,DYNAMIC,LOCANY / 370
3745	023	3745	7450	Y	Y	N	N	(R)ADAPTER(TYPE6,TYPE7),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3746	023	3746	7551	Y	Y	N	N	(R)ADAPTER(TYPE6,TYPE7),OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3767-1	024	AAA8	6800	N	N	N	N	(R)ADAPTER(IBM1),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702, 2703) / AUTOPOLL,AUTOANSR,AUTOCALL,CHECKING,INTERRUPT,OIU,SCONTROL,XCONTROL
3767-2	024	AAA8	6800	N	N	N	N	(R)ADAPTER(IBM1),FEATURE,OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702, 2703) / AUTOPOLL,AUTOANSR,AUTOCALL,CHECKING,INTERRUPT,OIU,SCONTROL,XCONTROL
3791L	027	3791L	7700	Y	Y	N	N	OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
3800-1	011	3800	1780	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / BURSTER,CGS1,CGS2
3800-3	011	3800	1780	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / BURSTER
3800-6	011	3800	1780	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / BURSTER,CGS1,CGS2
3800-8	011	3800	1780	Y	Y	N	N	FEATURE,OFFLINE,DYNAMIC / BURSTER

Figure 170. Supported Hardware Report (Part 24 of 29)

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                                        SUPPORTED HARDWARE - MVS DEVICES              TIME: 12:45  DATE: 2008-02-15  PAGE X-  25
TYPE-MODEL    UIM GENERIC  DPREF DYN 4DIG UCB NIP SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ _______  _____ ___ ____ ___ ___ ______________________________________________________________________________
3812          031 3286-2    4400  N   N    N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
3820          022 3820      1800  Y   Y    N   N  OFFLINE,DYNAMIC
3825          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3827          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3828          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3829          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3831          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3835          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3886          032 3886      4900  N   N    N   N  OFFLINE
3890          032 3890      4800  N   N    N   N  OFFLINE
3895          032 3895      5400  N   N    N   N  OFFLINE
3900          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3935          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
3995          053 3995      8600  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
3995-SDA      053 3995      8600  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
3995-151      002 3390       280  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP
3995-153      002 3390       280  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP
4000          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
4224          031 3286-2    4400  N   N    N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
4245          012 4245      1890  Y   Y    N   N  OFFLINE,DYNAMIC
4248          012 4248      1850  Y   Y    N   N  OFFLINE,DYNAMIC
4250          031 3286-2    4400  N   N    N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
4370          022 AFP1      1750  Y   Y    N   N  FEATURE,OFFLINE,DYNAMIC / BURSTER
5210          031 3286-2    4400  N   N    N   N  FEATURE,OFFLINE / DOCHAR,FRCHAR,GRCHAR,KACHAR,UKCHAR,PTREAD
7171          027 3791L     7700  Y   Y    N   N  OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
7770-3        023 AAAC      7200  Y   Y    N   N  OFFLINE,DYNAMIC,OWNER(VTAM,OTHER)
8232          014 CTC       8400  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / 370
83B3          025 AAA6      6600  N   N    N   N  (R)ADAPTER(TELE1),OFFLINE,SETADDR(0,1,2,3),(R)TCU(2701,2702,2703)
9032          051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
9032-3        051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
9032-5        051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
9033          051 SWCH     10500  Y   Y    Y   N  OFFLINE,DYNAMIC,LOCANY
9345          002 9345       270  Y   Y    Y   N  FEATURE,OFFLINE,DYNAMIC,LOCANY / SHARED,SHAREDUP

        KEY                                    KEY DESCRIPTION
        ---                                    ---------------
        TYPE-MODEL                          -  SUPPORTED DEVICE TYPE
        UIM                                 -  INDEX OF UNIT INFORMATION MODULE SUPPORTING THIS DEVICE TYPE
        GENERIC                             -  GENERIC DEVICE TYPE
        DPREF                               -  DEFAULT DEVICE PREFERENCE VALUE
        DYN                                 -  DEVICE SUPPORTS DYNAMIC I/O RECONFIGURATION
        4DIG                                -  DEVICE TYPE SUPPORTS DEVICE NUMBERS GREATER THAN 0FFF
        UCB                                 -  DEVICE TYPE SUPPORTS UCB BEING LOCATED ABOVE 16 MB
        NIP                                 -  DEVICE TYPE SUPPORTED AS NIP CONSOLE
        SUPPORTED PARAMETERS (VALUES) / FEATURES  -  LIST OF SUPPORTED PARAMETERS (WITH SELECTION VALUES) AND FEATURES
        Y                                   -  DEVICE TYPE HAS THE CAPABILITY
        N                                   -  CAPABILITY IS NOT AVAILABLE
        (R)                                 -  PARAMETER IS REQUIRED
        PRIVATE:                            -  START OF PARAMETERS PRIVATE TO UIM
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Figure 170. Supported Hardware Report (Part 25 of 29)

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                                              SUPPORTED HARDWARE - VM DEVICES              TIME: 12:45  DATE: 2008-02-15  PAGE X-  26
TYPE-MODEL    UIM VM D/T        CONS         SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ _____________ ____         ________________________________________________________________________________________
AFP1-0        278 AFP1           N           OFFLINE,UIRATE
BCTC          270 CTCA           N           OFFLINE,UIRATE
BSC1          282 3705           N           (R)ADAPTER(BSCA),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
BSC2          282 3705           N           (R)ADAPTER(BSCA),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
BSC3          282 3705           N           (R)ADAPTER(BSCA),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
CTC           270 CTCA           N           OFFLINE,UIRATE
CTCA          270 CTCA           N           OFFLINE,UIRATE
DUMMY         306 DUMMY          N           (R)CLASS(DASD,TAPE,TERM,DISPLAY,RDR,PRT,PUN,SWITCH),OFFLINE,UIRATE / DPS,RESERVE
FBASCSI       254 FBASCSI        N           OFFLINE,UIRATE,(R)ATTR(1750,2105,2107,2145,SCSI),(R)FCPDEV,(R)WWPN,(R)LUN,PREFPATH
FB512         258 FB-512         N           OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
FCP           254 FCP            N           OFFLINE,UIRATE
FCTC          270 CTCA           N           OFFLINE,UIRATE
HFGD          291 HFGD           N           OFFLINE,UIRATE
ICABSCA       308 ICA            N           (R)ADAPTER(BSCA),OFFLINE,UIRATE
ICAELAN       308 ICA            N           (R)ADAPTER(ELAN),OFFLINE,UIRATE
ICAHDLC       308 ICA            N           (R)ADAPTER(HDLC),OFFLINE,UIRATE
ICAILAN       308 ICA            N           (R)ADAPTER(ILAN),OFFLINE,UIRATE
ICASDLC       308 ICA            N           (R)ADAPTER(SDLC),OFFLINE,UIRATE
ICATELE2      308 ICA            N           (R)ADAPTER(TELE2),OFFLINE,UIRATE
IQD           314 OSA            N           OFFLINE,UIRATE
OSA           314 OSA            N           OFFLINE,UIRATE
OSAD          314 OSAD           N           OFFLINE,UIRATE
OSN           314 OSN            N           OFFLINE,UIRATE
RS6K          312 3088           N           OFFLINE,UIRATE
SCTC          270 CTCA           N           OFFLINE,UIRATE
SWCH          307 9032           N           OFFLINE,UIRATE
TWX           281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
1050          280 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
1050X         280 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
1287          288 1287           N           OFFLINE,UIRATE
1288          288 1288           N           OFFLINE,UIRATE
1403-N1       268 1403           N           AFP,CHARS,CLASS,DEST,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE / UNVCHSET
1403-2        268 1403           N           AFP,CHARS,CLASS,DEST,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE / UNVCHSET
1403-3        268 1403           N           AFP,CHARS,CLASS,DEST,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE / UNVCHSET
1403-5        268 1403           N           AFP,CHARS,CLASS,DEST,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE / UNVCHSET
1403-7        268 1403           N           AFP,CHARS,CLASS,DEST,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE / UNVCHSET
2032          307 2032           N           OFFLINE,UIRATE
2250-3        277 2250           N           OFFLINE,UIRATE
2305-2        269 2305-2         N           OFFLINE,SHARED,UIRATE
2501-B1       266 2501           N           CLASS,OFFLINE,UIRATE
2501-B2       266 2501           N           CLASS,OFFLINE,UIRATE
2540P-1       268 2540P          N           CLASS,FORM,OFFLINE,SEP,UIRATE
2540R-1       266 2540R          N           CLASS,OFFLINE,UIRATE
2701          279 2701           N           (R)ADAPTER(BSCA,IBM1,TELE2),OFFLINE,UIRATE
2710          278 AFP1           N           OFFLINE,UIRATE
2740          280 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
2740C         280 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
2740X         280 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
2741C         281 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
2741P         281 3705           N           (R)ADAPTER(IBM1),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3088          270 3088           N           OFFLINE,UIRATE
3151          281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3160          278 AFP1           N           OFFLINE,UIRATE
3161          281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3162          281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3163          281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3167          281 3705           N           (R)ADAPTER(TELE2),BASEADD,OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3170          278 AFP1           N           OFFLINE,UIRATE
3172          313 3172           N           OFFLINE,UIRATE
3174          283 3705           N           (R)ADAPTER(TYPE4),CPNAME,(R)MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,C6,D1,D2,D3,D4,D5,D6,
                                             D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,G5,G6,G7,G8,H1,H2,H3,
                                             H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,8),OFFLINE,UIRATE
3178          260 3178           Y           MODEL(2,3,4,5),OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3179          260 3179           Y           MODEL(2,3),OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3180          260 3180           Y           MODEL(2,3,4,5),OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3180-1        260 3180           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3190          260 3190           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3191          260 3190           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3192          260 3190           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3192-F        260 3190           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3193          260 3190           Y           OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
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Figure 170. Supported Hardware Report (Part 26 of 29)

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TYPE-MODEL	UIM	VM D/T	CONS	SUPPORTED PARAMETERS (VALUES) / FEATURES
3194	260	3190	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3203-5	268	3203-5	N	AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE,LIMIT / UNVCHSET
3211	268	3211	N	AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,INDEX,OFFLINE,SEP,UIRATE,LIMIT / UNVCHSET
3215	260	3215	Y	OFFLINE,UIRATE
3216	278	AFP1	N	OFFLINE,UIRATE
3250	277	3250	N	OFFLINE,UIRATE
3251	277	3250	N	OFFLINE,UIRATE
3262-13	287	3287	N	OFFLINE,UIRATE
3262-3	287	3287	N	OFFLINE,UIRATE
3262-5	268	3262	N	AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE,LIMIT
3268-2	287	3287	N	OFFLINE,UIRATE
3270	260	3270	Y	MODEL(2A,2C,2,3,4,5),OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3270-X	260	3270	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3274	283	3705	N	(R)ADAPTER(TYPE4),CPNAME,(R)MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,C6,D1,D2,D3,D4,D5,D6, D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,G5,G6,G7,G8,H1,H2,H3, H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,8),OFFLINE,UIRATE
3277-1	260	3277	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3277-2	260	3277	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-1	260	3278	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-2	260	3278	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-2A	260	3278-2A	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-3	260	3278-3	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-4	260	3278-4	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3278-5	260	3278-5	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-S2B	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-S3G	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-2	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-2A	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-2B	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-2C	260	3279-2C	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-2X	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-3	260	3279-3	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-3A	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-3B	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3279-3X	260	3279	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3284-1	287	3284	N	OFFLINE,UIRATE
3284-2	287	3284	N	OFFLINE,UIRATE
3286-1	287	3286	N	OFFLINE,UIRATE
3286-2	287	3286	N	OFFLINE,UIRATE
3287-1	287	3287	N	OFFLINE,UIRATE
3287-1C	287	3287	N	OFFLINE,UIRATE
3287-2	287	3287	N	OFFLINE,UIRATE
3287-2C	287	3287	N	OFFLINE,UIRATE
3288	287	3288	N	OFFLINE,UIRATE
3289-1	287	3289	N	OFFLINE,UIRATE
3289-2	287	3289	N	OFFLINE,UIRATE
3290	260	3290	Y	OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
3300	278	AFP1	N	OFFLINE,UIRATE
3330-1	257	3330-1	N	OFFLINE,SHARED,UIRATE
3330-11	257	3330-11	N	OFFLINE,SHARED,UIRATE
3330-2	257	3330-2	N	OFFLINE,SHARED,UIRATE
3330V	271	3330	N	OFFLINE,SHARED,UIRATE
3333-1	257	3330-1	N	OFFLINE,SHARED,UIRATE
3333-11	257	3330-11	N	OFFLINE,SHARED,UIRATE
3340	257	3340	N	OFFLINE,SHARED,UIRATE
3344	257	3340	N	OFFLINE,SHARED,UIRATE
3350	257	3350	N	OFFLINE,SHARED,UIRATE
3370	258	3370	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3375	258	3375	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3380	258	3380	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3380-CJ2	258	3380	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3380A	258	3380A	N	
3380B	258	3380B	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3390	258	3390	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3390A	258	3390A	N	
3390B	258	3390B	N	OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3420-3	261	3420-3	N	OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK
3420-4	261	3420-4	N	OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK
3420-5	261	3420-5	N	OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK
3420-6	261	3420-6	N	OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK
3420-7	261	3420-7	N	OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK

Figure 170. Supported Hardware Report (Part 27 of 29)

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                                        SUPPORTED HARDWARE - VM DEVICES             TIME: 12:45  DATE: 2008-02-15  PAGE X-  28
TYPE-MODEL    UIM GENERIC  DPREF DYN 4DIG UCB NIP SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ ________ _____ ___ ____ ___ ___ ____________________________________________________________________________________
3420-8        261 3420-8         N            OFFLINE,UIRATE / CONV,DUALDENS,TRANS,7-TRACK
3422          261 3422           N            OFFLINE,UIRATE
3424          261 3424           N            OFFLINE,UIRATE
3430          261 3430           N            OFFLINE,UIRATE
3480          261 3480           N            OFFLINE,UIRATE
3490          261 3490           N            OFFLINE,UIRATE
3505          266 3505           N            CLASS,OFFLINE,UIRATE
3525          268 3525           N            CLASS,FORM,OFFLINE,UIRATE
3540          288 3540           N            OFFLINE,UIRATE
3590          261 3590           N            OFFLINE,UIRATE
3704          279 3704           N            (R)ADAPTER(BSCA,IBM1,TELE2,TYPE1),BASEADD,CPNAME,MODEL(A1,A2,A3,A4,1,2,3,4),OFFLINE,
                                              SETADDR(0,1,2,3,4),UIRATE
3705          279 3705           N            (R)ADAPTER(BSCA,IBM1,TELE2,TYPE4),BASEADD,CPNAME,MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,
                                              C6,D1,D2,D3,D4,D5,D6,D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,
                                              G5,G6,G7,G8,H1,H2,H3,H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,
                                              8),OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3720          279 3705           N            (R)ADAPTER(TYPE4),CPNAME,(R)MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,C6,D1,D2,D3,D4,D5,D6,
                                              D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,G5,G6,G7,G8,H1,H2,H3,
                                              H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,8),OFFLINE,UIRATE
3725          279 3705           N            (R)ADAPTER(BSCA,IBM1,TELE2,TYPE4),BASEADD,CPNAME,MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,
                                              C6,D1,D2,D3,D4,D5,D6,D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,
                                              G5,G6,G7,G8,H1,H2,H3,H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,
                                              8),OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3737          270 CTCA           N            OFFLINE,UIRATE
3745          279 3705           N            (R)ADAPTER(BSCA,IBM1,TELE2,TYPE4),BASEADD,CPNAME,MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,
                                              C6,D1,D2,D3,D4,D5,D6,D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,
                                              G5,G6,G7,G8,H1,H2,H3,H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,
                                              8),OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3746          279 3705           N            (R)ADAPTER(BSCA,IBM1,TELE2,TYPE4),BASEADD,CPNAME,MODEL(A1,A2,B1,B2,B3,B4,C1,C2,C3,C4,C5,
                                              C6,D1,D2,D3,D4,D5,D6,D7,D8,E1,E2,E3,E4,E5,E6,E7,E8,F1,F2,F3,F4,F5,F6,F7,F8,G1,G2,G3,G4,
                                              G5,G6,G7,G8,H1,H2,H3,H4,H5,H6,H7,H8,J1,J2,J3,J4,K1,K2,K3,K4,L1,L2,L3,L4,1,2,3,4,5,6,7,
                                              8),OFFLINE,SETADDR(0,1,2,3,4),UIRATE
3800-1        267 3800           N            AFP,CHARS,CLASS,DEST,DPMSIZE(1,2,3,4,5,6,7,8,9),FCB,FLASH,FORM,IMAGE,OFFLINE,SEP,UIRATE,
                                              MARK,LIMIT / 4WCGMS
3800-3        267 3800-3         N            AFP,CHARS,CLASS,DEST,DPMSIZE(1,2,3,4,5,6,7,8,9),FCB,FLASH,FORM,IMAGE,OFFLINE,SEP,UIRATE,
                                              MARK,LIMIT / 4WCGMS
3800-6        267 3800-6         N            AFP,CHARS,CLASS,DEST,DPMSIZE(1,2,3,4,5,6,7,8,9),FCB,FLASH,FORM,IMAGE,OFFLINE,SEP,UIRATE,
                                              MARK,LIMIT / 4WCGMS
3800-8        267 3800-8         N            AFP,OFFLINE,UIRATE / 4WCGMS
3812          287 3287           N            OFFLINE,UIRATE
3816          287 3287           N            OFFLINE,UIRATE
3820          278 3820           N            OFFLINE,UIRATE
3825          278 AFP1           N            OFFLINE,UIRATE
3827          278 AFP1           N            OFFLINE,UIRATE
3828          278 AFP1           N            OFFLINE,UIRATE
3829          278 AFP1           N            OFFLINE,UIRATE
3831          278 AFP1           N            OFFLINE,UIRATE
3835          278 AFP1           N            OFFLINE,UIRATE
3851          271 3851           N            OFFLINE,SHARED,UIRATE
3886          288 3886           N            OFFLINE,UIRATE
3890          288 3890           N            OFFLINE,UIRATE
3895          288 3895           N            OFFLINE,UIRATE
3900          278 AFP1           N            OFFLINE,UIRATE
3935          278 AFP1           N            OFFLINE,UIRATE
3995          309 3088           N            OFFLINE,UIRATE
3995-SDA      309 3088           N            OFFLINE,UIRATE
3995-151      258 3390           N            OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
3995-153      258 3390           N            OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
4000          278 AFP1           N            OFFLINE,UIRATE
4224          287 3287           N            OFFLINE,UIRATE
4245          268 4245           N            AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE,LIMIT
4248          268 4248           N            AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE,LIMIT
4370          278 AFP1           N            OFFLINE,UIRATE
5080          291 5080           N            OFFLINE,UIRATE
5081          291 5080           N            OFFLINE,UIRATE
5210          287 3287           N            OFFLINE,UIRATE
6090          291 5080           N            OFFLINE,UIRATE
6091          291 5080           N            OFFLINE,UIRATE
6262          268 4248           N            AFP,CHARS,CLASS,DEST,FCB,FOLD,FORM,IMAGE,OFFLINE,SEP,UIRATE,LIMIT
7171          283 3278           N            OFFLINE,UIRATE / EMUL3270,E3270HLD,OPRDR
8232          270 3088           N            OFFLINE,UIRATE
```

Figure 170. Supported Hardware Report (Part 28 of 29)

```
                                        SUPPORTED HARDWARE - VM DEVICES               TIME: 12:45  DATE: 2008-02-15  PAGE X-  29
TYPE-MODEL    UIM GENERIC  DPREF DYN 4DIG UCB NIP SUPPORTED PARAMETERS (VALUES) / FEATURES
_____________ ___ ________ _____ ___ ____ ___ ___ _________________________________________________________________________________
9032          307 9032           N        OFFLINE,UIRATE
9032-3        307 9032           N        OFFLINE,UIRATE
9032-5        307 9032           N        OFFLINE,UIRATE
9033          307 9033           N        OFFLINE,UIRATE
9332-40       258 9332           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9332-42       258 9332           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9332-60       258 9332           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9332-62       258 9332           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9335-B1       258 9335           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9336-10       258 9336           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9336-20       258 9336           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9345          258 9345           N        OFFLINE,SHARED,UIRATE,MDC(OFF,DFLTOFF,DFLTON)
9348-1        261 9348           N        OFFLINE,UIRATE / DUALDENS

        KEY                               KEY DESCRIPTION
        ---                               ---------------
        TYPE-MODEL                     -  SUPPORTED DEVICE TYPE
        UIM                            -  INDEX OF UNIT INFORMATION MODULE SUPPORTING THIS DEVICE TYPE
        VM D/T                         -  VM DEVICE TYPE
        CONS                           -  DEVICE TYPE IS SUPPORTED AS VM CONSOLE
        SUPPORTED PARAMETERS (VALUES) / FEATURES  -  LIST OF SUPPORTED PARAMETERS (WITH SELECTION VALUES) AND FEATURES
        Y                              -  DEVICE TYPE HAS THE CAPABILITY
        N                              -  CAPABILITY IS NOT AVAILABLE
        (R)                            -  PARAMETER IS REQUIRED
```

Figure 170. Supported Hardware Report (Part 29 of 29)

```
                              I/O DEFINITION REFERENCE - DEVICES        TIME: 17:31  DATE: 1996-11-18  PAGE Y- 305

3490                TAPE      Magnetic Tape Subsystem                                                   /   1
______________________________________________________________________________________________________________________
UNIT=3490

                    Physical Configuration Information

                    Physical Device Types

                    Physical Device
                    3490-B20
                    3490-B40
                    Attachable to the following control units
                    3490-A10
                    3490-A20

                    Physical Device
                    (Integrated Tape Subsystem)
                    3490-C10
                    3490-C11
                    3490-C22

                    Physical Device
                    (Integrated Tape Subsystem inside a 3494)
                    3490-C1A
                    3490-C2A

                    Physical Device
                    3494 and 3495 are tape libraries containing automation,
                    library manager, one or more tape control units, storage
                    cells and tape cartridges. To prepare the IODF, no need
                    to define 3494 and 3495 explicitly. However, need to
                    indicate the tape devices as library tape devices by
                    specifying LIBRARY=YES in the device definition.

                    Logical Configuration Rules

                    For Channel Subsystem
                    - Up to maximum 4 channel paths for A10, 8 for A20,
                     2 for C1A or C2A.
                    - Range of 16 unit addresses for control unit. Also
                     accept a minimum of 2 addresses for integrated tape
                     subsystem.

                    For Operating System
                    - LIBRARY=YES, if devices are installed in a system-
                     managed IBM 3494 or IBM 3495 Tape Library.
                    - LIBRARY=YES or NO for BTLS managed library drives
                    - DYNAMIC=YES, if devices are dynamically reconfigured
                    - AUTOSWITCH=YES, if tape drives are dynamically switched
                     between system (MVS/ESA 5.2.0)

                    Configuration Example
                     CHPID PATH=(22,27),TYPE=CNC
```

Figure 171. I/O Definition Reference (Part 1 of 5)

```
                                I/O DEFINITION REFERENCE - DEVICES        TIME: 17:31  DATE: 1996-11-18  PAGE Y- 306

3490                TAPE      Magnetic Tape Subsystem                                                        /   2
____________________________________________________________________________________________________________________
                     CNTLUNIT CUNUMBR=0501,PATH=(22,27),UNIT=3490,         X
                          UNITADD=((00,16))
                     IODEVICE ADDRESS=(540,016),CUNUMBR=(0501),UNIT=3490,  X
                          OFFLINE=YES,DYNAMIC=YES,                         X
                          USERPRM=((LIBRARY,YES),(AUTOSWITCH,YES))

                    Software Prerequisites
                     Minimum version and release to operate the device in
                     MVS/ESA environment:

                    - MVS/SP - JES2 3.1
                    - MVS/DFP 3.1

                    Minimum Product Levels

                    - DFSORT release 11 (release 12 for C1A,C2A)
                    - EREP 3.4 (3.5 for C1A,C2A)
                    - DFHSM 2.6
                    - DFDSS 2.5

                    References

                    - MVS/ESA & MVS/XA Support for 3490 Magnetic Tape
                     Subsystem.  GC28-1141
                    - IBM 3490E Planning and Migration Guide GC35-0219
                    - IBM 3490  Planning and Migration Guide GC35-0116

                    Notes

                    - For the latest information, contact your local IBM
                     Marketing Representative.

                    -end-

Device number definition values: ADDRESS=(device number<,number-of-devices>)

    device number: 1 - 4 hexadecimal number in the range 0000 - FFFF.

    number-of-devices: Number of sequential device numbers to be assigned to the devices.
                    Minimum value:    1
                    Default value:    1
                    Maximum value: 4095


Channel Subsystem information:
------------------------------

    When attached to a parallel interface:
                    I/O interface time out function default: TIMEOUT=YES
                    Status verification facility default:    STADET=YES
```

Figure 171. I/O Definition Reference (Part 2 of 5)

```
                              I/O DEFINITION REFERENCE - DEVICES        TIME: 17:31  DATE: 1996-11-18  PAGE Y- 307

3490                TAPE      Magnetic Tape Subsystem                                                      /   3
_____________________________________________________________________________________________________________________
    Unit address: UNITADD=xx
                    The unit address is a hexadecimal value from 00 to FF which must be specified
                    in the unit address range of the control unit.
                    Default unit address are the last 2 digits of the device number.


MVS configuration information:
------------------------------

    Generic name: 3490        It may be modified dependent on the specified features.

    Support of dynamic I/O reconfiguration:      Yes
    Support of device numbers greater than 0FFF: Yes
    Support of UCBs above 16 MB storage:         Yes

    Required parameters: None.

    Optional parameters:

    OFFLINE         Device considered online or offline at IPL
                    Default value: OFFLINE=NO

                    Specifies whether MVS is to consider the device
                    online or offline at IPL.

                    Yes      The device is considered offline at IPL.

                    No       The device is considered online at IPL.
                            (Default)

                    If MVS needs the device during IPL, specify No.

    DYNAMIC         Device supports dynamic configuration

                    Specify yes to indicate that the device is to be
                    eligible for Dynamic I/O Configuration.

    LIBRARY         Device supports auto tape library

                    Data type is YES or NO
                    Pre-selected:  No

                    Specify YES to indicate that the device belongs
                    to an automated tape library.

    AUTOSWITCH      Device is automatically switchable

                    Data type is YES or NO
                    Pre-selected:  No

                    Specify YES to indicate that the device should
```

Figure 171. I/O Definition Reference (Part 3 of 5)

```
                                  I/O DEFINITION REFERENCE - DEVICES        TIME: 17:31  DATE: 1996-11-18  PAGE Y- 308

3490                TAPE      Magnetic Tape Subsystem                                                       /   4
_____________________________________________________________________________________________________________________
                    be treated as an automatically switchable device

    Supported features:

    ALTCTRL         Separate physical control unit path

                    Specify Yes to indicate that there is a separate
                    physical control unit path to the device.

    SHARABLE        Device is Sharable between systems

                    Specify Yes to indicate that the 3803 two-channel
                    switch is used for partitioning and that magnetic
                    tape drives can be shared between two processors.

                    Do not allocate or unload a shared tape drive.

                    If specify Yes for SHARABLE, HCD forces a value of
                    Yes for the OFFLINE parameter, even if you specify
                    No for OFFLINE.

    COMPACT         Compaction

                    Specify Yes to indicate that compaction is
                    available for tape devices.

                    Compaction is a method of compressing and encoding
                    data in order to reduce storage space.
```

Figure 171. I/O Definition Reference (Part 4 of 5)

```
                              I/O DEFINITION REFERENCE - DEVICES            TIME: 17:31  DATE: 1996-11-18  PAGE Y- 403

                                                             INDEX
 _____________________________________________________________________________________________________________________

    AFP1-0 ...... Y-   1          3088 ........ Y-  95          3279-2C ..... Y- 209          3480 ........ Y- 300
    BCTC ........ Y-   3          3151 ........ Y-  97          3279-2X ..... Y- 116          3481 ........ Y- 116
    BSC1 ........ Y-   5          3160 ........ Y-  98          3279-3 ...... Y- 216          3482 ........ Y- 116
    BSC2 ........ Y-   8          3161 ........ Y- 100          3279-3A ..... Y- 217          3483 ........ Y- 116
    BSC3 ........ Y-  11          3162 ........ Y- 101          3279-3B ..... Y- 223          3490 ........ Y- 306
    .....................................................................................................................
```

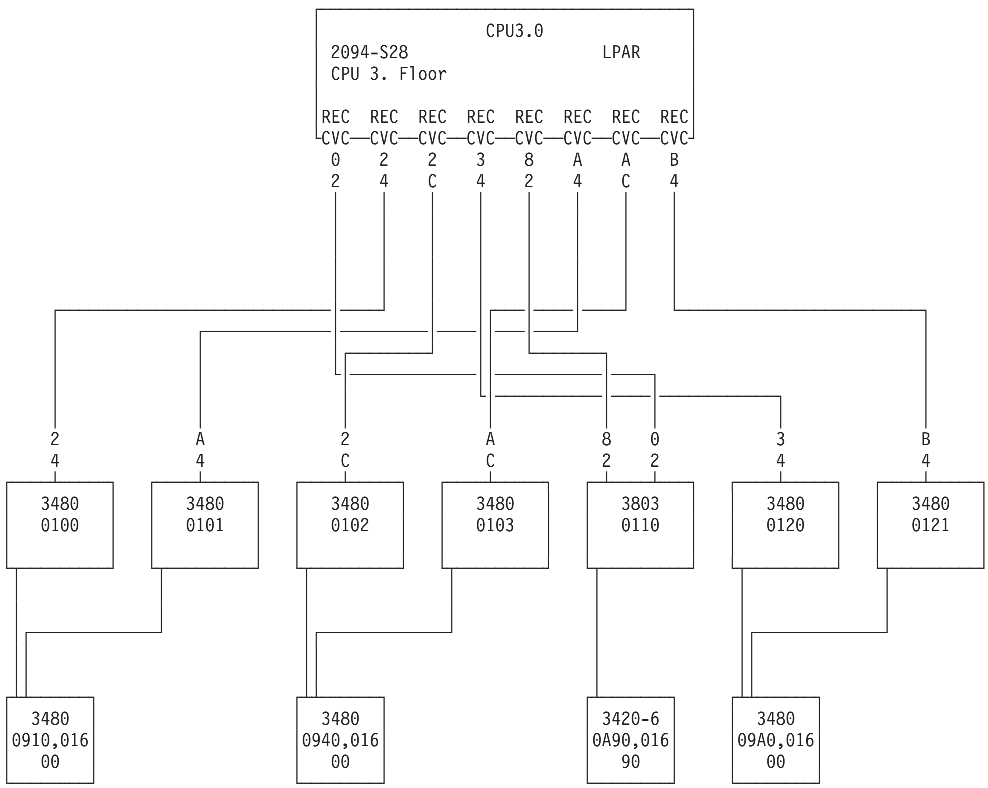
Figure 171. I/O Definition Reference (Part 5 of 5)

Graphical configuration reports

This section contains one example for an LCU report. "Create or view graphical configuration reports" on page 238 describes how to produce this report.

LCU Report

The LCU report shows all logical control units for the designated processor. Each diagram shows one or more logical control units.



IODF compare reports

The following figures show examples of IODF compare reports that can be produced by the IODF compare function of HCD. Not all possible reports are shown, and not all examples are shown completely. “HCD compare functions” on page 246 describes how to produce these reports.

For XMP processors, the processorID for the comparison is shown together with the channel subsystem in question, for example, `XMP01.1`

With all IODF reports where channel subsystems of XMP processors are involved, you can compare two channel subsystems.

You can also compare an SMP processor to a channel subsystem of an XMP processor. If this kind of comparison is limited by processor only, the SMP processor is compared to channel subsystem 0 of the XMP processor.

Processor Compare Report

```
                        Processor Compare Report                        TIME: 10:40  DATE: 2004-12-22  PAGE A -    1

         New IODF name:  BOKA.IODF75.WORK.R17                   Old IODF name:  BOKA.IODF76.WORK.R17
```

PROC	New IODF	Old IODF	Description
GOLDENE1	Actual Data	Old Data	
	with 4 CSSes prima + ry 2094-S38	with 4 CSSes	Processor Description continued
GOLDENE2	Added		

	LPAR
	2094-S28
	
	with 4 CSSes secon +
	dary 2094-S28
	000000029F09209405 +
	-01-1314:37:54
	ERV01
		
		000000029F09209405 +
		-01-2316:53:04
			Processor Configuration Mode
			Processor Type
			Processor Serial Number
			Processor Network Name of SNA Address
			Processor CPC Name of SNA Address
			Processor Description
			  continued
			Processor Token
			  continued
			  Processor Local System Name

Figure 172. Processor Compare Report

Channel Subsystem Compare Report

```
                           Channel Subsystem Compare Report              TIME: 15:48  DATE: 2002-12-13  PAGE A -    1

               New IODF name:  BOKA.IODFC1.MIG                     Old IODF name:  BOKA.IODFC1.MIG1


                              Limited to New Processor Id:  XMPBIG    Old Processor Id:  XMPBIG
                              Limited to New CSS Id:       0        Old CSS Id:       0

|------------------------------|----------------------|----------------------|---------------------------------------------------|
| PROC       CSS ID            | New IODF             | Old IODF             | Description                                       |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
| XMPBIG     0                 | Actual Data          | Old Data             |                                                   |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              | 64512                | 64510                | Maximum Numbers of Devices in Subchannel Set 0    |
|                              | 32180                | 11000                | Maximum Numbers of Devices in Subchannel Set 1    |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
```

Figure 173. Channel Subsystem Compare Report

Partition Compare Report

```
                           Partition Compare Report                      TIME: 16:14  DATE: 2003-01-17  PAGE B -    4

               New IODF name:  SEL.IODF00.COMP200.NEW              Old IODF name:  SEL.IODF00.COMP200.OLD

                              Limited to New Processor Id: PROCCHK    Old Processor Id: PROCCHK


|------------------------------|----------------------|----------------------|---------------------------------------------------|
| PROC       PART              | New IODF             | Old IODF             | Description                                       |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
| PROCCHK.0  PART1             | Actual Data          | Old Data             |                                                   |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              | 1                    | same                 | Partition Number                                  |
|                              | OS                   | same                 | Partition Usage                                   |
|                              | test system_1        | same                 | Partition Description                             |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
| PROCCHK.0  PART2             | Added                |                      |                                                   |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              | 2                    |                      | Partition Number                                  |
|                              | OS                   |                      | Partition Usage                                   |
|                              | test_system_2        |                      | Partition Description                             |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
...
```

Figure 174. Partition Compare Report

Channel Path Compare Report

Channel Path Compare Report TIME: 10:40 DATE: 2004-12-22 PAGE C - 9

New IODF name: BOKA.IODF75.WORK.R17 Old IODF name: BOKA.IODF76.WORK.R17

PROC CHPID	New IODF	Old IODF	Description
GOLDENE1.0 50	Added		
	555		Physical Channel ID
	OSD		Channel Path Type
	SPAN		Channel Path Operation Mode
	up to 1920 subchan +		Channel Path Description
	nels		continued
	undefined		Connects to Dynamic Switch
	not managed		Channel Path Managed Indicator
	none		Channel Path I/O Cluster Name
	n/a		MTU size (in KB)
	n/a		HCA Adapter ID
	n/a		HCA Port
	disabled		Queue Prioritization
	>> GECSS0FX		Partition in Access List
	>> GECSS01X		Partition in Access List
	>> GECSS03X		Partition in Access List
GOLDENE1.0 51	Added		
	n/a		Physical Channel ID
	IQD		Channel Path Type
	SHR		Channel Path Operation Mode
			Channel Path Description
	undefined		Connects to Dynamic Switch
	not managed		Channel Path Managed Indicator
	none		Channel Path I/O Cluster Name
	24		MTU size (in KB)
	n/a		HCA Adapter ID
	n/a		HCA Port
	n/a		Queue Prioritization
	>> GECSS0FX		Partition in Access List
	>> GECSS01X		Partition in Access List
	>> GECSS09X		Partition in Candidate List

...

Figure 175. Channel Path Compare Report

Control Unit Attachment Compare Report

```
                         Control Unit Attachment Compare Report         TIME: 14:21  DATE: 2000-12-08  PAGE D -    4

          New IODF name:  BOKA.IODF38                        Old IODF name:  BOKA.IODF38.TEMP

                         Limited to New Processor Id:  FR38LPAR  Old Processor Id:  FR38LPAR

|------------------------------|----------------------|----------------------|--------------------------------------------------|
| PROC       CU                | New IODF             | Old IODF             | Description                                      |
|------------------------------|----------------------|----------------------|--------------------------------------------------|
| FR38LPAR   2000              | Actual Data          | Old Data             |                                                  |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              | serial               | same                 | Control Unit Attachment Type                     |
|                              | S          *         | same                 | Protocol                                         |
|                              | 2          *         | same                 | I/O Concurrency Level                            |
|                              | 1                    | same                 | Control Unit Address                             |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              | 00,256               | same                 | Unit Address, Number of addresses                |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              |  >> 07.9B            |  >> same             | Connected Channel Path, Destination Link Address |
|                              |  >> 0C.70            |  >> same             | Connected Channel Path, Destination Link Address |
|                              |  >> 6B.9E            |  >> same             | Connected Channel Path, Destination Link Address |
|                              | 5                    | same                 | Number of Connected Managed Channel Paths        |
|------------------------------|----------------------|----------------------|--------------------------------------------------|
| FR38LPAR   2200              | Actual Data          | Old Data             |                                                  |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              | serial               | same                 | Control Unit Attachment Type                     |
|                              | S          *         | same                 | Protocol                                         |
|                              | 2          *         | same                 | I/O Concurrency Level                            |
|                              | 3                    | same                 | Control Unit Address                             |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              | 00,256               | same                 | Unit Address, Number of addresses                |
|                              |----------------------|----------------------|--------------------------------------------------|
|                              |  >> 0B.B9            |  >> same             | Connected Channel Path, Destination Link Address |
|                              |  >> 17.9B            |  >> same             | Connected Channel Path, Destination Link Address |
|                              |  >> 6B.9A            |  >> same             | Connected Channel Path, Destination Link Address |
|                              | 5                    | same                 | Number of Connected Managed Channel Paths        |
|------------------------------|----------------------|----------------------|--------------------------------------------------|
```

Figure 176. Control Unit Attachment Compare Report

Device Attachment Compare Report

```
                         Device Attachment Compare Report               TIME: 12:16  DATE: 2004-12-22  PAGE E -   11

          New IODF name:  BOKA.IODF75.WORK.R17                 Old IODF name:  BOKA.IODF77.WORK.R17


                               Limited to New Processor Id:  GOLDENE1  Old Processor Id:  GOLDENE1
                               Limited to New CSS Id:        0         Old CSS Id:        0

|------------------------------|----------------------|----------------------|---------------------------------------------------|
| PROC       Device, Range     | New IODF             | Old IODF             | Description                                       |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
| GOLDENE1.0 0000,8            | Actual Data          | Old Data             |                                                   |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              | 0                    | 1                    | Subchannel Set ID                                 |
|                              | 00                   | same                 | Unit Address                                      |
|                              | Yes                  | same                 | Illegal Status Detection Facility                 |
|                              | No                   | same                 | Timeout Facility                                  |
|                              | undefined            | same                 | Preferred Channel Path                            |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              |  >> GECSS0FX         |  >> same             | Partition in Explicit Device Candidate list       |
|                              |  >> GECSS01X         |  >> same             | Partition in Explicit Device Candidate list       |
|                              |  >> GECSS03X         |  >> same             | Partition in Explicit Device Candidate list       |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
| GOLDENE1.0 0008,8            | Actual Data          | Old Data             |                                                   |
|                              |----------------------|----------------------|---------------------------------------------------|
|                              | 0                    | same                 | Subchannel Set ID                                 |
|                              | 08                   | same                 | Unit Address                                      |
|                              | Yes                  | same                 | Illegal Status Detection Facility                 |
|                              | No                   | same                 | Timeout Facility                                  |
|                              | undefined            | same                 | Preferred Channel Path                            |
|------------------------------|----------------------|----------------------|---------------------------------------------------|
```

Figure 177. Device Attachment Compare Report

Control Unit Compare Report

```
                           Control Unit Compare Report                    TIME: 08:41  DATE: 1997-11-06  PAGE F -    1

            New IODF name:  REDDE.IODF00.COMP1                   Old IODF name:  REDDE.IODF00.COMP2

                                 Limited to New Processor Id:  LPARPROC  Old Processor Id:  LPARPROC
                                 Limited to New Partition Id:  PART1     Old Partition Id:  PART3

  |----------------------------|----------------------|----------------------|-----------------------------------------------------|
  | CU                         | New IODF             | Old IODF             | Description                                         |
  |----------------------------|----------------------|----------------------|-----------------------------------------------------|
  | 0200                       | Actual Data          | Old Data             |                                                     |
  |                            |----------------------|----------------------|-----------------------------------------------------|
  |                            | 3990                 | same                 | Control Unit Type                                   |
  |                            |                      | same                 | Control Unit Serial Number                          |
  |                            |                      | same                 | Control Unit Description                            |
  |                            |----------------------|----------------------|-----------------------------------------------------|
  |                            |  >> BASPROC          |  >> new added        | Attached to Processor                               |
  |                            |  >> LPARPROC         |  >> same             | Attached to Processor                               |
  |                            |  >> P2084.1          |  >> same             | Attached to Processor                               |
  |                            |----------------------|----------------------|-----------------------------------------------------|
  |                            |  >> 0200,15          |  >> same             | Attached Device, Range                              |
  |                            |  >> 020F             |  >> same             | Attached Device, Range                              |
  |                            |  >> 0210,11          |  >> same             | Attached Device, Range                              |
  |                            |----------------------|----------------------|-----------------------------------------------------|
  |                            |  >> 01 E4            |  >> same             | Connected to Switch, Port                           |
  |                            |  >> 01 E5            |  >> same             | Connected to Switch, Port                           |
  |                            |----------------------|----------------------|-----------------------------------------------------|
  |                            |  >> access list      |  >> candidate list   | Relation to Limiting LPAR                           |
  |----------------------------|----------------------|----------------------|-----------------------------------------------------|
```

Figure 178. Control Unit Compare Report

Device Compare Report

```
                         Device Compare Report                          TIME: 08:41  DATE: 1997-11-06  PAGE G -    1

           New IODF name:  REDDE.IODF00.COMP1                     Old IODF name:  REDDE.IODF00.COMP2

                              Limited to New Processor Id:  LPARPROC  Old Processor Id:  LPARPROC
                              Limited to New Partition Id:  PART1     Old Partition Id:  PART3

 |----------------------------|----------------------|----------------------|-----------------------------------------------------|
 | Device, Range              | New IODF             | Old IODF             | Description                                         |
 |----------------------------|----------------------|----------------------|-----------------------------------------------------|
 | 0100                       | Actual Data          | Old Data             |                                                     |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            | 9032                 | same                 | Device Type                                         |
 |                            |                      | same                 | Serial Number                                       |
 |                            |                      | same                 | Device Description                                  |
 |                            |                      | same                 | VOLSER                                              |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> BASPROC          |  >> new added        | Attached to Processor                               |
 |                            |  >> old deleted      |  >> BASPROC1         | Attached to Processor                               |
 |                            |  >> LPARPROC         |  >> same             | Attached to Processor                               |
 |                            |  >> P2084.1          |  >> same             | Attached to Processor                               |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> 0100             |  >> same             | Connected to Control Unit                           |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> access list      |  >> candidate list   | Relation to Limiting LPAR                           |
 |----------------------------|----------------------|----------------------|-----------------------------------------------------|
 | 0200,15                    | Actual Data          | Old Data             |                                                     |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            | 3390                 | same                 | Device Type                                         |
 |                            |                      | same                 | Serial Number                                       |
 |                            |                      | same                 | Device Description                                  |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> BASPROC          |  >> new added        | Attached to Processor                               |
 |                            |  >> LPARPROC         |  >> same             | Attached to Processor                               |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> 0200             |  >> same             | Connected to Control Unit                           |
 |                            |  >> 0210             |  >> same             | Connected to Control Unit                           |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> OSOSOSOS         |  >> same             | Attached to Operating System Configuration          |
 |                            |----------------------|----------------------|-----------------------------------------------------|
 |                            |  >> access list      |  >> candidate list   | Relation to Limiting LPAR                           |
 |----------------------------|----------------------|----------------------|-----------------------------------------------------|
```

Figure 179. Device Compare Report

Switch Compare Report

```
                                       Switch Compare Report                          TIME: 13:52  DATE: 2007-07-25  PAGE H -    1

                New IODF name:  HCI.IODF00                             Old IODF name:  HCI.IODF01


 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | SWITCH                     | New IODF             | Old IODF             | Description                                        |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | 01                         | Actual Data          | Old Data             |                                                    |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | 9032                 | same                 | Switch Type                                        |
 |                            |                      | same                 | Switch Serial Number                               |
 |                            |                      | same                 | Description                                        |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | >> 1000    1000      | >> same              | Switch Control unit, switch device                 |
 |                            | >> 1010    1010      | >> same              | Switch Control unit, switch device                 |
 |                            | >> 1020    1020      | >> same              | Switch Control unit, switch device                 |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | 02                         | Actual Data          | Old Data             |                                                    |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | 9032                 | same                 | Switch Type                                        |
 |                            |                      | same                 | Switch Serial Number                               |
 |                            |                      | same                 | Description                                        |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | >> 2222    2222      | >> same              | Switch Control unit, switch device                 |
 |                            | >> 3333    3333      | >> 4444 4444         | Switch Control unit, switch device                 |
 |                            | >> 4444    4444      | >> new added         | Switch Control unit, switch device                 |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
```

Figure 180. Switch Compare Report

Switch Detail Compare Report

```
                                       Switch Detail Compare Report                   TIME: 13:52  DATE: 2007-07-25  PAGE I -    9

                New IODF name:  HCI.IODF00                             Old IODF name:  HCI.IODF01


                                     Limited to New Switch Id:  01      Old Switch Id:  01


 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | SWITCH   PORT              | New IODF             | Old IODF             | Description                                        |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | 01       B0                | Actual Data          | Old Data             |                                                    |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | installed            | same                 | Port Installed Flag                                |
 |                            |                      |                      | Port Name                                          |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            |  >> 0800             |  >> same             | Attached to Control Unit                           |
 |                            |  >> P2084.1  31      |  >> same             | Attached to Processor, Channel Path                |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | 01       B1                | Actual Data          | Old Data             |                                                    |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | installed            | same                 | Port Installed Flag                                |
 |                            | CU_400               | CU_500               | Port Name                                          |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            |  >> 0800             |  >> 0500             | Attached to Control Unit                           |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
 | 01       B2                | Actual Data          | Old Data             |                                                    |
 |                            |----------------------|----------------------|----------------------------------------------------|
 |                            | installed            | same                 | Port Installed Flag                                |
 |                            | PROCA_CP18           |                      | Port Name                                          |
 |                            | occupied             | not occupied         | Port Occupied Flag                                 |
 |----------------------------|----------------------|----------------------|----------------------------------------------------|
```

Figure 181. Switch Detail Compare Report

Switch Configuration Compare Report

The Switch Configuration Compare Report compares the switch configurations contained in the specified IODFs.

```
                                    Switch Configuration Compare Report            TIME: 13:52  DATE: 2007-07-25  PAGE J -    1

                New IODF name:  HCI.IODF00                          Old IODF name:  HCI.IODF01

 |------------------------------|----------------------|----------------------|---------------------------------------------------|
 | SWITCH     SWCONFIG          | New IODF             | Old IODF             | Description                                       |
 |------------------------------|----------------------|----------------------|---------------------------------------------------|
 | 01         BASIC             | Actual Data          | Old Data             |                                                   |
 |                              |----------------------|----------------------|---------------------------------------------------|
 |                              | PROHIBIT             | ALLOW                | Default Connection Type                           |
 |                              | SW Building 01-125   | same                 | Switch Configuration Description                  |
 |------------------------------|----------------------|----------------------|---------------------------------------------------|
```

Figure 182. Switch Configuration Compare Report

Switch Configuration Detail Compare Report

```
                                      Switch Configuration Detail Compare Report      TIME: 13:52  DATE: 2007-07-25  PAGE K -    1

                New IODF name:  HCI.IODF00                          Old IODF name:  HCI.IODF01

 |----------------------------|----------------------|----------------------|---------------------------------------------------|
 | SWITCH   SWCONFIG PORT     | New IODF             | Old IODF             | Description                                       |
 |----------------------------|----------------------|----------------------|---------------------------------------------------|
 | 01       BASIC    E1       | Actual Data          | Old Data             |                                                   |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            | Unblocked            | same                 | Blocked / Unblocked Connection                    |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            |  >> F1               |  >> same             | Port of Dedicated Connection                      |
 |----------------------------|----------------------|----------------------|---------------------------------------------------|
 | 01       BASIC    E2       | Actual Data          | Old Data             |                                                   |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            | Unblocked            | same                 | Blocked / Unblocked Connection                    |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            |  >> E7               |  >> same             | Port of Allowed Connection                        |
 |                            |  >> F3               |  >> same             | Port of Allowed Connection                        |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            |  >> E8               |  >> same             | Port of Prohibited Connection                     |
 |----------------------------|----------------------|----------------------|---------------------------------------------------|
 | 01       BASIC    E3       | Actual Data          | Old Data             |                                                   |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            | Unblocked            | same                 | Blocked / Unblocked Connection                    |
 |                            |----------------------|----------------------|---------------------------------------------------|
 |                            |  >> E8               |  >> same             | Port of Prohibited Connection                     |
 |                            |  >> E9               |  >> same             | Port of Prohibited Connection                     |
 |----------------------------|----------------------|----------------------|---------------------------------------------------|
```

Figure 183. Switch Configuration Detail Compare Report

Esoteric Compare Report

```
                                   Esoteric Compare Report                         TIME: 08:32  DATE: 1997-11-06  PAGE P -    1

              New IODF name:  REDDE.IODF00.COMP1                     Old IODF name:  REDDE.IODF00.COMP2

                                Limited to New Operating System Id: OS1       Old Operating System Id:  OS1

|----------------------------|----------------------|----------------------|-----------------------------------------------------|
| OSCONFIG EDT      ESOTERIC | New IODF             | Old IODF             | Description                                         |
|----------------------------|----------------------|----------------------|-----------------------------------------------------|
| OS1      01       BOBO     |                      | Deleted              |                                                     |
|                            |----------------------|----------------------|-----------------------------------------------------|
|                            |                      | No                   | Esoteric is VIO Eligible                            |
|                            |                      |                      | Esoteric Token                                      |
|                            |                      |----------------------|-----------------------------------------------------|
|                            |                      |  >> 0201,3           | Assigned Device, Range                              |
|                            |                      |  >> 0205,3           | Assigned Device, Range                              |
|----------------------------|----------------------|----------------------|-----------------------------------------------------|
| OS1      01       HUGO     | Added                |                      |                                                     |
|                            |----------------------|----------------------|-----------------------------------------------------|
|                            | No                   |                      | Esoteric is VIO Eligible                            |
|                            |                      |                      | Esoteric Token                                      |
|                            |----------------------|                      |-----------------------------------------------------|
|                            |  >> 0200,8           |                      | Assigned Device, Range                              |
|                            |  >> 0300,64          |                      | Assigned Device, Range                              |
|----------------------------|----------------------|----------------------|-----------------------------------------------------|
| OS1      01       SYSDA    | Actual Data          | Old Data             |                                                     |
|                            |----------------------|----------------------|-----------------------------------------------------|
|                            | Yes                  | same                 | Esoteric is VIO Eligible                            |
|                            |                      | same                 | Esoteric Token                                      |
|                            |----------------------|----------------------|-----------------------------------------------------|
|                            |  >> old deleted      |  >> 0204             | Assigned Device, Range                              |
|                            |  >> 0300,64          |  >> same             | Assigned Device, Range                              |
|----------------------------|----------------------|----------------------|-----------------------------------------------------|
```

Figure 184. Esoteric Compare Report

OS Device Compare Report

```
                          OS Device Compare Report                     TIME: 08:32  DATE: 1997-11-06  PAGE R -    1

             New IODF name:  REDDE.IODF00.COMP1                    Old IODF name:  REDDE.IODF00.COMP2


                    Limited to New Operating System Id: OS1       Old Operating System Id:  OS1

|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OS      Device, Range      | New IODF             | Old IODF             | Description                                        |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OS1     0100               | Actual Data          | Old Data             |                                                    |
|                            |----------------------|----------------------|----------------------------------------------------|
|                            | 9033                 | same                 | Device Type                                        |
|                            | SWCH                 | same                 | Name of Generic                                    |
|                            | Yes                  | same                 | Value(s) of Parameter OFFLINE                      |
|                            | Yes                  | same                 | Value(s) of Parameter DYNAMIC                      |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OS1     0200,32            | Actual Data          | Old Data             |                                                    |
|                            |----------------------|----------------------|----------------------------------------------------|
|                            | 3390                 | same                 | Device Type                                        |
|                            | 3390                 | same                 | Name of Generic                                    |
|                            | No          *        | same                 | Value(s) of Parameter OFFLINE                      |
|                            | Yes                  | same                 | Value(s) of Parameter DYNAMIC                      |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OS1     01D1,4             | Actual Data          | Old Data             |                                                    |
|                            |----------------------|----------------------|----------------------------------------------------|
|                            | 3390A                | same                 | Device Type                                        |
|                            | 3390                 | same                 | Name of Generic                                    |
|                            | 0                    | 1                    | Subchannel Set ID                                  |
|                            | No                   | same                 | Value(s) of Parameter OFFLINE                      |
|                            | Yes                  | same                 | Value(s) of Parameter DYNAMIC                      |
|                            | ...                  | ...                  | ...                                                |
|                            | SHARED               | same                 | Feature                                            |
|                            | ...                  | ...                  | ...                                                |
|----------------------------|----------------------|----------------------|----------------------------------------------------|

* indicates this value as default value (only shown when both sides exist)
```

Figure 185. OS Device Compare Report

OS Console Compare Report

```
                          OS Console Compare Report                    TIME: 12:41  DATE: 1997-08-26  PAGE Q -    1

             New IODF name:  USER.IODF03.WORK                      Old IODF name:  HCD.IODF01.WORK

                    Limited to New Operating System Id: OPSYS01   Old Operating System Id:  OPSYS01

|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OSCONFIG DEVICE            | New IODF             | Old IODF             | Description                                        |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OPSYS01  0001              | Actual Data          | Old Data             |                                                    |
|                            |----------------------|----------------------|----------------------------------------------------|
|                            | 2                    | 1                    | Order Number                                       |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
| OPSYS01  0002              | Added                |                      |                                                    |
|                            |----------------------|----------------------|----------------------------------------------------|
|                            | 1                    |                      | Order Number                                       |
|----------------------------|----------------------|----------------------|----------------------------------------------------|
```

Figure 186. OS Console Compare Report

CSS / OS Device Compare Report

```
                                     CSS / OS Device Compare                         TIME: 17:00  DATE: 2004-11-17  PAGE S -    1

                            IODF Name : SEL.IODF00.NCND.REQ.WORK1
                Processor Id: P2084     Css Id: 0   Partition Name: PART00    ./.   Operating System Configuration Id: MVS1

|----------------------------|----------------------|----------------------|
| Device, Range              | CSS Device Type      | OS Device Type       |
|----------------------------|----------------------|----------------------|
| 0100            *          | 3390                 | same                 |
| 0200,2          -          | 3390                 | same                 |
| 0205,3          -          | 3390                 | same                 |
| 0208,8          -          | 3390                 | 3800-1               |
| 0300,6                     | 3390                 | same                 |
|----------------------------|----------------------|----------------------|
* Devices relate to the limiting LPAR via CHPIDs which have the limiting LPAR in the candidate list only.
- Devices relate to the limiting LPAR via CHPIDs but the device is excluded from the CSS with an explicit device candidate list.
```

Figure 187. CSS / Operating System Device Compare

Appendix C. Problem determination for HCD

Overview

The information in this appendix is intended to help you diagnose problems that may arise with definitions that were created by the use of HCD. It explains:
- How to identify problems
- What diagnostic information and tools you can use
- How to search problem reporting data bases

Because HCD is part of z/OS, problems with HCD must generally be handled as explained in *z/OS Problem Management*.

Product Identifiers
- Module Prefix: CBD
- Component ID: 5695SC1XL

For more information on identifiers, refer to the *z/OS Program Directory*.

Identifying problems

Before you can begin to diagnose a system problem, you have to know what kind of problem you have.

The following table contains examples of symptoms you can use to determine a problem. Each symptom refers to a corresponding section for further problem diagnostic.

Table 12. Symptoms of system problems

Symptom	Corresponding Section
HCD terminates abnormally	"HCD abnormal termination" on page 448.
Wait State during IPL	"Error during IPL (Wait State Codes)" on page 450.
A function key assignment does not match the functions that can be performed on the panel.	"Problems with panels and function key assignment" on page 451
Messages CBDA400I to CBDA420I are displayed	"Problems with help information provided by HCD" on page 452
Output of textual report is incorrect or incomplete	"Problems with output of HCD textual reports" on page 453
Output of graphical report is incorrect or incomplete	"Problems with output of HCD graphical reports" on page 454
Messages during initialization of HCD	"Problems during initialization of HCD" on page 456
A string like ?PARMnn? appears on the Define Device Parameters / Features panel	"Problems with UIMs" on page 457
A UIM is flagged in error on the Installed UIMs panel	"Problems with UIMs" on page 457

Table 12. Symptoms of system problems (continued)

Symptom	Corresponding Section
Messages during migration	“Resolving migration errors” on page 302
HCD does not display an error message when you make a mistake	“HCD internal problems” on page 458
An HCD generated IOCP input data set fails when using the IOCP program	“HCD internal problems” on page 458
Transmit configuration package action does not produce the expected results	“Problems with ’Transmit Configuration Package’ action” on page 458
HCD LDAP Backend terminates abnormally	“HCD LDAP Backend abnormal termination” on page 463
HCD LDAP Backend returns one of the error codes `LDAP_OPERATIONS_ERROR`, `LDAP_NO_MEMORY`, or `LDAP_LOCAL_ERROR`	“Adverse LDAP return code from the HCD LDAP Backend” on page 464
Message `CBD0009E` is printed to the started task’s log	“Error in the HCD LDAP Backend” on page 464

HCD abnormal termination

If HCD terminates abnormally, view the HCD message log that contains the termination message CBDA000I specifying the *system abend code* (also called *abend code*) and the *reason code* in the HCD message log.

Refer to the message descriptions shown in *z/OS and z/VM HCD Messages*. Take the action as described under “Programmer Response”. If the message points to a probable logic error in one of the modules of HCD, develop a search argument for the problem-reporting data bases. If the search finds that the problem has been reported before, request the problem fix; if not, report the problem to IBM. For a list of additional information that should be provided, see the appropriate message explanation.

Diagnosing system abend code ’00F’

If HCD terminates with system abend code ’00F’, this abend code is accompanied by a reason code, which refers to one of the HCD messages describing the reason of the failure. Note that you have to view the HCD message log for the system abend code and reason code. The reason code consists of eight digits and has the format ’mnnnllll’ where:

m Is the prefix indicating the HCD message range:
- **0** CBDAxxxx messages
- **1** CBDBxxxx messages
- **2** CBDCxxxx messages
- **6** CBDGxxxx messages

nnn Is the message number within the HCD message range.

llll Is the message reason code describing in more detail the reason of the message.

The information provided by the abend code can be used as a quick reference into the message. For example, the reason code 00990106 means that:
- The message CBDA099I was issued.
- The message reason code is 0106.

The reason code 00150095 means that:
- The message CBDA015 was issued.

- The message reason code is 95.

Table 13 and Table 14 show what the search argument and the problem data could look like.

Table 13. Search Argument

Search Argument	Description	Example
AB/S0hhh	System abend code	AB/S000F
PRCS/mnnnllll	Reason code	PRCS/00990106
MS/ccccnnns	Message identifier	MS/CBDA099I

Table 14. Problem Data

Problem Data	Example
CBDA000 abend code and reason code	00F and 00990406
CBDA099 reason code	406
CBDA099 additional error information (content of HCDMLOG). It is important that *all* information shown in HCDMLOG is recorded.	
The ID of the panel where the error occurred	CBDPPRF0
Description of what type of action the user wanted to perform when the problem occurred	Add a Processor
The TRACE output data set (See "TRACE command" on page 469 for instructions how to produce an HCD trace output.)	

ISPF list file and abend panel: Additional information on errors may be recorded in the ISPF list file.

For abends, additional information may be displayed on the ISPF abend panel.

Diagnosing system abend other than '00F'

If HCD terminates with an abend code other than '00F' (indicated in the terminating message), proceed as follows:

1. Look at the explanation of the abend code and any reason code that accompanies the abend code. Take the recommended actions.
2. Look for any messages that accompany the abend. Take the recommended actions.
3. Obtain the SYS1.LOGREC record. (Format the SYS1.LOGREC record using EREP.)
4. In SYS1.LOGREC find the SDWAVRA information which is as follows:
   - The CSECT (module) names found in the diagnostic stack.

     The CSECT names are separated by a blank. The SDWAVRA contains all CSECT names from the diagnostic stack as long as they fit into it. If the SDWAVRA is too small to contain all names, the premature end of the CSECT name trace is indicated by an asterisk.
   - The data from each diagnostic stack entry that is marked as VRA data.

This is normally the input parameter list of the modules corresponding to the CSECT name trace.

Table 15 and Table 16 show what the search argument and the problem data associated with our example could look like.

Table 15. Search Argument

Search Argument	Description	Example
RIDS/CBDccccc	CSECT name	RIDS/CBDMGHCP
AB/S0hhh	System abend code	AB/S0106
PRCS/mnnnllll	Reason code	PRCS/0000000B
MS/cccnnns	Message identifier	MS/CSV011I
FLDS/SDWAVRA VALU/cccc	SDWAVRA contents	

Table 16. Problem Data

Problem Data	Example
SYS1.LOGREC error record	
SDWAVRA information	
Accompanying messages	
Component ID and FMID	
Linkage editor output	
Description of what type of action the user wanted to perform when the problem occurred	
The TRACE output data set (See "TRACE command" on page 469 for instructions how to produce an HCD trace output.)	

Error during IPL (Wait State Codes)

IOS may issue wait state codes during IPL when using an IODF to perform an IPL. The wait state codes indicate that there is a problem, for example, with an IODF data set or with device specifications in the IODF or UIM. The reason codes with the wait state codes point to the cause of the problem. For information about the codes, refer to *z/OS MVS System Codes*.

Depending on the code that was issued, you have to use the arguments that apply to the specific situation listed in the box below. The same applies for submitting problem data.

Table 17 and Table 18 on page 451 show what the search argument and the problem data could look like.

Table 17. Search Argument

Search Argument	Description	Example
WS/D0hhh	Wait state code	WS/D0083
PRCS/mnnnllll	Reason code	PRCS/00000002

Table 17. Search Argument (continued)

Search Argument	Description	Example
MS/cccnnns	Message identifier	
PIDS/name of UIM	Program name	PIDS/CBDUS005
VALU/Ccccccccc (if applicable)	Message variable text	

Table 18. Problem Data

Problem Data	Example
Wait State Code	D0083
Reason Code	01
Accompanying message	
UIM name (if available)	CBDUS005
Stand-alone dump	
IODF dump	

Problems with panels and function key assignment

If problems with panels or the assignment of function keys occur, ensure the following:

- Data set SYS1.SCBDTENU must be allocated to ISPTLIB and data set SYS1.SCBDPENU to ISPPLIB.
- SYS1.SCBDCLST must be allocated to SYSPROC
- SYS1.SCBDPENU, SYS1.SCBDMENU, and SYS1.SCBDTENU must be dynamically allocated when HCD has been started. Compare with LIBDEF definitions in CBDCHCD.

If the library allocation is correct, develop a search argument, and if no problem solution is found, report the problem. To display the panel identifier, use the ISPF command PANELID. The name of the function panel will be shown in the upper left corner of the panel.

Table 19 and Table 20 show what the search argument and the problem data could look like.

Table 19. Search Argument

Search Argument	Description	Example
RIDS/CBDccccc	Panel identifier	RIDS/CBDPHW10

Table 20. Problem Data

Problem Data	Example
Panel identifier and name of the panel where the error was detected.	CBDPHW10 Define, Modify, or View Configuration Data
Type of error found.	

Problems with help information provided by HCD

Messages that relate to problems with the HCD help facility have the identifiers CBDA400I to CBDA420I. Use the commands:

- HELPID to display the name of the help panel at the end of the command line. The name is displayed in the command line just before the scroll field. It can be used as search argument.
- HELPTEST to display the help panel while in help mode. It allows you to review or test any help panel while in help mode. That is, it eliminates the need to create the appropriate situation if a review or test of a help panel is required.

  This command can also be used to get the help information for a message. The help member for a message consists of the message ID minus the trailing severity indicator (such as "I"). For example, the help member for message CBDA200I has the name CBDA200. Thus you may get an explanation for messages that are not yet listed in the messages documentation.

Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most of the IBM® messages you encounter, as well as for some system abends and codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can use LookAt from these locations to find IBM message explanations for z/OS elements and features, z/VM®, z/VSE™, and Clusters for AIX® and Linux™:

- The Internet. You can access IBM message explanations directly from the LookAt Web site at www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/.
- Your z/OS TSO/E host system. You can install code on your z/OS systems to access IBM message explanations using LookAt from a TSO/E command line (for example: TSO/E prompt, ISPF, or z/OS UNIX® System Services).
- Your Microsoft® Windows® workstation. You can install LookAt directly from the *z/OS Collection* (SK3T-4269) or the *z/OS and Software Products DVD Collection* (SK3T-4271) and use it from the resulting Windows graphical user interface (GUI). The command prompt (also known as the DOS > command line) version can still be used from the directory in which you install the Windows version of LookAt.
- Your wireless handheld device. You can use the LookAt Mobile Edition from www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookatm.html with a handheld device that has wireless access and an Internet browser.

You can obtain code to install LookAt on your host system or Microsoft Windows workstation from:

- A CD in the *z/OS Collection* (SK3T-4269).
- The *z/OS and Software Products DVD Collection* (SK3T-4271).
- The LookAt Web site (click **Download** and then select the platform, release, collection, and location that suit your needs). More information is available in the LOOKAT.ME files available during the download process.

Problem with content, wording, mismatch

If problems with content, wording, or mismatches are encountered, obtain the help panel name by using the HELPID command. The help panel name is displayed at the end of the command line.

Table 21 shows what the search argument could look like.

Table 21. Search Argument

Search Argument	Description	Example
RIDS/CBDcccc	Help panel name	RIDS/CBDF403
RIDS/CBDccccc	Panel identifier	RIDS/CBDPDVF0

Problem shown by help messages CBDA400I or CBDA405I

If message CBDA400I or CBDA405I is issued, check:
1. The library concatenation for your HCD invocation.
2. That the help members are installed in the proper libraries (in SYS1.SCBDHENU).
3. That the help library is allocated either in LINKLST member or to ISPLLIB.

Problem shown by help messages other than CBDA400I and CBDA405I

If a message in the range CBDA400I to CBDA420I but other than CBDA400I and CBDA405I occurs, you have probably encountered a logic error in the dialog.

Table 22 and Table 23 show what the search argument and the problem data could look like.

Table 22. Search Argument

Search Argument	Description	Example
MS/cccnnns	Message identifier	MS/CBDA404
RIDS/CBDcccc	Help panel name	RIDS/CBDF401

Table 23. Problem Data

Problem Data	Example
Message identifier of the message that was issued. All additional information shown in the message, such as the name of the help panel or the reference phrase.	CBDA404
Panel identifier	CBDPDVF0
Help panel name	CBDF401
Description of the related field (in case of field help).	Action entry field
Name of the action choice (in case of action bar help).	
Name of the command (in case of command help).	

Problems with output of HCD textual reports

Use this procedure if you find problems that relate to the HCD report facility.
1. Check the output of the report job for messages that provide additional information.
2. For incorrect or incomplete output:
   a. Compare the contents of the IODF with the output. For example, if the device features are not shown correctly in the OS device detail report, use

the action ***View device definition*** on the I/O Device List panel to display the definitions of the device for which the report seems to be incorrect.

b. If you find out that the definitions in the IODF are correct, but the report output is incorrect, report this problem to IBM.

Table 24 shows what the problem data could look like.

Table 24. Problem Data

Problem Data	Example
Type of report that was to be created.	Control unit detail report
JCL that was used to create the report.	
The content of the IODF for which the report was requested. Refer to "TRACE command" on page 469 to create an IODF dump.	

Problems with output of HCD graphical reports

When you have any problems printing or viewing a graphical configuration report, read the following problem descriptions. If you have any other problem, report the problem to IBM.

Screen shows four dots

When displaying the configuration, the screen shows only four dots.

Check that the background and foreground color you specified in the HCD profile match. Choose a foreground color that is visible on the background color.

Incorrect DCF, GDF, or GML format in output data set

You can simply check, whether you have created the output format you have specified in the profile using the keyword GCR_FORMAT. Browse or edit the created data set.

BookMaster format will look like this:

```
:userdoc
.layout 1
.dr thick weight .4mm
.rh on
.sp 2
```

DCF format will look like this:

```
.df graph font X0GT20
.tr 31 AC BE BC 76 AB 30 BB 15 8F 77 CB 78 CC 80 EB 64 EC 6A FA 24 BF
.ll 240mm
.dr thick weight .4mm
.rh on
.sp 2
```

GML format will look like this:

```
:gdoc
.df graph font X0GT20
.tr 31 AC BE BC 76 AB 30 BB 15 8F 77 CB 78 CC 80 EB 64 EC 6A FA 24 BF
.ll 240mm
.dr thick weight .4mm
.rh on
.sp 2
```

If the output is not correct, make sure that:

- The HCD profile is allocated with ddname HCDPROF before invoking HCD.
- The profile contains the keywords GCR_FORMAT=DCF or GML and GCR_FONT with an appropriate font (for example, X0GT20 for 3820 printers).

For information on how to specify keywords in the HCD profile, refer to "Defining an HCD profile" on page 25.

Illegible printout when using DCF or GML

The output of a report data set contains correct DCF and GML format, but the printout is illegible.

Make sure that:

- A monospaced font (for example, X0GT20 for 3820 printers) is specified in the HCD profile using the keyword GCR_FONT.
- The specified font is installed on your printer.

Output exceeds page boundary

The printed output exceeds page boundary.

Make sure that:

- During printing you specified a parameter to print the report in landscape format, that is to rotate the printout by 90 degree.
- The parameter LAYOUT 1 was specified to use the full page for the report.

Box characters are not correct

When using DCF formatting, the box characters are not correct.

The graphical print facility uses special hex characters for the various box characters. These special characters are then translated to real box characters by means of the .tr command. If the selected font does not contain the box characters, you must either choose another font or modify the .tr command in the file generated by the graphical print facility. See the following table for information on which hex combinations HCD uses for the various box characters.

```
.tr 31 AC BE BC 76 AB 30 BB 15 8F 77 CB 78 CC 80 EB 64 EC 6A FA 24 BF
```

where

31 Upper left corner
BE Upper right corner
76 Lower left corner
30 Upper right corner
15 Junction (+)
77 Upward T
78 Downward T
80 Leftward T
64 Rightward T
6A Bar
24 Hyphen (dash)

Table 25 shows what the problem data could look like.

Table 25. Problem Data

Problem Data	Example
Type of report that was to be created.	LCU report

Table 25. Problem Data (continued)

Problem Data	Example
The content of the IODF for which the report was requested. Refer to "TRACE command" on page 469 to create an IODF dump.	

Problems during initialization of HCD

If a problem occurs during initialization, HCD does one of the following:

- Issues a message and continues the initialization
- Terminates the initialization

Whether the initialization of HCD *continues* or *terminates* depends on the error that is encountered as explained in the following.

Initialization continues

If a UIM service routine encounters an error during initialization, HCD works without this UIM. HCD pops up messages on the user's terminal to inform the user that messages were written to the message log.

Note: If an error is encountered in a UIM *and* if SYSUDUMP is allocated, HCD does not continue. An HCD abend ′00F′ is forced to provide a dump at the point where the error was detected.

Use the option ***List Installed UIMs*** to display the panel "Installed UIMs". On this panel, the UIM is marked as in error. (Refer to "Query installed UIMs" on page 259.)

If you do not have access to any UIM, check if your UIMs are correctly installed. In the HCD profile you can specify the name and volume serial number of the library that contains the UIMs (see "Defining an HCD profile" on page 25). If you do not specify a name in the profile, SYS1.NUCLEUS is assumed as default names for the UIMs.

Initialization is terminated

The initialization is terminated either with an abend or with a message.

In case of an abend, the dialog:

- Pops up message CBDA040I on the user's terminal. The message informs the user that HCD has abnormally terminated.
- Puts message CBDA050I with abend code ′00F′ in the message log. The message also provides a reason code.
- Puts the message that is issued by a UIM service routine in the message log.

If an error is encountered in a UIM *and* if SYSUDUMP is allocated, an HCD abend ′00F′ is forced to provide a dump at the point where the error was detected.

Message CBDA041I: Means that HCD is not able to find the UIMs. If this message is issued during initialization using the ″CIT″ variable, make sure that the UIMs are installed in SYS1.NUCLEUS.

Table 26 and Table 27 show what the search argument and the problem data could look like.

Table 26. Search Argument

Search Argument	Description	Example
MS/cccnnns	Message identifier	MS/CBDA041I
PIDS/UIM name	UIM name	

Table 27. Problem Data

Problem Data	Example
UIM name	
Message ID(s) and full message text	CBDA041I
TRACE output data set Refer to "TRACE command" on page 469.	

Problems with UIMs

For information on converting and testing UIMs, refer to *z/OS MVS Device Validation Support*.

The following explanations apply to UIMs provided by the installation and to UIMs provided by IBM.

Messages during initialization of HCD

Internal logic errors in UIMs are primarily found during the initialization of HCD. Refer to "Problems during initialization of HCD" on page 456 for information on how to proceed in case of initialization problems.

UIM problems after initialization of HCD

Internal logic errors in UIMs may also be discovered:

- During the definition of a device (as a string like ?PARMnn? on the Device Parameter Feature panel). Message CBDA381I indicates that you may have installed a back-level UIM.
- On the Installed UIMs panel when a UIM is flagged in error. In this case messages CBDA070I or CBDA096I may be issued. Message CBDA070I means that the UIM does not match the corresponding UDT. Message CBDA096I means an unresolvable conflict between a VM and MVS UIM.

You can use the message log, together with SYSUDUMP and HCDTRACE to find the error in the UIM that failed.

If the error relates to an installation-provided UIM, make appropriate corrections. For information on converting UIMs, refer to *z/OS MVS Device Validation Support* .

If the error relates to a UIM provided by IBM, report the problem.

Table 28 and Table 29 on page 458 show what the search argument and the problem data could look like.

Table 28. Search Argument

Search Argument	Description	Example
MS/cccnnns	Message identifier	CBDA070I

Table 28. Search Argument (continued)

Search Argument	Description	Example
PIDS/UIM name	UIM name	CBDUS025

Table 29. Problem Data

Problem Data	Example
UIM name	CBDUS025
Message ID(s) and full message text	CBDA070I
Type of action the user wanted to perform	List installed UIMs
TRACE output data set Refer to "TRACE command" on page 469.	

HCD internal problems

When you have one of the following error situations, you probably have detected an internal HCD error:

- HCD displays wrong messages or does not display a message at all when you made a mistake.
- An HCD generated IOCP input data set causes error messages when using the IOCP program.

Report problems like this to IBM.

Table 30 and Table 31 show what the search argument and the problem data could look like.

Table 30. Search Argument

Search Argument	Description	Example
MS/cccnnns	Message identifier	
RIDS/CBDcccc	Panel identifier	RIDS/CBDPCH30

Table 31. Problem Data

Problem Data	Example
Message ID(s)	
Panel identifier	CBDPCH30
Type of action the user wanted to perform	Change Channel path definition
Description of configuration	

Problems with 'Transmit Configuration Package' action

If a problem occurs during the ***Transmit configuration package*** action, HCD may:

- Not start the action due to authorization problems
- Not submit the job
- Submit the job but not complete it

Job steps of the Transmit Procedure

Transmit configuration package builds a batch job with multiple steps. The step names are:

GO Creates an IDCAMS CLUSTER for a temporary work IODF.

ALLOCT2	Creates an IDCAMS CLUSTER for a temporary production IODF.
INIT1	Initializes the temporary work IODF.
INIT2	Initializes the temporary production IODF.
BLDPR1	The processor configurations that are contained in the configuration package are built into a data set as control statements. The processor list is specified via DD name HCDCNTL. If a processor contains a CFS channel path that has a connection to a CF partition external to the configuration package, the processor containing the CF partition is also included in the output data set.
MIGRPR1	The generated processor configuration control statements are migrated into the temporary work IODF while preserving the processor tokens from the master IODF.
PRINTPR1	The MESSAGES and LISTING data set are deleted if no error occurred.
BLDOS1	All OS configurations included in the configuration package are built into a data set as control statements. The OS configuration list is specified via DD name HCDCNTL.
MIGROS1	The generated OS configuration control statements are migrated into the temporary work IODF.
PRINTOS1	The MESSAGES and LISTING data set are deleted if no error occurred.
BLDSW1	The switch configurations of all switches containing ports that are connected to either a channel path or control unit of the processors of the configuration package are built into a data set as control statements. The switch list is specified via DD name HCDCNTL.
MIGRSW1	The generated switch configuration control statements are migrated into the temporary work IODF.
PRINTSW1	The MESSAGES and LISTING data sets are deleted if no error occurred.
BPROD	A temporary production IODF is built from the temporary work IODF.
EXPOATT	The temporary production IODF is exported attended to the specified user/node ID.
EXPOUATT	The production IODF is exported unattended to the specified system.
DEL1	The temporary work IODF is deleted.
DEL2	The temporary production IODF is deleted.

Note: Stepname GO is used for HCDDECK, HCDMLOG, HCDLIB, HCDTRACE, and HCDPROF. Thus, the data sets are made available to the steps which require them.

Temporary data sets created by the Transmit Procedure

The transmit procedure creates the following data sets:

- hlq.IODFxx.zzzz (production IODF)
- hlq.IODFxx.XMIT.package.WORK (work IODF)
- hlq.IODFxx.XMIT.package.DECK (configuration decks)
- hlq.IODFxx.XMIT.package.MSGLOG (HCDMLOG)
- hlq.IODFxx.XMIT.package.sss.MESSAGES (HCDPRINT migration messages)
- hlq.IODFxx.XMIT.package.sss.LISTING (HCDASMP migration listing)

where:

hlq	is the high level qualifier specified on the transmit panel or the HLQ parameter of the batch utility.
xx	is the suffix of the target IODF name specified with the package
package	is the name of the configuration package to be transmitted

zzzz	are the qualifiers 3-n of the target IODF name
sss	qualify the migration type (PR1 for processor, OS1 for operating systems, SW1 for switch configurations)

After a successfully completed transmit action all these data sets, except the message log file, are deleted. The message log file is preserved until it is overwritten, when another transmit action using the same package name and IODF suffix is performed.

Apart from the production IODF, all redundant data sets remaining from a cancelled transmit action are identified by their common data set name qualifiers.

```
hlq.IODFxx.XMIT.package.
```

Authorization problems

Because the last sent date of the IODF from which the transmit action is performed is updated with the current date, you require write access to the accessed production IODF. Otherwise message CBDG247I is displayed.

You also need permission to write to the data sets with the qualifiers of the IODF to be created and transmitted.

Job is not submitted

If the work IODF or production IODF to be created temporarily exists already, it is not possible to start the transmit action. This may happen when a previous transmit job was cancelled, ended with an error or another transmit job is running which uses the same high level qualifier and target IODF name.

Depending on the source of the problem this may be resolved by deleting the existing temporary IODFs or by specifying a different high level qualifier for the target IODF.

Job is not completed

The transmit action generates a batch job. Check the HCD message log file to find out if the job was executed. It is shown as a sequence of HCD batch job steps ending with a successful export message. There are several possible causes if this is not the case:

- JCL errors: check the job output. To see all statements including the inline statements which are generated by the HCD dialog and submitted, issue

  ```
  TRACE ON ID=JCL
  ```

  and perform the transmit action. For an example of a trace refer to“Customization unsuccessful” on page 461.
- If the HCD message log file shows that a particular step failed, check the job output for potential allocation problems.
- If one of the migration steps failed, check the LISTING and MESSAGES data sets. (Refer to “Temporary data sets created by the Transmit Procedure” on page 459 for more information on the data sets created during the action.) Ensure that the same versions of UIMs are available for the ***Transmit configuration package*** action as for creation of the IODF.

  The MESSAGES and LISTING data sets, as well as the generated decks, are deleted if no errors occurred. If you want to keep them, you can modify the conditional statements in procedure CBDJXMIT for the migrate steps. Do this by copying CBDJXMIT to a new procedure.

Proceed as follows, if you need to trace particular steps:

1. Define a profile including a TRACE statement.
2. Specify the stepname.HCDPROF DD with the profile name.
3. Allocate a trace data set name.
4. Specify GO.HCDTRACE DD with the name of the trace data set in order to use it for all steps to be traced or stepname.HCDTRACE to use the trace data set only for the single step.
5. To specify HCDDECK, HCDMLOG, HCDLIB, HCDTRACE, or HCDPROF use GO as the step name. The other steps refer to the definitions in the GO step. If you want to preserve a specific output data set, pre-allocate it to HCDDECK (see “Build I/O configuration statements” on page 320).

Customization unsuccessful

This section describes points to be considered when customizing the transmit procedure.

The transmit procedure exploits the migration batch utility, which uses parsing macro CBDZPARS (residing in SYS1.MACLIB). If you want to use a different macro library, specify this as GO.HCDLIB

The dialog always generates and submits the following statements:
- All parameters for procedure CBDJXMIT
- The JOB card, JOBLIB and overwrite statements given by the user
- IDCAMS DEFINE CLUSTER and DELETE CLUSTER statements in steps GO, ALLOCT2, DEL1 and DEL2
- An HCDCNTL DD statement for at least one of BLDPR1, BLDOS1 or BLDSW1 job steps, dependent on the package content
- The SYSTSIN for EXPOATT or EXPOUATT, depending on whether attended or unattended export is selected

The following is a sample trace showing the batch job built by a transmit action.

```
09:53:01  97-11-04  Trace started.
//XMIT     JOB (3243),'OS390H1',MSGCLASS=X,CLASS=A,REGION=4M
//JOBLIB   DD DSN=SYS1.SCBDHENU,DISP=SHR
//XMT0    EXEC PROC=CBDJXMIT,PR=1,OS=1,SW=1,
//             ATTEND=1,RECORDS='1684',
//             DESC1='IODFST',DESC2='IODF88',
//             QUALX='IODF88.XMIT.CB88',
//             IODFTP='OS390H1.IODF88',
//             IODFTW='OS390H1.IODF88.XMIT.CB88.WORK',
//             IODFSP='IODFST.IODF11.MASTER'
//GO.SYSIN DD *
 DEFINE CLUSTER(                            -
       NAME ( OS390H1.IODF88.XMIT.CB88.WORK.CLUSTER) -
       LINEAR                               -
       RECORDS (1684) -
       VOLUMES (DS7001)) -
       DATA(NAME(OS390H1.IODF88.XMIT.CB88.WORK))
/*
//ALLOCT2.SYSIN DD *
 DEFINE CLUSTER(                            -
       NAME ( OS390H1.IODF88.CLUSTER) -
       LINEAR                               -
       RECORDS (1684) -
       VOLUMES (DS7001)) -
       DATA(NAME(OS390H1.IODF88))
/*
//BLDPR1.HCDCNTL DD *
```

```
CB88
CF14    ,CF
/*
//BLDOS1.HCDCNTL DD *
B710
/*
//BLDSW1.HCDCNTL DD *
71
72
74
77
/*
//EXPOATT.SYSTSIN DD *
    CALL 'SYS1.LINKLIB(CBDMGHCP)', +
    'EXPORT,OS390H1,PKSTCB88'
/*
//DEL1.SYSIN DD *
       DELETE OS390H1.IODF88.XMIT.CB88.WORK.CLUSTER
/*
//DEL2.SYSIN DD *
       DELETE OS390H1.IODF88.CLUSTER
/*
09:53:29  97-11-04  Trace stopped.
```

Table 32 shows what the problem data could look like.

Table 32. Problem Data

Problem Data	Example
Job output	See example trace shown in section "Customization unsuccessful" on page 461.
Message log file	
Trace of failing step	
Deck for failing step	
LISTING data set	See"Job steps of the Transmit Procedure" on page 458
MESSAGES data set	See"Temporary data sets created by the Transmit Procedure" on page 459
Submitted job (via TRACE ID=JCL)	
Procedure used (if modified)	

LDAP problem determination

In addition to the regular text messages from the HCD LDAP Backend, debug output can be requested. This debug output is switched on or off by specifying a debug level for the IBM Tivoli Directory Server for z/OS (see *IBM Tivoli Directory Server Administration and Use for z/OS*) and is printed to the same location as the HCD LDAP Backend text messages. HCD LDAP Backend's debug output is only available in English language and character representation IBM-1047.

The HCD LDAP Backend mainly supports two debug levels: `LDAP_DEBUG_ERROR` and `LDAP_DEBUG_TRACE`.

LDAP_DEBUG_ERROR causes all the information concerning errors, detected while performing operations, to be printed. From the HCD LDAP Backend's point of view, LDAP_DEBUG_ERROR can be switched on regularly without significant performance loss.

LDAP_DEBUG_TRACE causes all important program operations to be printed. From the HCD LDAP Backend's point of view, LDAP_DEBUG_TRACE should only be used when reproducing error situations for problem determination.

If you have general problems getting the IBM Tivoli Directory Server for z/OS, RACF Backend, or any other plug-ins running, leave out all HCD LDAP Backend definitions from the started task and configuration files (ds.conf). If the server and plug-ins still will not run, contact the IBM service.

If everything functions correctly without the HCD LDAP Backend and abends with the HCD LDAP Backend, then request a dump and check there for further information.

If the dump indicates that functions in DLL GLDSLP31 or GLDCLDAP are missing, then maybe the IBM Tivoli Directory Server for z/OS functionality is not available.

HCD LDAP Backend abnormal termination

There are two different locations at which the HCD LDAP Backend might terminate abnormally:

- The IBM Tivoli Directory Server for z/OS address space
- The HCD instance address space

The way to find out more information about the abnormal termination depends on in which of these locations it terminated see "z/OS LDAP Server address space" or "HCD instance address space" on page 464.

In general, whenever the HCD LDAP Backend or parts of it terminate abnormally, some global resources may remain in memory. These resources are so called POSIX message queues and are used for the Inter Process Communication (IPC) between the HCD LDAP Backend and the HCD instances. They have to be removed from the system manually.

To remove POSIX message queues from the system proceed as follows:

1. Look into the IBM Tivoli Directory Server for z/OS started task log to find the identifiers (ID's) of all message queues allocated: The HCD LDAP Backend prints out all ID's using the message CBD0004I. Note that you have to find all of these CBD0004I messages.
2. Use the UNIX System Services command line tool ipcs to list all the POSIX message queues in memory.
3. Find those identifiers in the list which correspond to POSIX message queues belonging to the abnormally terminated HCD LDAP Backend.
4. Remove the appropriate message queues using UNIX System Service command line tool ipcrm.

z/OS LDAP Server address space: In general, diagnostic output can be found in the IBM Tivoli Directory Server for z/OS started task log. Investigate this log to find information, about the system or user abend code, the reason code, and additional messages and follow the instructions in "HCD abnormal termination" on page 448.

For more information on problem determination, refer to *z/OS Problem Management*. Read the information on how to obtain a dump of the abnormally terminated program and determine whether the problem was caused by the HCD LDAP Backend or by any other program in the IBM Tivoli Directory Server for z/OS address space.

HCD instance address space: Since an HCD instance resides in a different address space (created with a call to `spawn()`) to that of the corresponding IBM Tivoli Directory Server for z/OS, it is not permitted to print its output to the IBM Tivoli Directory Server for z/OS started task log. Instead, an HCD instance creates an HFS file containing diagnostic output. The name and location of this file follows the conventions described in the publication *z/OS Language Environment Debugging Guide* in the unit "Using Language Environment Debugging Facilities". Note that the environment variable `_CEE_DMPTARG` is set to `/tmp` by default.

Example:
Assume that a language environment dump of the HCD instance with the process ID 197 is taken at 05:55:01 pm on September 18, 1998. The file containing the dump will be called `CEEDUMP.19980918.175501.197` and it will be located in the HFS directory `/tmp`.

Adverse LDAP return code from the HCD LDAP Backend

Each LDAP client's request is answered by the IBM Tivoli Directory Server for z/OS with an LDAP response containing a return code for the request. Such a return code can be either good (`LDAP_SUCCESS`) or bad (e.g. `LDAP_UNWILLING_TO_PERFORM`). These numeric return codes can be transformed into text messages (e.g. "DSA is unwilling to perform.") using the LDAP client API.

Return codes such as `LDAP_OPERATIONS_ERROR`, `LDAP_NO_MEMORY`, or `LDAP_LOCAL_ERROR` typically indicate a problem within the IBM Tivoli Directory Server for z/OS, the HCD LDAP Backend, or the LDAP client. If you assume the problem to be located in the IBM Tivoli Directory Server for z/OS or the HCD LDAP Backend, look into the IBM Tivoli Directory Server for z/OS started task log and search for error messages.

Return codes such as `LDAP_INAPPROPRIATE_MATCHING`, `LDAP_INVALID_DN_SYNTAX`, or `LDAP_UNWILLING_TO_PERFORM` typically indicate an incorrect LDAP request. Check if your request conforms with the appropriate constraints. You may also check the IBM Tivoli Directory Server for z/OS started task log for error messages.

Error in the HCD LDAP Backend

If the HCD LDAP Backend's message `CBD0009E` is printed to the IBM Tivoli Directory Server for z/OS started task log, an error situation was encountered inside the HCD LDAP Backend while performing an operation. Switch on IBM Tivoli Directory Server for z/OS debug level `LDAP_DEBUG_ERROR` and reproduce the problem. The log will contain more information concerning the reason of the error. You may additionally specify debug level `LDAP_DEBUG_TRACE` to get detailed informations about the operations performed by the HCD LDAP Backend.

The following illustrates two typical error situations with advice on how to check for these problems.

HCD Instance Startup Fails: If an HCD instance cannot be started correctly, this will not lead to error messages in the IBM Tivoli Directory Server for z/OS started task log or to bad return codes for the LDAP client in all cases.

Consider the following possible scenario: The IBM Tivoli Directory Server for z/OS is started together with the HCD LDAP Backend which, in turn, launches at least one HCD instance. All launched HCD instances fail to start. As the HCD LDAP Backend has no indication that the HCD instances failed to start, it will wait forever for an acknowledgement from the HCD instances. Incoming requests will be scheduled for an HCD instance and will be blocked up until an acknowledge arrives. In this way, the requests will never be performed and no LDAP response will be sent to the requesting LDAP client.

From the LDAP client's point of view: If the very first request for the HCD LDAP Backend is pending for a long time, the HCD instances might have failed to start up. In general, if one HCD instance fails to start up, all HCD instances will fail.

To check whether an HCD instance failed to start, look in the IBM Tivoli Directory Server for z/OS started task log: HCD LDAP Backend's message `CBD0007I` will indicate how many HCD instances will be started. If all of these HCD instances are able to start up correctly, you will find an appropriate number of `CBD1002I` messages. If you cannot find them it's most probable that the HCD instances failed to start up.

HCD instance user ID switch fails: If you have set up the IBM Tivoli Directory Server for z/OS or the HCD LDAP Backend incorrectly, the HCD instances might have problems switching their User ID appropriately. It might be possible that the User ID switch fails completely, or only for one or more specific User IDs.

If you assume that LDAP requests can't be performed because of a failed User ID switch, you can check your assumption as follows:
Search for the `CBD0009E` message in the IBM Tivoli Directory Server for z/OS started task log. If you can find it switch on IBM Tivoli Directory Server for z/OS debug level `LDAP_DEBUG_ERROR` and search for message `EDC5139I`. This message indicates that the User ID switch has failed.

Finally, check the setup of your HCD LDAP Backend.

Diagnostic information and tools

The information and tools described in this section help you to diagnose system problems.

HCD messages

In case of an error, HCD issues messages. Depending on what you are currently doing, the messages are written:
- To the terminal as a single message
- To the terminal in a message list
- In a message log
- In a migration log
- In the output of a batch job

Terminal messages

User-errors, such as erroneous syntax entry and contextually wrong definitions, are handled by the dialog at the time of data entry. That is, the dialog displays messages at the terminal and the user can take corrective action immediately.

Some operations produce multiple messages. In this case, HCD displays a message list. You can save the displayed messages from the message list into the message log. See "Message lists" on page 66 on how to work with message lists.

Message log

Errors that are of low interest for the end user, such as incomplete UIMs during initialization, are only written to the message log. The user will be informed about this when leaving the dialog or switching to another IODF. Only in critical situations (for example, when the message log is not available), will the messages be written into the ISPF list data set. If this, however, also fails, the message will be written into the operating system log.

To see a message in the message log, issue the SHOWMSG command or use the ***View message log*** pull-down choice from the ***Query*** action bar on any action list panel.

Migration log

HCD maintains a migration log that contains messages issued by the migration process. You can view this migration log through ISPF.

Figure 188 shows where you can find messages while working with HCD.

Mode of Operation	**You Find the Message**
Dialog Mode	On the terminal In the message log
Batch mode	In the message log, that is the data set allocated with ddname HCDMLOG In the output (SYSPRINT) of the batch job [1]
Migration of input data sets	In the migration log, that is the data set allocated with ddname HCDPRINT
IPL	Trapped by IPL. A wait state code is issued.
HCD LDAP Backend	In the LDAP response, which the IBM Tivoli Directory Server for z/OS sends to the LDAP client. In the IBM Tivoli Directory Server for z/OS started task's log.
Note: [1] The output shows the message number and text; for explanations refer to *z/OS and z/VM HCD Messages*.	

Figure 188. Where to find HCD messages

LDAP response messages

If HCD is used as part of the HCD LDAP Backend, HCD will issue messages if problems occur. These messages can be made visible in the following way:
In general, LDAP clients send their requests to the IBM Tivoli Directory Server for z/OS and get an LDAP response for each request. If an LDAP client requests an operation from HCD via the HCD LDAP Backend and HCD encounters any problems while working on the request, HCD issues one or more text messages. These messages are sent back to the LDAP client as a part of the LDAP response and can be extracted using the LDAP client API.

The command line utilities (e.g. `ldapsearch` or `ldapmodify`) which are part of the IBM Tivoli Directory Server for z/OS show the messages contained in the LDAP response as "additional info".

z/OS LDAP Server started task log

The HCD LDAP Backend runs as a part of the IBM Tivoli Directory Server for z/OS and all HCD LDAP Backend messages are printed to the same location as the IBM Tivoli Directory Server for z/OS messages. The IBM Tivoli Directory

Server for z/OS runs as started task for the HCD LDAP Backend and the messages from the server and all of its backends are printed to the IBM Tivoli Directory Server for z/OS started task log.

The HCD LDAP Backend and its HCD instances print some informational and error messages to the IBM Tivoli Directory Server for z/OS started task log. If the LDAP server debug is switched on (i.e. debug level is not `LDAP_DEBUG_OFF`), all diagnostic output is also printed to the started task log. The regular HCD LDAP Backend messages and the additional debug output can be used to verify that the HCD LDAP Backend is working correctly.

HCD trace facility

The output of the HCD trace facility provides information to locate internal HCD problems. It helps the IBM program system representative to identify the cause of a failure.

Data Set

The trace records generated by HCD are recorded in the trace data set.

The trace data set must be preallocated with a ddname of HCDTRACE. If the trace data set is not allocated when HCD is invoked, no tracing takes place. The default CLIST that is provided with HCD allocates a trace data set with the name HCD.TRACE, prefixed by your user ID.

Trace records

The trace records show the control flow within the various HCD modules. Trace information is written into the trace data set:

- Whenever a module (CSECT) gets control.

  In this case, the passed parameter list is recorded together with the name and description of the invoked module.
- Whenever a module (CSECT) returns to its calling routine.

  The passed parameter list containing the return and reason codes is recorded.

When HCD is invoked, HCD overwrites the existing trace with the new trace data. If you want to retain the existing data, you have to make sure that the data is saved.

Figure 189 on page 468 is an example of a trace output. The following explains the records you see:

```
17:00:13  96-08-01  Trace started
```

The time stamp shows when the trace facility was started. This record is useful to identify the trace data sets when multiple traces are produced on the same day.

```
PUSH CBDMSMSG   -   Message Routine  96214 HCS6031   17001352   08472028
```

This line indicates that control has been passed to another module at a certain time. In this example, the module named CBDMSMSG with service level ’96214 HCS6031’ received control at 17:00:13.52 at storage address `X'08472028'`. The records also give a short description of what the module does, and the parameter list that is passed to the called module.

```
CBDMSMSG Message destination: Screen
```

This trace entry is written by the called module.

```
POP CBDMSMSG   -   Message Routine                   17001353
```

Indicates that control from the module named CBDMSMSG is returned to the calling routine at 17:00:13.53. Also, the passed parameter list is shown again, but now the parameter list contains the return/reason code indicating how successful the requested function was.

```
17:01:24  96-08-01  Trace stopped
```

The last entry in the trace output is a time stamp that indicates end of tracing.

```
17:00:13  96-08-01  Trace started.
   :
PUSH CBDMSMSG   -   Message Routine  96214 HCS6031 17001352   08472028
00000000    D4E2C740 C3C2C4C1 F1F2F6C9 C9000100   *MSG CBDA126II"""*
00000010    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000020    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000030    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000040    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000050    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000060    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000070    00000000 00000000 00000000 00000000   *""""""""""""""""*
CBDMSMSG Message destination: Screen
00000000    E3D9C1C3 C5408396 94948195 8440A681   *TRACE command wa*
00000010    A2408183 838597A3 85844B              *s accepted.     *
POP  CBDMSMSG   -   Message Routine                         17001353
00000000    D4E2C740 C3C2C4C1 F1F2F6C9 C9000100   *MSG CBDA126II"""*
00000010    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000020    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000030    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000040    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000050    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000060    00000000 00000000 00000000 00000000   *""""""""""""""""*
00000070    00000000 00000000 00000000 00000000   *""""""""""""""""*
    .
    .
    .
17:01:24  96-08-01  Trace stopped.
```

Figure 189. Example: Trace output

Figure 190 on page 469 is an extract of a trace output when an abend occurred. The following explains the record in the example.

E S T A E: The entries show information that was recorded by the HCD ESTAE routine. Entries under ***Diagnostic stack*** list the modules that were executing when the abnormal termination occurred, together with the service levels. The first entry names the module that ended abnormally; in this example, the module is CBDMDPK5. The entries also show the control flow between the various HCD modules. In this example:

- Module CBDMDPK0 called module CBDMDPK5.
- Module CBDMGDIA called module CBDMDPK0.
- Module CBDMGHCP called module CBDMGDIA.
- and so on.

```
*******************************************************************
*         E S T A E                                               *
*         System abend code  :  00F                               *
*         Reason code        :  00990654                          *
*         HCD version        :  z/OS 1.4 HCD                      *
*         Diagnostic stack   :  CBDMDPK5   97207   HCS6051        *
*                               CBDMDPK0   97207   HCS6051        *
*                               CBDMGDIA   97206   HCS6051        *
*                               CBDMGHCP   97207   HCS6051        *
*                                                                 *
*         Module name        :  CBDMGHCP                          *
*         Entry point address:  0003C9C8                          *
*         PSW                :  078D0000 80044498                 *
*                                                                 *
*    R0  00000340  R1  8400F000  R2  00044604  R3  062C1494       *
*    R4  062BC4DA  R5  00000005  R6  00000000  R7  062BCAD0       *
*    R8  00000000  R9  062BCAC4  R10 85D0C900  R11 862BB236       *
*    R12 800443A8  R13 062BBF84  R14 062BCAC4  R15 00990654       *
*******************************************************************
```

Figure 190. Example: Trace output in case of Abend

Activating the trace

The trace can be activated either:

- Dynamically by using the TRACE command in the HCD dialog. The command is optional, and can be entered whenever a displayed panel has a command line. For information on the TRACE command, refer to "TRACE command."
- By invoking HCD (for details see Chapter 12, "How to invoke HCD batch utility functions," on page 307) with the TRACE option specified in the passed parameter string (this is done automatically by the entry in the CLIST).

```
//BWINJOB  JOB (3259,RZ-28),'BWIN',NOTIFY=BWIN,CLASS=A,
//             MSGCLASS=Q,MSGLEVEL=(1,1),REGION=4M
//REPORT1  EXEC PGM=CBDMGHCP,
//              PARM='TRACE,REPORT,CSMEN,PROC1,PART1,MVS1,00'
                     .
                     .
                     .
//HCDTRACE DD   DSN=BWIN.HCD.TRACE,DISP=OLD
//
```

- By specifying the TRACE command in the HCD profile, see "Defining an HCD profile" on page 25 for the TRACE profile statement.

The tracing stays active until either turned off by the TRACE command, or until HCD terminates.

TRACE command

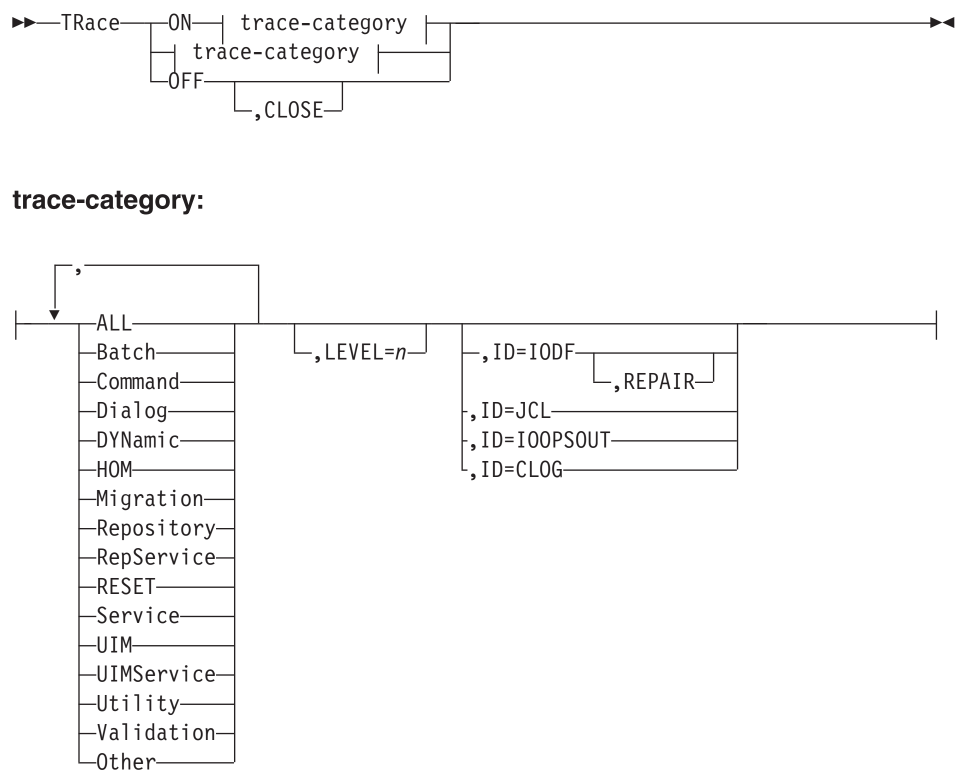
The TRACE command activates and deactivates the HCD trace facility. The command allows you also to limit the detail of data written into the trace data set by requesting that only certain functions and details should be traced.

The TRACE command can be entered on any HCD panel showing a command line. The command can also be specified in the HCD profile (see "TRACE command" on page 29).

For HCD to write the output to the trace data set, ON must be specified with at least one trace category (or you must have invoked HCD with the TRACE parameter, see “Activating the trace” on page 469). To view the trace output, you have to close the trace data set first. You can do this by either leaving HCD or by entering the command TRACE OFF,CLOSE.

The format of the command is as follows:

TRACE Command



Note: You may abbreviate some of the keywords. The characters you have to use are indicated by uppercase (you must then omit lowercase). For example `RepService` may be abbreviated as `RS`.

ON Starts the trace facility.

OFF Stops the trace facility.

CLOSE Closes the trace data set.

trace category Specifies the functional scope to be traced:

ALL	Trace everything.
Batch	Trace all batch routine.
Command	Trace all command routines.
Dialog	Trace all dialog routines.
DYNamic	Trace all dynamic routines.
HOM	Trace all object management routines.
Migration	Trace all migration routines.
Repository	Trace all repository main routines.
RepService	Trace all repository service routines.
RESET	Reset all currently active categories, LEVEL and ID.

Service	Trace all service routines.
UIM	Trace all UIM routines.
UIMService	Trace all UIM service routines.
Utility	Trace all utility routines.
Validation	Trace all validation routines.
Other	Trace all other not yet mentioned routines.

LEVEL=*n* Assigns a level of detail to the functions to be traced, where *n* is a decimal number ranging from 0 to 255. If the option is omitted, the default level of 5 is assumed. The TRACE option described in "Input parameter string" on page 308 is equivalent to the command `TRACE ON,ALL,LEVEL=255`.

ID=IODF Writes an IODF dump into the trace data set. This parameter cannot be specified in the HCD profile. If you have a consistent IODF, an output in the trace data set is only shown when you set `LEVEL=128` or higher. Otherwise, an output is only shown if the IODF contains defects.

REPAIR

Removes detected errors in the work IODF and reports corrections in the trace data set. Before you use the REPAIR option, you must set the work IODF in update mode.

ID=JCL Writes into the trace data set all statements generated when action ***Transmit configuration package*** is invoked from the HCD dialog.

ID=IOOPSOUT

Writes all responses of I/O Operations IHVAPI2 calls into the trace data set. These are the results of I/O Operations query requests.

ID=CLOG Writes the contents of the change log file into the HCD trace data set. You should use this option togehter with `LEVEL=8`. This parameter cannot be specified in the HCD profile.

Trace command via HCD profile

- If HCD is started with the TRACE keyword, (for example, either started via HCM with the ***HCD Trace*** box selected in the HCM login dialog, or via the IBM Tivoli Directory Server for z/OS configuration file), initially *all* the trace categories will be traced. After the HCD profile has been read, however, the TRACE parameters there may modify the TRACE behavior.
- The TRACE parameters set in the HCD profile will also influence the TRACE behavior if you activate the tracing in HCM at a later time.
- The TRACE parameters set in the HCD profile will determine the contents of the trace for the rest of the session.
  - If you use the `RESET` option followed by trace categories *cat1,cat2,...,catn*, then only the categories *cat1,cat2,...,catn* will be considered. The `RESET` option must be the first option because the trace categories are additive (LEVEL is set to 0).
  - Specifying the keyword `off` will terminate the startup trace.
  - Specifying the keyword `on` will start the HCD trace (if not already started) and will invoke the trace parameters of the TRACE statement.
  - Specifying `LEVEL=`*n* will set the level of trace detail. If the `LEVEL` parameter is not set, then the trace will use the default level of 5.
- If no categories are set explicitly, then all trace categories will be active.

IODF dump

Use the ID=IODF parameter of the TRACE command to produce an IODF dump. This command goes through your IODF, checks it for corrupted data, and writes all records and defects into the trace data set. If you have a consistent IODF, you must set the LEVEL parameter to `LEVEL=128` or higher to get an output. Otherwise, an output is only shown if the IODF contains defects.

If your IODF has defects, error message CBDA999I ’Defect(s) detected in IODF xxx’ is displayed, and message CBDA099I is written into the message log data set. In addition, the trace data set records defects with the string ’Error:’ followed by the reason. You can locate the reported defects by searching to that string in the trace data set.

If no defects are detected in the IODF, message CBDA126I ’TRACE command was accepted’ is given.

If you cannot invoke HCD, and therefore, cannot use the TRACE command any longer, use a JCL stream for producing a dump. Figure 191 is an example of the JCL stream for producing an IODF dump.

Make changes to the entries according to your installation requirements.

```
//WAS$IODF JOB '3259,BOX01,S=C','SMITH',MSGLEVEL=(1,1),
//             NOTIFY=WAS,CLASS=A,MSGCLASS=Q,REGION=4096K
//PRTVSAM  EXEC PGM=IDCAMS
//INPUT    DD  DSNAME=WAS.IODF02.WORK,DISP=SHR
//OUTPUT   DD  DSNAME=WAS.IODF02.DUMP,UNIT=SYSALLDA,
//             SPACE=(CYL,(20,10)),
//             DCB=(LRECL=125,BLKSIZE=629,RECFM=VBA),
//             DISP=(NEW,CATLG)
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
     PRINT -
       INFILE(INPUT) -
       DUMP -
       OUTFILE(OUTPUT)
/*
//
```

Figure 191. Example: JCL stream for producing an IODF dump

Repair an IODF

If your IODF contains defects, some of them can be repaired with the REPAIR option of the TRACE ID=IODF command.

First, your work IODF must be set in update mode to correct defects. You can do this, for example, by changing a description field in your work IODF. A production IODF cannot be repaired.

To repair defects in your work IODF, add the REPAIR option to the TRACE ID=IODF command: TRACE ON,REPAIR,ID=IODF.

Each corrected defect is recorded in the trace data set with the string ’Defect has been corrected’.

If a defect has been repaired, message CBDA998I, ’Defect(s) detected in IODF xxx. Repair action performed.’ is issued. Repeat the TRACE ID=IODF command to check whether all defects could be corrected.

An IODF that has been enabled for multi-user access cannot be repaired. You first must disable it for multi-user access before it can be set into update mode and be repaired.

MVS dumps and traces

To aid in diagnosing problems, z/OS automatically provides messages and error records, and on request dumps and traces. HCD uses those services to record errors. For information about:

- Dumps and traces, refer to *z/OS MVS Diagnosis: Tools and Service Aids*.
- Using the diagnostic information, refer to *z/OS Problem Management*.

IPCS reports

z/OS allows you to format dumps into diagnostic reports. To produce the reports, use the Interactive Problem Control System (IPCS).

For information, refer to:
- *z/OS MVS IPCS User's Guide*
- *z/OS MVS IPCS Commands*
- *z/OS MVS IPCS Customization*

Searching problem reporting data bases and reporting problems

Search arguments are used to search problem reporting data bases. If the problem being diagnosed was already reported and the symptoms entered into the data base, the search will produce a match.

To perform a search, do the following:

1. Analyze the problem reporting data base and develop a search argument using the information provided in the boxes labeled *Search Argument*.
2. Complete the digits (such as ccc, nnn, hhh) according to the applicable conditions. For example, if the message CBDA099I was received, the developed search argument for *message identifier* would be: MS/CBDA099I. An example is shown in Table 13 on page 449.
3. Use the search arguments to search *problem reporting data bases*. If the search finds that the problem has been reported before, request a fix from IBM.

   If the search is unsuccessful, report the problem to the IBM Support Center. Submit the information that is listed in the *Problem Data* tables. An example is shown in Table 14 on page 449.

For more detailed information on these steps, refer to *z/OS Problem Management*.

Sending an IODF to a different location

There may be situations, in which an IODF is to be transferred to a different location or system. Usually, the HCD Export/Import Utility can be used to transmit the IODF to the desired target destination. Sometimes, however, there are situations, where this may not be possible (e.g. a direct connection does not exist). The following steps describe a simple method in which you can transfer your IODF data from one z/OS host to any other z/OS host even if a direct transmission path not available.

1. Examine the size of the IODF, which is to be transferred. Check for the number of allocated 4K blocks (either under the HCD dialog ***Maintain I/O definition files ---> View I/O definition File Information***.

2. Use the HCD Export function, found under the HCD dialog ***Define, modify, or view configuration data***, ***Export I/O definition file*** in the HCD dialog. Send the IODF to your own user ID; that is, to the user ID of the host on which you are currently working. HCD will export the IODF data as a sequential data set to your own user ID. If you specify an asterisk (*) for the target user ID and target node ID, the sequential data set is not transmitted but rather written directly to the data set *user*.EXPORTED.IODFnn.xxxx. In this case, you can skip step 4.
3. Exit the HCD dialog.
4. Use the TSO RECEIVE command to retrieve the IODF data from your internal reader. Per default, you will get a sequential data set *user*`.EXPORTED.IODFnn.xxxx`. This data set has the record organization `FB` and `LRECL=BLKSIZE=4096` and the number of blocks as mentioned under step 1 on page 473).
5. Download this data set to your workstation. It is important that you ensure that the download is in *binary* mode.
6. To save storage resources, you may consider compressing (zipping) the downloaded file on the workstation.
7. Now you can transfer the IODF to a different workstation/location. Once the IODF data has arrived at the target workstation, you have to uncompress (unzip) the file if it has been compressed for transportation.
8. On the target z/OS host pre-allocate a data set into which the IODF data is to be uploaded. It must be a sequential data set with `FB, BLKSIZE=LRECL=4096` and the number of blocks must be the number of allocated blocks of the original IODF (see step 1 on page 473).
9. Upload the IODF data from the workstation to the z/OS host in binary mode into the pre-allocated sequential data set.
10. Use the HCD Import function, found under the HCD dialog ***Define, modify, or view configuration data***, ***Import I/O definition file*** and specify the sequential data set to be imported into an IODF data set using the name of your choice.

Appendix D. HCD object management services

Programming Interface information

The HCD object management services (HOM) provide an application programming interface for retrieving data from the IODF, such as switch data, device type, or control unit type. The programs requesting the services cannot run in APF-authorized state.

The mapping macros CBDZHRB, CBDZHIEX, CBDZHOEX, and CBDZHCEX (see "Data input and output areas" on page 476, and "Request block (HRB)" on page 476) are not available as source code. The macros are listed in *z/OS MVS Data Areas, Vol 1 (ABEP-DALT)*, and must be coded by the application writer.

How to invoke the HOM services

Programs can invoke the services from the HCD routine CBDMGHOM. An application issuing a request must have its own copy of the CBDMGHOM routine dynamically loaded or linked. For every request, the application has to pass the parameters shown in Table 33 using standard linkage conventions.

Table 33. Used registers and passed parameters

Register	Contents
0	Undefined
1	Address of five-word parameter list: 1. **Address of request control block (HRB)** 4-byte field containing the address of the request block. The request block contains the function, the object to which the function is applied, and qualifiers, attributes, and parameters. See "Request block (HRB)" on page 476 for more details. 2. **Address of (pointer to input data or zero)** 4-byte field containing the address of the address of the data input block if the request requires input. It is required on a HRB_SETUP request. See "Data input and output areas" on page 476 for more details. 3. **Address of (length of input data or zero)** 4-byte field containing the address of the fullword fixed binary integer containing the length of the input data. It must correspond to the exact length of the data contained in the data-input block, that is, no trailing or intermediate blanks are allowed. 4. **Address of (pointer to output data or zero)** 4-byte field containing the address of the address of the data output block if the request returned output. It is required on HRB_DGET and HRB_MGET requests to obtain the data and messages from the API. See "Data input and output areas" on page 476 for more details. 5. **Address of (length of output data or zero)** 4-byte field containing the address of the fullword fixed binary integer containing the length of the output data. The parameters must be coded in the order shown. Only the first parameter (address of request block) is mandatory. The others are optional and depend on the type of request, as shown in Figure 192 on page 479. If you omit an optional parameter, you must specify a zero instead.

Table 33. Used registers and passed parameters (continued)

Register	Contents
2-12	Undefined
13	Address of 18 word save area
14	Return address
15	Entry point address

Note: The service supports calls for both 24-bit and 31-bit addressing mode.

Data input and output areas

Data input and output areas must be contiguous areas of main storage allocated by the application in private storage and freed later on.

The areas have no header section, that is, the data starts at the first byte of the area and continues without gaps. The data contained in these areas are the interface records, which are described in the mapping macros CBDZHOEX and CBDZHIEX in *z/OS MVS Data Areas, Vol 1 (ABEP-DALT)*.

For the GET request, the output area might contain the definition of multiple objects on return, whereas the input area normally contains only one object.

Issue a HRB_DGET function to get the provided output data. The size of the output data is returned by the previous GET request. The application is responsible to allocate the correct output size. If the data does not fit into the size allocated by the application for the output area, the data will be truncated.

Request block (HRB)

The HOM request block (HRB) you have to set up is described fully as mapping macro CBDZHRB in *z/OS MVS Data Areas, Vol 1 (ABEP-DALT)*. Table 34 summarizes the request block names and constants you can specify for the functions shown in Figure 192 on page 479.

On input, this block contains the detailed request to the HOM services. On output, it contains the data requested, messages, return codes, and reason codes.

The field HRB_OBJECT with all its subfields describes the object that should be processed on the request to the API.

The object code HRB_OBJ_CODE must be coded for every request, because it identifies the class of objects that are subject of the actual request.

The constants and flags required to describe the objects are contained in CBDZHCEX, which is documented in *z/OS MVS Data Areas, Vol 1 (ABEP-DALT)*.

Table 34. Summary of Request Block Names and Related Constants

Name	Constants	Description
HRB_SDESC	HRB_SDESC_C	Request block storage descriptor. Required for all requests.
HRB_LENGTH		Length of the request block HRB.
HRB_USE_IODF		Name of the IODF to be used for the request.

Table 34. Summary of Request Block Names and Related Constants (continued)

Name	Constants	Description
HRB_FUNCTION	HRB_SETUP HRB_OPEN HRB_GET HRB_ACT_STATUS HRB_DGET HRB_MGET HRB_CLOSE HRB_TERMINATE	Function code
HRB_OBJ_CODE	HRB_HCD	Required for SETUP and TERMINATE.
	HRB_IODF	Required for OPEN and CLOSE.
	HRB_PROCESSOR	Required for processor.
	HRB_CSS	Required for channel subsystem.
	HRB_PCU	Required for physical control unit.
	HRB_DEVICE	Required for device.
	HRB_SWITCH	Required for switch.
	HRB_CHANNEL	Required for channel path.
	HRB_DATA	Required for DGET.
	HRB_MESSAGE	Required for MGET.
	HRB_IODF	Required for ACT_STATUS.
HRB_OBJ_NAME		May be used to specify the name and number of an object. For devices, the number includes the suffix.
HRB_OBJ_NR		
HRB_Q_CODE	HRB_PCU HRB_DEVICE HRB_SWITCH	May be used together with HRB_PROCESSOR to specify that the processor data is qualified by the control unit, device, or switch.
	HRB_PROCESSOR	May be used together with HRB_CHANNEL to determine the kind of channel path data.
HRB_Q_NAME		May be used to specify the qualifier name and number for composite names.
HRB_Q_NR		
HRB_REQ_MODE	HRB_MODE_ID	Gets objects starting with the ID specified. The ID of the object must be set in HRB_OBJ_NR or HRB_OBJ_NAME. The HRB_RANGE_VALUE must not be zero.
	HRB_MODE_FIRST	Gets first object in the defined scope.
	HRB_MODE_LAST	Gets last object in the defined scope.
	HRB_MODE_ALL	Gets all objects in the defined scope.
	HRB_MODE_CHAIN	Gets all objects within the chain defined by the given object, for example, all devices of a multi-exposure device.
HRB_RANGE_VALUE		May be used to specify the number and direction of objects to be processed (positive number = subsequent objects; negative number = preceding objects).
HRB_TRACE	HRB_YES	The request is traced. Make sure that the trace data set is allocated with a DD name of HCDTRACE.
HRB_RESULT		The subfields of HRB_RESULT contain the output of the request, such as the data requested, the size of the output data, or return codes.

Functions

The HCD application programming interface provides the functions described in Figure 192 on page 479. The functions are listed as you need them while requesting data from the HCD HOM services. The constants you have to specify for HRB_FUNCTION and HRB_OBJ_CODE are included in the figure.

Task	Fields in Request Block (HRB)		Explanation
	HRB_FUNCTION=	HRB_OBJ_CODE=	
1. Set up the connection to the HCD API			
Setup connection	HRB_SETUP	HRB_HCD	Establish the HCD environment by passing the setup function in the request block. **Input:** HCD session interface (HSI) record.
2. Open the IODF			
Open IODF	HRB_OPEN	HRB_IODF	Open an IODF, for which you have read authority, by passing the HRB_OPEN function in the request block.
3. Request data for HCD objects			
Get Processor	HRB_GET	HRB_PROCESSOR	Issue a request with the GET function to retrieve data from the IODF. The request returns the address and the length of the data output block. Issue a request with the HRB_DGET function to obtain the retrieved information. **Note:** Issue HRB_GET and HRB_MGET before requesting additional data, because the new request deletes all data and messages from the previous request.
Get Channel Subsystem	HRB_GET	HRB_CSS	
Get Channel Path	HRB_GET	HRB_CHANNEL	
Get Switch	HRB_GET	HRB_SWITCH	
Get Physical Control Unit	HRB_GET	HRB_PCU	
Get Device	HRB_GET	HRB_DEVICE	
Get Activation Status	HRB_ACT_STATUS	HRB_IODF	The request allows you to identify the currently active IODF, processor, and so on. **Output:** Activation status interface (ASI) record.
4. Get the data from the previous GET request			
Data Get	HRB_DGET	HRB_DATA	Issue the request with the address and length of the output area to obtain the data retrieved with the previous GET function. **Output:** Interface record for the object.
Message Get	HRB_MGET	HRB_MESSAGE	Check the return and reason code of the previous GET request. If the return code is warning, error, or severe, issue the request with the address and length of the output area to obtain the messages. **Output:** Message interface (MSI) record.
5. Close the IODF			
Close IODF	HRB_CLOSE	HRB_IODF	When you do not need the IODF anymore, close the IODF by issuing a request with the close function.
6. Terminate the connection to the HCD API			
Terminate connection	HRB_TERMINATE	HRB_HCD	When you do not need the HOM services anymore, terminate the connection by issuing a request with the terminate function.

Figure 192. Functions provided by the HOM services

Example

The example shows how to get a range of 20 devices, starting with ID X'414'and connected to control unit X'21'. The example is shown in pseudo-code because the actual syntax and declarations depend on the programming language used.

```
...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_FUNCTION    = HRB_SETUP
HRB_OBJ_CODE    = HRB_HCD
Load or link CBDMGHOM with: (HRB,HSI-address,HSI-length,0,0)
 ...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_USE_IODF    = IODF-name
HRB_FUNCTION    = HRB_OPEN
HRB_OBJ_CODE    = HRB_IODF
Load or link CBDMGHOM with: (HRB,0,0,0,0)
 ...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_USE_IODF    = IODF-name
HRB_FUNCTION    = HRB_GET
HRB_OBJ_CODE    = HRB_DEVICE
HRB_OBJ_NR      = X'0414000'
HRB_Q_CODE(1)   = HRB_PCU
HRB_Q_NR(1)     = X'00000021'
HRB_REQ_MODE    = HRB_MODE_ID
HRB_RANGE_VALUE = X'00000014'
Load or link CBDMGHOM with: (HRB,0,0,0,0)
 ...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_USE_IODF    = IODF-name
HRB_FUNCTION    = HRB_DGET
HRB_OBJ_CODE    = HRB_DATA
Load or link CBDMGHOM with: (HRB,0,0,DVI-address,DVI-length)
 ....
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_USE_IODF    = IODF-name
HRB_FUNCTION    = HRB_MGET
HRB_OBJ_CODE    = HRB_MESSAGE
Load or link CBDMGHOM with: (HRB,0,0,MSI-address,MSI-length)
 ...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_USE_IODF    = IODF-name
HRB_FUNCTION    = HRB_CLOSE
HRB_OBJ_CODE    = HRB_IODF
Load or link CBDMGHOM with: (HRB,0,0,0,0)
 ...
HRB_SDESC       = HRB_SDESC_C
HRB_LENGTH      = length-of-HRB
HRB_FUNCTION    = HRB_TERMINATE
HRB_OBJ_CODE    = HRB_HCD
Load or link CBDMGHOM with: (HRB,0,0,0,0)
 ...
```

Return codes

On return, HRB_RETURN_CODE in the request block HRB contains the severity of an error:

- HRB_SEVERE indicates that processing has been terminated and a new setup is required. Issue HCD_MGET to retrieve the messages describing the error.
- HRB_SYNTAX indicates that the request was given to the API in an incorrect syntax and therefore, the request has not been processed.
- HRB_WARNING and HRB_ERROR are given for the remaining errors. Issue HCD_MGET to retrieve the messages describing the error.
- HRB_OK tells you that no problems occurred.

Reason codes

HRB_REASON_CODE in the request block HRB specifies the error in more detail.

End of Programming Interface information

Appendix E. Scenarios

The diagram in Figure 193 on page 484 shows an IODF from the viewpoint of the control unit. It shows all attachments of the CU via switches up the processor, as well as the devices attached to the CU. The information displayed for each object is listed below:

- For processors:
  - Processor identification
  - Processor type/model
  - Description
  - Configuration mode
  - Partitions associated with CHPIDs
  - CHPIDs (ID, type, operation mode)
- For switches:
  - Switch identifier and ports
  - Switch type/model
- For CUs:
  - CU type/model
  - CU number
  - Serial number or description
- For devices:
  - Device type/model
  - Device number (starting number and range)

This diagram represents the validated IODF after the completion of the scenario steps described hereafter.

The following scenarios cover the main definition tasks required to produce the IODF illustrated by the diagram. The scenarios have an exemplary character and are not meant to be complete or repetitive (that means, not to show a definition step for every object of the same type).

For detailed information on the ***Define*** tasks refer to Chapter 6, “How to define, modify, or view a configuration,” on page 77.

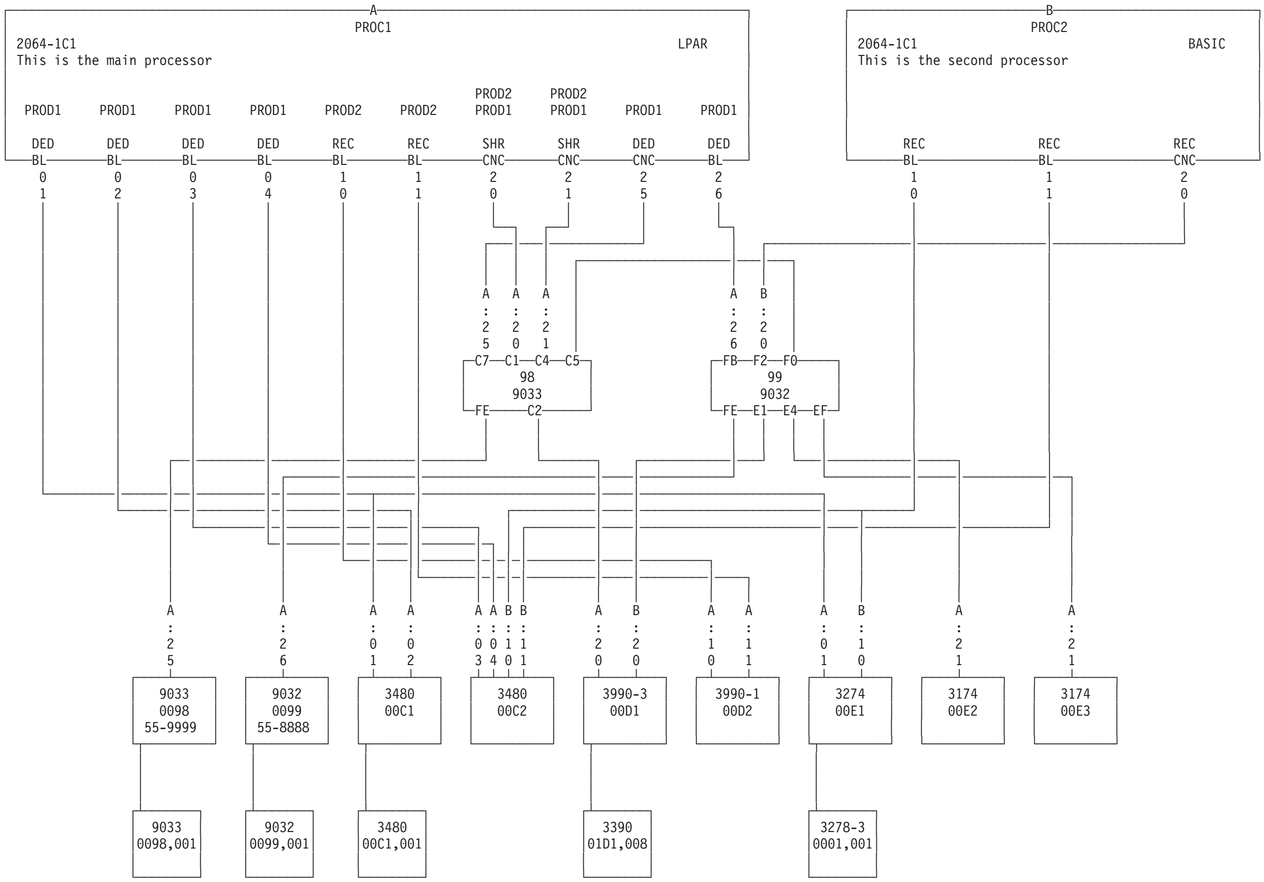


Figure 193. Example of a Hardware Configuration

Define operating system configuration data

You have to define the operating systems running on the processor(s), or in one of its partitions first. This includes their EDTs and esoteric names.

1. On the primary task selection panel, select ***Define, modify, or view configuration data***. Press the Enter key. HCD displays the Define, Modify, or View Configuration Data panel.
2. On the Define, Modify, or View Configuration Data panel, select ***Operating system configurations***. HCD displays the Operating System Configuration List panel. Initially, the panel is empty.
3. Use F11=Add to define an operating system. HCD displays the following panel:

```
 ─────────────── Add Operating System Configuration ───────────────


  Specify or revise the following values.

  OS configuration ID  . . . . . OPSYS01
  Operating system type  . . . . MVS      +

  Description  . . . . . . . . . zOS operating system __________
```

4. Specify the name (ID) of the operating system, its type and description, and press the Enter key. HCD displays the updated Operating System Configuration List panel showing the just defined operating system.

```
  Goto  Backup  Query  Help
--------------------------------------------------------------------------
                   Operating System Configuration List             Row 1 of 1

Select one or more operating system configurations, then press Enter. To
add, use F11.

/ Config. ID   Type     Description
_ OPSYS01      MVS      z/OS operating system
******************************* BOTTOM OF DATA *******************************
```

After you have defined the operating system, define the EDTs and the esoterics belonging to the EDTs.

To define an EDT proceed as follows:

1. On the Operating System Configuration List panel, select the operating system and the ***Work with EDTs*** action from the context menu (or action code **s**). HCD displays the EDT List panel. Initially, the panel is empty.
2. Use F11=Add to define an EDT. HCD displays the following panel:

```
 ┌──────────────────────────────── EDT List ──────────────────────────────┐
 │ Goto  Backup  Query  Help                                              │
 │ ┌─────────────────────────────── Add EDT ────────────────────────┐     │
 │ │                                                                │     │
 │ │                                                                │     │
 │ │ Specify the following values.                                  │     │
 │ │                                                                │     │
 │ │ Configuration ID . : OPSYS01      z/OS operating system        │     │
 │ │                                                                │     │
 │ │ EDT identifier . . . A1                                        │     │
 │ │ Description  . . . . special ________________________          │     │
 │ │                                                                │     │
 │ └────────────────────────────────────────────────────────────────┘     │
 │                                                                        │
```

3. Specify the EDT identifier and description, and press the Enter key. HCD displays the EDT List panel showing the just defined EDT.

```
 ┌──────────────────────────────── EDT List ───────────────────────────────┐
 │ Goto  Backup  Query  Help                                               │
 │ ----------------------------------------------------------------------- │
 │                                                              Row 1 of 1 │
 │ Command ===> _______________________________________ Scroll ===> PAGE   │
 │                                                                         │
 │ Select one or more EDTs, then press Enter. To add, use F11.             │
 │                                                                         │
 │ Configuration ID . : OPSYS01            z/OS operating system           │
 │                                                                         │
 │ / EDT Last Update By       Description                                  │
 │ _ A1  2002-10-02  KLAU     special                                      │
 │ ************************* BOTTOM OF DATA ****************************** │
 │                                                                         │
```

4. Define the esoterics for the just defined EDT. Perform the following steps:
   a. On the EDT List panel, select the EDT and the ***Work with esoterics*** action from the context menu (or action code **s**). HCD displays the Esoteric List panel. Initially, the panel is empty.

b. Use F11=Add to define an esoteric. HCD displays the following panel:

```
┌─────────────────────────── Esoteric List ──────────────────────────┐
│   Goto  Filter  Backup  Query  Help                                 │
│ - ┌──────────────────── Add Esoteric ────────────────────┐ --------- │
│   │                                                      │           │
│   │                                                      │           │
│ S │ Specify the following values.                        │           │
│   │                                                      │           │
│ C │ Esoteric name  . . . ES001 __                        │           │
│ E │ VIO eligible . . . . No     (Yes or No)              │           │
│   │ Token  . . . . . . . ____                            │           │
│ / │                                                      │           │
│ * │                                                      │ ********* │
│   └──────────────────────────────────────────────────────┘           │
│                                                                      │
```

c. Specify the esoteric name, and whether the esoteric is VIO eligible or not, and press the Enter key. HCD displays the Esoteric List panel showing the esoteric you just defined.

```
┌─────────────────────────── Esoteric List ───────────────────────────┐
│  Goto  Filter  Backup  Query  Help                                   │
│ -------------------------------------------------------------------- │
│                                                          Row 1 of 1  │
│                                                                      │
│ Select one or more esoterics, then press Enter. To add, use F11.     │
│                                                                      │
│ Configuration ID . : OPSYS01      z/OS operating system              │
│ EDT identifier . . : A1           special                            │
│                                                                      │
│ / Esoteric  VIO    Token  State                                      │
│ _ ES001     No     ____   No device defined                          │
│ ************************** BOTTOM OF DATA *************************** │
│                                                                      │
```

The "State" column indicates that no devices are associated with the esoteric. You are going to define the devices later on.

Use the steps described above to define additional esoterics. After you are done, use F3=Exit to return to the EDT List panel. Use F3=Exit again to return to the Operating System Configuration List panel.

You may define additional operating systems using the steps described above.

Define switches

Because the configuration contains two ESCON directors (switches), you have to define them at this point. This also includes the definition of the switch configuration for each switch. You will have to connect the switches to the various channel paths and control units at a later time.

1. On the Define, Modify, or View Configuration Data panel, select *Switches*. Pressing Enter displays the Switch List panel showing all switches defined in the IODF. Initially, the panel is empty.
2. Use F11=Add to define a switch. HCD displays the following panel:

```
 ─────────────────────────── Add Switch ───────────────────────────

 Specify or revise the following values.

 Switch ID . . . . . . . . 98   (00-FF)
 Switch type . . . . . . . 9033           +
 Serial number . . . . . . 55-9999
 Description . . . . . . . First Switch
 Switch address  . . . . . __  (00-FF) for a FICON switch

 Specify the port range to be installed only if a larger range
 than the minimum is desired.

 Installed port range  . . C0  -  CF  +

 Specify either numbers of existing control unit and device, or
 numbers for new control unit and device to be added.

 Switch CU number(s) . . . 0098   ____  ____  ____  ____  +
 Switch device number(s) . 0098   ____  ____  ____  ____

  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
  F12=Cancel
```

Enter the required data; you must at least specify:
- Switch identifier
- Switch type

Specify also the switch control unit numbers and switch device numbers. HCD then defines the switch control units, the switch devices, and connects the switch devices to the control units. The switch control units are automatically connected to port FE.

3. Press the Enter key. HCD displays the Switch List panel showing the switch you just created.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                 Switch List         Row 1 of 1 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more switches, then press Enter. To add, use F11.

                                                                CU   Dev
/ ID Type +        Ad Serial-# + Description                    Num. Num.
_ 98 9033          __ 55-9999    First Switch                   0098 0098
******************************* Bottom of data ********************************
```

4. To define the switch configuration, proceed as follows:
   a. On the Switch List panel, select the switch and the ***Work with switch configurations*** (or action code **s**). HCD displays all switch configurations defined for the switch. Initially, the panel is empty.
   b. Use F11=Add to define a new switch configuration. HCD displays the following panel:

```
┌──────────────────── Switch Configuration List ─────────────────────┐
│  Goto  Backup  Query  Help                                         │
│ - ┌─────────────── Add or Repeat Switch Configuration ───────────────┐
│   │                                                                  │
│   │                                                                  │
│ S │ Specify or revise the following values.                          │
│   │                                                                  │
│ S │ Switch ID . . . . . . . : 98     First Switch                    │
│   │                                                                  │
│   │ Switch configuration ID . basic __                               │
│ / │                                                                  │
│ * │ Description . . . . . . . night shift configuration ______       │
│   │                                                                  │
│   │ Default connection  . . . 1  1.  Allow                           │
│   │                              2.  Prohibit                        │
│   │                                                                  │
│   └──────────────────────────────────────────────────────────────────┘
│
```

c. Enter the required data and press the Enter key. HCD displays the Switch Configuration List panel showing the just created switch configuration.

```
┌──────────────────── Switch Configuration List ─────────────────────────┐
│  Goto  Backup  Query  Help                                              │
│ ----------------------------------------------------------------------- │
│                                                         Row 1 of 1      │
│                                                                         │
│ Select one or more switch configurations, then press Enter. To add, use F11. │
│                                                                         │
│ Switch ID  . . . . : 98     First Switch                                │
│                                                                         │
│   Switch       Default                                                  │
│ / Config. ID   Connection + Description                                 │
│ _ BASIC        Allow        night-shift configuration                   │
│ ************************ BOTTOM OF DATA **************************      │
│                                                                         │
```

Return to the Switch List panel and repeat the procedure described above to define switch 99 as switch type 9032.

Define processor-related data

The definition of a processor consists of defining the processor itself, the partitions and the channel paths.

Define processor

Define the processor as follows:

1. On the Define, Modify, or View Configuration Data panel select ***Processors***. Press the Enter key. HCD displays the Processor List panel. Initially, the panel is empty.
2. Use F11=Add to define a processor. HCD displays the following panel:

```
 ─────────────────────────── Add Processor ───────────────────────────


 Specify or revise the following values.

 Processor ID . . . . . . . . . . PROC1 __

 Processor type . . . . . . . . . 2064 ___  +
 Processor model  . . . . . . . . 1C1 ____  +
 Configuration mode . . . . . . . LPAR   +
 Number of channel subsystems . . _        +

 Serial number  . . . . . . . . 1234562064
 Description  . . . . . . . . . This is the main processor ____

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . ________  +
 CPC name . . . . . . . . . . . ________  +

 Local system name  . . . . . . ________
```

Enter the required data; you must at least specify:
- Processor identifier
- Processor type/model
- Configuration mode

If, for processors other than XMP processors, you specify a value for the field ***Number of channel subsystems***, this is ignored.

3. Because more than one support level exists for the 2064-1C1 processor type, HCD displays the following panel:

```
 ─────────────────────── Available Support Levels ───────────────────────
                                                 Row 1 of 4 More:      >
 Command ===> ___________________________________________________________

 Select the processor support level which provides the processor
 capabilities you want to use.


   Support Level
   Basic 2064 support, IQD, FCP, CF Duplex
 #
   Basic 2064 support, IQD, FCP, CF Duplex, CAS
 #
 ***************************** Bottom of data *****************************

  F1=Help       F2=Split      F3=Exit       F7=Backward    F8=Forward
  F9=Swap      F12=Cancel    F20=Right     F22=Command

 A support level selection is required. Press PF1 on the Support Level
 field for available detail information.
```

Note: As indicated by the message on the ***Available Support Levels*** panel, you can retrieve an explanation of the processor support level for zSeries processors: Position the cursor on the processor support level description and press PF1 to get an enumeration of functions provided by this support level.

Select the appropriate support level (for example, Basic 2064 support, IQD, FCP, CF Duplex) and press the Enter key.

4. This completes the processor definition and HCD displays the Processor List panel showing the just defined processor.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                                Processor List       Row 1 of 1 More:       >
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more processors, then press Enter. To add, use F11.


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ PROC1    2064     1C1      LPAR  1234562064 This is the main processor
******************************* Bottom of data ********************************
```

Define partitions

To define partition(s) for the channel subsystem, proceed as follows:

1. On the Channel Subsystem List, select the created channel subsystem (CSS ID 0) and the ***Work with partitions*** action from the context menu (or action code **p**). HCD displays all partitions defined for the processor. Initially, the panel is empty.
2. Use F11=Add to define a new partition. HCD displays the following panel:

```
┌─────────────────────────── Partition List ──────────────────────────┐
│  Goto  Backup  Query  Help                                          │
│ ----------------------------------------------------------------------│
│                                                                     │
│ Command ===> ________________________________________ Scroll ===> CSR │
│                                                                     │
│ Select one or more partitions, then press Enter. To add, use F11.   │
│                                                                     │
│ Processor ID  . . . . : PROC1     This is the main processor        │
│ Configura ┌─────────────────────── Add Partition ──────────────────┐ │
│ Channel S │                                                       │ │
│           │                                                       │ │
│ / Partiti │ Specify the following values.                         │ │
│ ********* │                                                       │ │
│           │ Partition name . . . PROD1 ___                        │ │
│           │ Partition number . . 1       (same as MIF image ID)   │ │
│           │ Partition usage  . . OS      +                        │ │
│           │                                                       │ │
│           │ Description  . . . . First production partition ______ │ │
│           │                                                       │ │
│  F1=Help  │                                                       │ │
│  F7=Backw │  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset  │ │
│ F12=Cance │  F9=Swap   F12=Cancel                                 │ │
└───────────└───────────────────────────────────────────────────────┘─┘
```

3. Enter the required data; you must at least specify the name of the partition. Press the Enter key. HCD displays the updated Partition List panel showing the just defined partition.

Define the partitions PROD2, TEST1, and TEST2 following the procedure described above. Finally, the Partition List panel looks like the one shown below:

```
 ------------------------------ Partition List ------------------------------
   Goto  Backup  Query  Help
 ------------------------------------------------------------------------
                                                                 Row 1 of 4

 Select one or more partitions, then press Enter. To add, use F11.

 Processor ID  . . . . : PROC1     This is the main processor
 Configuration mode  . : LPAR
 Channel Subsystem ID  :

 / Partition Name   Number Usage + Description
 _ PROD1            1      OS      First production partition
 _ PROD2            2      OS      Second production partition
 _ TEST1            3      OS      First test system
 _ TEST2            4      OS      Second test system
 *************************** BOTTOM OF DATA ****************************
```

Define channel path data

After you finished to define the partitions, you can define the channels. Proceed as follows:

1. On the ***Processor List***, select the processor and the ***Work with attached channel paths*** from the context menu (or action code **s**). HCD displays all CHPIDs defined for the processor. Initially, the panel is empty.
2. Use F11=Add to define a new channel path. HCD displays the following panel:

```
 --------------------------- Add Channel Path ---------------------------


 Specify or revise the following values.

 Processor ID . . . . : PROC1       This is the main processor
 Configuration mode . : LPAR
 Channel Subsystem ID :

 Channel path ID  . . . . 01    +           PCHID . . . ___
 Number of CHPIDs . . . . 4
 Channel path type  . . . BL  +
 Operation mode . . . . . DED  +
 Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
 Description  . . . . . . ________________________________

 Specify the following values only if connected to a switch:

 Dynamic switch ID  . . . __  + (00 - FF)
 Entry switch ID  . . . . __  +
 Entry port . . . . . . . __  +

```

Enter the required data; you must at least specify:
- Channel path identifier
- Channel path type
- Operation mode

Note: Four channel paths are defined in one step.

3. Press the Enter key. HCD displays the Define Access List panel. The panel shows all partitions defined for the processor.

```
 ------------------------- Define Access List --------------------------
                                                          Row 1 of 4

 Select one or more partitions for inclusion in the access list.

 Channel path ID  . . : 01      Channel path type  . : CNC
 Operation mode . . . : DED     Number of CHPIDs . . : 4

 / Partition Name   Number Usage Description
 / PROD1            1      OS    First production partition
 _ PROD2            2      OS    Second production partition
 _ TEST1            3      OS    First test system
 _ TEST2            4      OS    Second test system
 ************************* BOTTOM OF DATA **************************
```

4. Select the partition that must have access to the channel by using a / . Because the channel path's operation mode is dedicated, you can only select *one* partition.
5. Press the Enter key. HCD displays the updated Channel Path List.

Define channel paths 10 and 11 in the same way, however with operation mode ***REC***. Note that they are connected to partition PROD2 (see Figure 193 on page 484).

The definition of a shared channel path (20 and 21) connected to a switch is slightly different. Proceed as follows:

1. Use F11=Add to define a new channel path. HCD displays the following panel:

```
 --------------------------- Add Channel Path ---------------------------


 Specify or revise the following values.

 Processor ID . . . . : PROC1       This is the main processor
 Configuration mode . : LPAR
 Channel Subsystem ID :

 Channel path ID  . . . . 20    +           PCHID . . . ___
 Number of CHPIDs . . . . 2
 Channel path type  . . . CNC  +
 Operation mode . . . . . SHR  +
 Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
 Description  . . . . . .  ________________________________

 Specify the following values only if connected to a switch:

 Dynamic switch ID  . . .      + (00 - FF)
 Entry switch ID  . . . . 98  +
 Entry port . . . . . . . C1  +
```

2. Enter the required data. Note that the values for the switch and port values are only valid for channel path 20. After pressing the Enter key, HCD displays the Update CHPID Settings panel. Update the values for channel path 21 as shown in the following figure.

```
 ┌─────────── Update CHPID Settings    ─────────────┐
 |                                      Row 1 of 2  |
 |                                                  |
 | Specify or revise the following values.          |
 |                                                  |
 | Processor ID . . . . : PROC1                     |
 | Channel Subsystem ID :                           |
 |                                                  |
 |              DynEntry  --Entry +--               |
 | CHPID  PCHID Switch +  Switch Port               |
 | 20     _____ __        98     C1                 |
 | 21     _____ 99        98     C4                 |
 | **************** BOTTOM OF DATA *****************|
 |                                                  |
```

3. Press the Enter key. HCD displays the Define Access List panel. This panel shows all partitions defined for the processor. Select the partitions that are in the access list of the channel paths.

```
 ┌──────────────────────── Define Access List ───────────────────────────┐
 |                                                           Row 1 of 4  |
 | Command ===> _____________________________________ Scroll ===> CSR    |
 |                                                                       |
 | Select one or more partitions for inclusion in the access list.       |
 |                                                                       |
 | Channel path ID  . . : 20      Channel path type  . : CNC             |
 | Operation mode . . . : SHR     Number of CHPIDs . . : 2               |
 |                                                                       |
 | / Partition Name   Number Usage Description                           |
 | / PROD1            1      OS    First production partition            |
 | / PROD2            2      OS    Second production partition           |
 | _ TEST1            3      OS    First test system                     |
 | _ TEST2            4      OS    Second test system                    |
 | ************************* BOTTOM OF DATA ***************************  |
 |                                                                       |
```

4. Press the Enter key. HCD displays the Define Candidate List panel. Select the partitions that are in the candidate list of the channel paths.

```
 ┌─────────────────────── Define Candidate List ─────────────────────────┐
 |                                                           Row 1 of 2  |
 |                                                                       |
 | Select one or more partitions for inclusion in the candidate list.    |
 |                                                                       |
 | Channel path ID  . . : 20      Channel path type  . : CNC             |
 | Operation mode . . . : SHR     Number of CHPIDs . . : 2               |
 |                                                                       |
 | / Partition Name   Number Usage Description                           |
 |   TEST1            3      OS    First test system                     |
 | / TEST2            4      OS    Second test system                    |
 | ************************* BOTTOM OF DATA ***************************  |
 |                                                                       |
```

5. Press the Enter key. HCD displays the updated Channel Path List panel.

Define channel paths 25 and 26 in a similar way so that you will to achieve the following resulting Channel Path List:

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Channel Path List      Row 1 of 10 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more channel paths, then press Enter. To add use F11.

Processor ID . . . . : PROC1
Configuration mode . : LPAR
Channel Subsystem ID :

                    DynEntry Entry +
/ CHPID Type+ Mode+ Switch + Sw Port Con Mngd Description
_ 01    BL    DED   __       __ __       No    ____________________________
_ 02    BL    DED   __       __ __       No    ____________________________
_ 03    BL    DED   __       __ __       No    ____________________________
_ 04    BL    DED   __       __ __       No    ____________________________
_ 10    BL    REC   __       __ __       No    ____________________________
_ 11    BL    REC   __       __ __       No    ____________________________
_ 20    CNC   SHR   __       98 C1       No    ____________________________
_ 21    CNC   SHR   99       98 C4       No    ____________________________
_ 25    CNC   DED   98       98 C7       No    ____________________________
_ 26    CNC   DED   99       99 FB       No    ____________________________
 ****************************** Bottom of data *******************************
  F1=Help      F2=Split     F3=Exit     F4=Prompt    F5=Reset     F7=Backward
  F8=Forward   F9=Swap     F10=Actions  11=Add      F12=Cancel   F13=Instruct
 F20=Right    F22=Command
```

To view the matrix of the Channel Path list, scroll to the right with the F20=Right key.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Channel Path List      Row 1 of 10 More: <
Command ===> _______________________________________________ Scroll ===> PAGE

Select one or more channel paths, then press Enter. To add, use F11.

Channel Subsystem ID :
1=PROD1     2=PROD2     3=TEST1     4=TEST2     5=
6=          7=          8=          9=          A=
B=          C=          D=          E=          F=
                          I/O Cluster  --------- Partitions 0x------  PCHID
/ CHPID Type+ Mode+ Mngd  Name         1 2 3 4 5 6 7 8 9 A B C D E F  AID/P
_ 01    BL    DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 02    BL    DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 03    BL    DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 04    BL    DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 10    BL    REC   No    ________     _ a c _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 11    BL    REC   No    ________     _ a c _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 20    CNC   SHR   No    ________     a a _ c _ _ _ _ _ _ _ _ _ _ _  ___
_ 21    CNC   SHR   No    ________     a a _ c _ _ _ _ _ _ _ _ _ _ _  ___
_ 25    CNC   DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
_ 26    CNC   DED   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _  ___
****************************** Bottom of data *******************************

 F1=Help      F2=Split     F3=Exit      F4=Prompt    F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel   F13=Instruct
F19=Left     F22=Command
```

Use the F3=Exit key to return to the Processor List panel. Use the F3=Exit key again, to return to the Define, Modify, or View Configuration Data panel.

Define processor PROC2 in the same way.

Complete switch definitions

After you have defined the processors and the channel paths, you can complete the switch definitions. Basically you have to connect the switch control units to processor PROC1. Because the switches are chained together, this connection will be established as well.

Connect switch control unit to processor

1. On the Define, Modify, or View Configuration Data panel, select ***Control units***. Press the Enter key. HCD displays the Control Unit List panel. This panel shows the two switch control units.

```
  Goto  Filter  Backup  Query  Help
--------------------------------------------------------------------------
                            Control Unit List                       Row 1 of 2

Select one or more control units, then press Enter.  To add, use F11.

                           ---#---
/ CU   Type +       CUADD CSS MC  Serial-# + Description
c 0098 9033                       55-9999    First Switch
_ 0099 9032                       55-8888    Second Switch
******************************* Bottom of data ********************************
```

2. Select control unit 0098 and the ***Change*** action from the context menu (or action code **c**). HCD displays the Change Control Unit Definition panel with the control unit that already has been correctly defined. Press the Enter key. HCD displays the Select Processor / CU panel.

```
                        Select Processor / CU    Row 1 of 2 More:       >

 Command ===> ____________________________________________ Scroll ===> PAGE

 Select processors to change CU/processor parameters, then press Enter.

 Control unit number . . : 0098     Control unit type . . . : 9033

             ---------------Channel Path ID . Link Address + ---------------
 / Proc.CSSID 1------ 2------ 3------ 4------ 5------ 6------ 7------ 8------
 s PROC1      _______ _______ _______ _______ _______ _______ _______ _______
 _ PROC2      _______ _______ _______ _______ _______ _______ _______ _______
```

3. Select the processor PROC1 and the ***Select (connect/change)*** action from the context menu (or action code **s**). HCD displays the following panel.

```
 Goto  Filter  Backup  Query  Help
┌────────────────────── Select Processor / Control Unit ──────────────────┐
│ -  ┌──────────────────── Change Control Unit Definition ─────────────────┐
│    │                                                                     │
│    │                                                                     │
│ S  │ Specify or revise the following values.                             │
│    │                                                                     │
│ C  │ Control unit number  . : 0098       Type . . . . . . : 9033         │
│    │ Processor ID . . . . . : PROC1      This is the main processor      │
│    │ Channel Subsystem ID . :                                            │
│ /  │                                                                     │
│    │ Channel path IDs . . 25 __  __  __  __  __  __  __   +              │
│    │ Link address . . . . FE__ ____ ____ ____ ____ ____ ____ ____ +      │
│    │                                                                     │
│ *  │ Unit address . . . . 00  __  __  __  __  __  __  __   +             │
│    │ Number of units  . . ___ ___ ___ ___ ___ ___ ___ ___                │
│    │                                                                     │
│    │ Logical address  . . __ + (same as CUADD)                           │
│    │                                                                     │
│ C  │ The following values are required only for parallel channels:       │
│    │                                                                     │
│    │ Protocol  . . . . . . . . __  + (D, S or S4)                        │
│ F  │                                                                     │
└──  │ I/O concurrency level . . 2  + (1, 2 or 3)                          │
     │                                                                     │
     └─────────────────────────────────────────────────────────────────────┘
```

4. Enter the required data; you must at least specify:
   - Channel path
   - Link address
   - Unit address
5. Press the Enter key. HCD displays the Modify Device Parameters panel. This panel indicates that the unit address 98, that HCD defined when the switch device was specified, was changed to 00.

```
┌────────────────────── Select Processor / Control Unit ──────────────────────┐
│┌───────────────────────── Modify Device Parameters ────────────────────────┐│
││                                                  Row 1 of 1 More:      > ││
││                                                                           ││
││ Specify or revise any changes to the device parameters in the list below. ││
││ To view attached control units, scroll to the right.                      ││
││                                                                           ││
││ Processor ID . . . . . : PROC1         This is the main processor         ││
││ Channel Subsystem ID . :                                                  ││
││ ---------Device--------- ---UA----                  Preferred  Exposure   ││
││ No., Range Type          Old New + Time-Out  STADET CHPID +    Device     ││
││ 0098,001   9033          98  00    No        Yes    __                    ││
││ ***************************** BOTTOM OF DATA ***************************** ││
││                                                                           ││
```

6. Press the Enter key to accept the change. HCD displays the Select Processor / CU panel showing the just specified switch control unit settings.
7. Press once more the Enter key to return to the Control Unit List panel.

Establish the connection of switch 99 to processor PROC1 in the same way as shown in Figure 193 on page 484.

Complete port data

1. On the Define, Modify, or View Configuration Data panel select *Switches*. The Switch List panel showing all defined switches is displayed.

2. On the Switch List panel, select switch 98 and the ***Work with ports*** action from the context menu (or action code **p**). HCD displays the Port List, showing all ports with their attachments to channels, control units or other switches that are supported by the selected switch.

```
  Goto  Options  Filter  Backup  Query  Help
 ----------------------------------------------------------------------------
                                Port List                          Row 1 of 17
 Command ===> _____________________________________________ Scroll ===> PAGE

 Select one or more ports, then press Enter.

 Switch ID . . . . . . . : 98   Address :      First Switch
 Switch configuration ID : BASIC        night shift configuration

                                  -------------Connection---------------   DED
 / Port H Name +                     Unit ID         Unit Type        O B CON +
 _ C0   Y ________________________                                    N N __
 _ C1   Y PROC1CHPID20              PR PROC1    CHP 20 2064-1C1       N N __
 _ C2   Y ________________________                                    N N __
 _ C3   Y ________________________                                    N N __
 _ C4   Y PROC1CHPID21              PR PROC1    CHP 21 2064-1C1       N N __
 _ C5   Y ________________________                                    N N __
 _ C6   Y ________________________                                    N N __
 _ C7   Y PROC1CHPID25              PR PROC1    CHP 25 2064-1C1       N N __
 _ C8   N ________________________                                    _ _ __
 _ C9   N ________________________                                    _ _ __
 _ CA   N ________________________                                    _ _ __
 _ CB   N ________________________                                    _ _ __
 _ CC   N ________________________                                    _ _ __
 _ CD   N ________________________                                    _ _ __
 _ CE   N ________________________                                    _ _ __
 _ CF   N ________________________                                    _ _ __
 _ FE   Y ________________________ CU 0098            9033            N N __
 ******************************* Bottom of data ********************************
```

3. Specify the port name for all ports attached to the channels and press the Enter key.

Chain the two switches together

1. Select port C5 and the ***Connect to switch*** action from the context menu (or action code **w**). HCD displays the Connect to Switch panel. On this panel you can specify the switch ID and the port of the chained switch.

```
  Goto  Options  Filter  Backup  Query  Help
 - ---------- Connect to Switch ----------  ---------------------------------

 C                                          _______________ Scroll ===> PAGE
    Specify the following values.
 S
    Switch ID  : 98  Port . . . : C5
 S                                          t Switch
 S  Switch ID  . . . . . 99  +              t shift configuration
    Port . . . . . . . . F0  +
                                            ----Connection-------------   Ded
 /   F1=Help     F2=Split     F3=Exit       D            Unit Type     O B Con+
 _   F4=Prompt   F5=Reset     F9=Swap                                  N N __
 _  F12=Cancel                                 CHP   20 2064-1C1       N N __
 _                                                                     N N __
 _ C3   Y ________________________                                     N N __
 _ C4   Y PROC1CHPID21             PR PROC1    CHP   21 2064-1C1       N N __
 w C5   Y ________________________                                     N N __
 _ C6   Y ________________________                                     N N __
 _ C7   Y PROC1CHPID25             PR PROC1    CHP   25 2064-1C1       N N __
 _ C8   N ________________________                                     _ _ __
 _ C9   N ________________________                                     _ _ __
```

2. Press the Enter key. HCD displays the updated Port List panel. Specify the port name for port C5.

   Specify a dedicated connection between port C4 and port C5 and port C1 and C2.

```
  Goto  Options  Filter  Backup  Query  Help
----------------------------------------------------------------------------
                                 Port List                        Row 1 of 17
Command ===> _____________________________________________ Scroll ===> PAGE

Select one or more ports, then press Enter.

Switch ID . . . . . . . : 98   Address :      First Switch
Switch configuration ID : BASIC        night shift configuration

                                  -------------Connection-------------   Ded
/ Port H Name +                      Unit ID          Unit Type     O B Con+
_ C0   Y ________________________                                   N N __
_ C1   Y PROC1CHPID20             PR PROC1      CHP 20 2064-1C1      N N C2
_ C2   Y ________________________                                   N N C1
_ C3   Y ________________________                                   N N __
_ C4   Y PROC1CHPID21             PR PROC1      CHP 21 2064-1C1      N N C5
_ C5   Y CHAIN_FROM_99 __________   SW 99       PO  F0 9032          N N C4
_ C6   Y ________________________                                   N N __
_ C7   Y PROC1CHPID25             PR PROC1      CHP 25 2064-1C1      N N __
_ C8   N ________________________                                   _ _ __
_ C9   N ________________________                                   _ _ __
_ CA   N ________________________                                   _ _ __
_ CB   N ________________________                                   _ _ __
_ CC   N ________________________                                   _ _ __
_ CD   N ________________________                                   _ _ __
_ CE   N ________________________                                   _ _ __
_ CF   N ________________________                                   _ _ __
_ FE   Y ________________________ CU 0098            9033           N N __
****************************** Bottom of data *******************************
```

3. Use F3=Exit to return to the Switch List panel. Use F3=Exit again to return to the Define, Modify, or View Configuration Data panel.

Define control unit data

After defining the processor, its partitions and channel paths, and switches, you can define control units:

1. On the Define, Modify, or View Configuration Data panel select ***Control units***. Press the Enter key. HCD displays the Control Unit List panel. So far, the panel shows the switch control units.
2. Use F11=Add to define a control unit. HCD displays the following panel:

```
  Goto  Filter  Backup  Query  Help
 ----------------------------------------------------------------------------
                              Control Unit List

Select one or more control units, then press Enter.  To add, use F11.

                           ---#---
/ CU   Type +       CUADD CSS MC  Serial-# + Description
_ 0098 9033                       55-9999    First Switch
_ 009 ─────────────────────────── Add Control Unit ─────────────────
*****
       
        Specify or revise the following values.

        Control unit number  . . . . 00E2  +
        Control unit type  . . . . . 3174 ________  +

        Serial number  . . . . . . . __________
        Description  . . . . . . . . Terminal control unit _________

        Connected to switches  . . . 99 __ __ __ __ __ __ __  +
        Ports  . . . . . . . . . . . E4 __ __ __ __ __ __ __  +

        If connected to a switch:

        Define more than eight ports . . 2  1.  Yes
                                            2.  No
        Propose CHPID/link addresses and
        unit addresses . . . . . . . . . 2  1.  Yes
                                            2.  No
```

Enter the required data; you must at least specify:
- Control unit number
- Control unit type

If the control unit is connected to a switch, also specify the switch/ports.

3. Press the Enter key. HCD displays the Select Processor / CU panel. This panel shows a list of all processors you already have defined.

```
                         Select Processor / CU    Row 1 of 2 More:       >

Command ===> ____________________________________________ Scroll ===> PAGE

Select processors to change CU/processor parameters, then press Enter.

Control unit number . . : 00E2     Control unit type . . . : 3174

             ---------------Channel Path ID . Link Address + ---------------
/ Proc.CSSID 1------ 2------ 3------ 4------ 5------ 6------ 7------ 8------
s PROC1      _______ _______ _______ _______ _______ _______ _______ _______
_ PROC2      _______ _______ _______ _______ _______ _______ _______ _______
****************************** Bottom of data *******************************
```

4. On the Select Processor / CU panel, select the processor and the ***Select (connect/change)*** action from the context menu (or action code **s**). HCD displays the Add Control Unit panel.

```
 Goto  Filter Backup  Query  Help
┌────────────────────── Select Processor / Control Unit ──────────────────────┐
│ - ┌──────────────────────────── Add Control Unit ───────────────────────────┐
│   │                                                                         │
│   │                                                                         │
│ S │ Specify or revise the following values.                                 │
│   │                                                                         │
│ C │ Control unit number  : 00E2        Type . . . . . . : 3174              │
│   │ Processor ID . . . . : PROC1       This is the main processor           │
│   │ Channel Subsystem ID :                                                  │
│ / │                                                                         │
│   │ Channel path IDs . . . 21   __  __  __  __  __  __  __   +              │
│ c │ Link address . . . . . E4__ ____ ____ ____ ____ ____ ____ ____ +        │
│ _ │                                                                         │
│ * │ Unit address . . . . . 00   __  __  __  __  __  __  __   +              │
│   │ Number of units  . . . 32   ___ ___ ___ ___ ___ ___ ___                 │
│   │                                                                         │
│   │ Logical address  . . . __ + (same as CUADD)                             │
│   │                                                                         │
│   │ Protocol  . . . . . . . . _   + (D,S or S4)                             │
└── │ I/O concurrency level . . 2  + (1, 2 or 3)                              │
    │                                                                         │
    └─────────────────────────────────────────────────────────────────────────┘
```

5. Specify channel path IDs and link address (21 and E4). For this example, change the number of units to 32.

   Press the Enter key. HCD displays the Select Processor / CU panel, now indicating that the processor PROC1 is connected to the control unit. This is shown by a `Yes` in the `Att` column, which you can reach by scrolling to the right.

6. This completes the definition of control unit 00E2, because it is only attached to processor PROC1. Press the Enter key to return to the Control Unit List panel now showing the just defined control unit.

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Control Unit List                   Row 1 of 9
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more control units, then press Enter.  To add, use F11.

                           ---#---
/ CU   Type +       CUADD CSS MC  Serial-# + Description
_ 0098 9033                       55-9999    First Switch
_ 0099 9032                       55-8888    Second Switch
_ 00E2 3174                       __________ Terminal control unit
******************************* Bottom of data ********************************
```

7. The other control units are defined similarly, resulting in the following Control Unit List panel:

```
  Goto  Filter  Backup  Query  Help
------------------------------------------------------------------------------
                              Control Unit List                      Row 1 of 9
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more control units, then press Enter.  To add, use F11.

                            ---#---
/ CU   Type +        CUADD CSS MC  Serial-# + Description
_ 0098 9033                        55-9999    First Switch
_ 0099 9032                        55-8888    Second Switch
_ 00C1 3480                        __________ ________________________________
_ 00C2 3480                        __________ ________________________________
_ 00D1 3990-3                      __________ ________________________________
_ 00D2 3990-3                      __________ ________________________________
_ 00E1 3274                        __________ ________________________________
_ 00E2 3174                        __________ Terminal control unit
_ 00E3 3174                        __________ ________________________________
******************************* Bottom of data ********************************
```

8. Press the F3=Exit key to return to the Define, Modify, or View Configuration Data panel.

Define I/O device data

When you define a device or a group of devices, you have to connect them to the processors (CSS), and then to the operating systems supposed to access the device(s). The operating system definition for the device(s) consists of specifying the parameters and features, and of grouping these device(s) to esoterics.

Proceed as follows:

1. On the Define, Modify, or View Configuration Data panel select ***I/O devices***. Press the Enter key. HCD displays the I/O Device List. This list shows the switch devices.
2. Use F11=Add to define a device or a range of devices. HCD displays the following panel:

```
 -------------------------------- Add Device ----------------------------------


  Specify or revise the following values.

  Device number . . . . . . . . 0001    (0000 - FFFF)
  Number of devices . . . . . . 1
  Device type . . . . . . . . . 3278-3           +

  Serial number . . . . . . . . __________
  Description . . . . . . . . . ________________________________

  Volume serial number . . . . . ______  (for DASD)

  Connected to CUs . . 00E1  ____  ____  ____  ____  ____  ____  ____


   F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
  F12=Cancel
```

Specify the physical characteristics of the device. You must at least specify:

- Device number
- Device type/model

Specify also the control unit(s) the device is attached to.

Press the Enter key. HCD displays the Device / Processor Definition panel showing all processors that have a path to the control units the device is attached to.

```
  Goto  Filter  Backup  Query  Help
 ┌──────────────────────── Device / Processor Definition ─────────────────────┐
 │                                                            Row 1 of 2      │
 │                                                                            │
 │ Select processors to change device/processor definitions, then             │
 │ press Enter.                                                               │
 │                                                                            │
 │ Device number  . . : 0001          Number of devices  . : 1               │
 │ Device type  . . . : 3278-3                                                │
 │                                                                            │
 │                                          Preferred  Device Candidate List  │
 │/ Proc.CSSID  SS+  UA+  Time-Out  STADET  CHPID +    Explicit         Null  │
 │ _ PROC1           __   Yes       Yes     __         No               ___   │
 │ _ PROC2           __   Yes       No      __         ___              ___   │
 │ ************************** BOTTOM OF DATA ******************************* │
 │                                                                            │
```

3. Press the Enter key to accept a default unit address (unit address 01). HCD displays the Define Device to Operating System Configuration panel. This panel shows all operating systems defined in the IODF.

```
  Goto  Filter  Backup  Query  Help
 ┌─────────── Define Device to Operating System Configuration ───────────┐
 │                                                        Row 1 of 1     │
 │                                                                       │
 │ Select OSs to connect or disconnect devices, then press Enter.        │
 │                                                                       │
 │ Device number  . : 0001          Number of devices  : 1              │
 │ Device type  . . : 3278-3                                             │
 │                                                                       │
 │ / Config. ID   Type     SS Description                      Defined   │
 │ s OPSYS01      MVS         z/OS operating system                      │
 │ ************************** BOTTOM OF DATA *************************** │
 │                                                                       │
```

To define the device to an operating system proceed as follows:

a. On the Define Device to Operating System Configuration panel, select the operating system and the ***Select (connect/change)*** action from the context menu (or action code **s**). HCD displays the Define Device Parameters / Features panel.

```
                    Define Device Parameters / Features         Row 1 of 21

 Specify or revise the values below.

 Configuration ID . : OPSYS01      z/OS operating system
 Device number  . . : 0001         Number of devices  : 1
 Device type  . . . : 3278-3

 Parameter/
 Feature     Value +          R Description
 OFFLINE     No                 Device considered online or offline at IPL
 DYNAMIC     Yes                Device has been defined to be dynamic
 LOCANY      No                 UCB can reside in 31 bit storage
 ASCACHAR    No                 ASCII A Character Generator
 ASCBCHAR    No                 ASCII B Character Generator
 DOCHAR      Yes                United States English Character Generator
 FRCHAR      No                 French Character Generator
 GRCHAR      No                 German Character Generator
 KACHAR      No                 Katakana Character Generator
```

b. Specify the parameters and features and press the Enter key. HCD displays the Assign/Unassign Device to Esoteric panel.

```
                     Assign/Unassign Device to Esoteric          Row 1 of 2

 Specify Yes to assign or No to unassign. To view devices already assigned
 to esoteric, select and press Enter.

 Configuration ID : OPSYS01           z/OS operating system
 Device number  . : 0001              Number of devices  : 1
 Device type  . . : 3278-3            Generic  . . . . . : 3277-2

 / EDT.Esoteric  Assigned  Starting Number Number of Devices
 _ A1.ES001      No        ____            ____
 _ A1.ES002      No        ____            ____
 ***************************** BOTTOM OF DATA ******************************
```

c. Overwrite the values in the `Assigned` column to assign (Yes) and unassign (No) devices to the esoterics.

d. Press the Enter key to display the Define Device to Operating System Configuration panel.

e. Press the Enter key to return to the I/O Device List panel.

f. Define additional devices in the same way.

g. Press the F3=Exit key to display the Define, Modify, and View Configuration panel.

Define NIPCON data

1. On the Define, Modify, or View Configuration Data panel select ***Operating system configurations***. Press the Enter key. HCD displays the Operating System Configuration List panel.
2. On the Operating System Configuration List panel, select the operating system for which a NIP console has to be defined and the ***Work with consoles*** action from the context menu (or action code **n**). Press the Enter key. HCD displays the NIP Console List panel. Initially, the panel is empty.
3. Use the F11=Add key to define a NIP console. HCD displays the following panel:

```
  Goto  Backup  Query  Help
- ┌──────────────────────────── NIP Console List ──────────────────────────┐
  │  Goto  Backup  Query  Help                                              │
  │ ------------------------------------------------------------------------│
S │                                                                         │
F │                                                                         │
  │ Select one or more consoles, then press Enter. To add, use F11.        │
/ │                                                                         │
/ │ Configuration ID . : OPSYS01      z/OS operating system                 │
* │                                                                         │
  │ / Order   Device ┌────────────── Add NIP Console ──────────────┐        │
  │   Number  Number │                                             │        │
  │ **************** │                                             │ **     │
  │                  │ Specify the following values.               │        │
  │                  │                                             │        │
  │                  │ Device number of console . . . . . 0001     │        │
  │                  │                                             │        │
  │                  │ Order number . . . . . . . . . . . 1        │        │
  │                  │                                             │        │
  │                  │  F1=Help    F2=Split    F5=Reset    F9=Swap │        │
  │                _ │ F12=Cancel                                  │ GE     │
  │                  └─────────────────────────────────────────────┘        │
  └─────────────────────────────────────────────────────────────────────────┘
```

4. Enter the required data. Press the Enter key to return to the updated NIP Console List panel.
5. Press the PF3=Exit key to return to the Operating System Configuration List panel.
6. Press the PF3=Exit key to return to the Define, Modify, or View Configuration Data panel.
7. Press the F3=Exit key to return to the primary task selection panel.

Appendix F. IODF data model

The following tables describe the IODF data model in terms of object class and attribute definitions. These definitions conform to the data that is kept in the IODF.

The object classes and attribute types introduced by HCD start with the prefix **hcd** which helps with identifying them.

The object hierarchy below the HCD Backend suffix is structured as follows:

```
hcdIodf (RDN: hcdIodfId)
 │
 ├─ hcdControlUnit (RDN: hcdControlUnitNumber)
 │
 ├─ hcdDevice (RDN: hcdDeviceNumber[+hcdDeviceSuffix])
 │
 ├─ hcdDistPackage (RDN: hcdDistPackageId)
 │
 ├─ hcdOsConfig (RDN: hcdOsConfigId)
 │    │
 │    ├── hcdEligibleDeviceTable (RDN: hcdEligibleDeviceTableId)
 │    │    ├── hcdEsotericDeviceGroup (RDN: hcdEsotericDeviceGroupId)
 │    │    └── hcdGenericDeviceType (RDN: hcdGenericDeviceTypeId)
 │    └── hcdOsDevice (RDN: hcdDeviceNumber[+hcdDeviceSuffix])
 │
 ├─ hcdProcessorConfig (RDN: hcdProcessorConfigId[+hcdCssId])
 │    │
 │    ├── hcdChannelPath (RDN: hcdChannelPathId)
 │    ├── hcdCssControlUnit (RDN: hcdControlUnitNumber)
 │    ├── hcdCssDevice (RDN: hcdDeviceNumber[+hcdDeviceSuffix])
 │    ├── hcdIocds (RDN: hcdIocdsId)
 │    └── hcdPartition (RDN: hcdPartitionId[+hcdPartitionNumber])
 └─ hcdSwitch (RDN: hcdSwitchId)
      ├─ hcdPort (RDN: hcdPortId)
      └─ hcdSwitchConfig (RDN: hcdSwitchConfigId)
           └─── hcdPortConfig (RDN: hcdPortId)
```

IODF object class definitions within LDAP

The following tables describe the object classes which are used for the HCD LDAP DIT. In addition to other information, they contain the names of the attributes of each object class. The required attributes (shown in the row 'Must Contain') must be specified when adding an object of that class. Their values cannot be deleted. Optional attributes (shown in the row 'May Contain') may not always be required. They may, however, be necessary for certain objects according to HCD configuration rules. Attributes which are used to build the RDN of an object must not be modified for the corresponding object class.

The row 'Supported Requests' contains information about which operations are possible on entries of the corresponding object class. There are some object classes which do not allow all contained (non-RDN) attributes to be added (because they are read-only attributes) or modified. In this case, the list of attributes which may be modified is specified in the 'Supported Requests' row in parentheses after the MODIFY identifier.

Note: For certain entries, there may be restrictions to this general description as a result of HCD configuration rules.

The following rules apply for update requests on control unit and device object classes:

1. Control Unit

The general attributes of a specific control unit exist in an appropriate entry in class `hcdControlUnit`. For each connected processor, the processor related attributes of that control unit are contained in an entry of class `hcdCssControlUnit`. Hence, as a result of this relation, an entry can only be added to class `hcdCssControlUnit` if the corresponding entry in class `hcdControlUnit` is already present. Likewise, if an entry of class `hcdControlUnit` is deleted, all the entries for the corresponding control unit in class `hcdCssControlUnit` will implicitly also be deleted.

2. Devices

In a manner similar to the control units, the general attributes of a specific device exist in an entry of class `hcdDevice` and may additionally exist in entries of classes `hcdCssDevice` and `hcdOsDevice`. The device attributes relating a device to a particular processor are contained in a corresponding entry of class `hcdCssDevice`. Such an entry can only exist if an entry for the device in class `hcdDevice` also exists and the device is connected to a control unit defined via, both an entry in the class `hcdControlUnit`, and an entry in class `hcdCssControlUnit`. This dependency means that it is not possible to explicitly add or delete an entry of class `hcdCssDevice` directly. Instead, an entry of class `hcdCssDevice` will be implicitly added if:

- A control unit defined in an `hcdControlUnit` entry that has the particular device attached to it is defined also as an entry in class hcdCssControlUnit.
- An entry in class `hcdDevice` is created containing the attribute `hcdConnControlUnits` with a control unit number of an `hcdControlUnit` entry that also has a corresponding `hcdCssControlUnit` entry defined.

Implicitly added entries of class `hcdCssDevice` initially have default attribute values. These attributes can be modified to get their proper values.

An entry of class `hcdCssDevice` will be implicitly deleted if:

- The entry in corresponding class hcdDevice is deleted, or
- The connected control units in class hcdCssControlUnit are deleted, or
- The connected control units in class hcdControlUnit are deleted.

Changes to the attributes of control unit and device entries may affect all corresponding entries in the same logical control unit of a processor configuration, i.e. all entries of classes hcdCssControlUnit and hcdCssDevice with the same value of the attribute hcdLogicalControlUnit. In such a case, it may be necessary to delete all entries belonging to the same logical control unit and add them again with the changed attributes. This should be done using the update sequence in transaction mode.

For each operating system configuration, the operating system related device attributes are contained in a corresponding entry in class hcdOsDevice. An entry in class hcdOsDevice can only exist if the corresponding entry in class hcdDevice also exists. An entry in class hcdOsDevice can be explicitly added or deleted. This means that the device is connected to or disconnected from the operating system configuration. An entry in class hcdOsDevice is implicitly deleted if the corresponding entry in class hcdDevice is deleted.

If a device entry in class hcdDevice is added which has the same RDN attribute (hcdDeviceNumber) value of an existing entry in that class, HCD assigns a non-zero suffix to the device number (RDN attribute hcdDeviceSuffix) to make the RDN unique. The attribute hcdDeviceSuffix cannot be specified with an add request. If the value of attribute hcdDeviceSuffix is 0000, it need not be specified in the RDN, as this is the default value. If the value of the attribute hcdDeviceSuffix is not equal to 0000, it has to be specified in the RDN of the MODIFY and DELETE requests for the corresponding device entry. Therefore, the complete device RDN has to be retrieved via a preceding search request in order to be able to specify the correct RDN of a device entry.

Note: To facilitate the search of the correct hcdDeviceSuffix of devices in a device group, you can specify an LDAP search request for a specific device number, but without device suffix, or with device suffix 0000. Such a request will return all device entries with the same device number with its different device suffixes. From the returned entries, you can retrieve the suffix for the device that you now can modify or delete with a subsequent request.

Class	**hcdChannelPath**
Description	Describes a channel path of the processor configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdProcessorConfig
Must Contain	hcdChannelPathId, hcdChannelPathType, hcdOperationMode, objectClass
May Contain	hcdDescription, hcdDynSwitch, hcdConnChannelPath, hcdAccessingPartitions, hcdCandidatePartitions, hcdConnPort, hcdIsOccupied, hcdIsManaged, hcdSysplex, hcdMaximumFrameSize, hcdSpanningChannelSubsystems, hcdPhysicalChannelId, hcdHasPrioQueuesDisabled, hcdHcaAdapterId, hcdHcaPort

Class	hcdChannelPath
Supported Requests	SEARCH ADD MODIFY DELETE
Special Notes	Attribute hcdIsOccupied is only shown if set to Yes. Attribute hcdSpanningChannelSubsystems is output only. A spanned channel path is added/modified in one channel subsystem while specifying partitions from more than one channel subsystem. It can be defined with operation mode SHR or SPAN. Attribute hcdHasPrioQueuesDisabled is only shown if applicable.

Class	hcdControlUnit
Description	Describes a control unit
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdIodf
Must Contain	hcdControlUnitNumber, hcdUnit, objectClass
May Contain	hcdDescription, hcdModel, hcdSerialNumber, hcdConnPorts
Supported Requests	SEARCH ADD MODIFY DELETE

Class	hcdCssControlUnit
Description	Describes a control unit from the Channel Subsystem viewpoint
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdProcessorConfig
Must Contain	hcdControlUnitNumber, hcdConnChannelPaths, objectClass
May Contain	hcdUnitAddressRanges, hcdControlUnitAddress, hcdIOConcurrencyLevel, hcdControlUnitProtocol, hcdLogicalControlUnit, hcdManagedChannelPathsCount
Supported Requests	SEARCH ADD (requires the existence of an object in class hcdControlUnit with same RDN) MODIFY (hcdConnChannelPaths, hcdUnitAddressRanges, hcdControlUnitAddress, hcdIOConcurrencyLevel, hcdControlUnitProtocol, hcdManagedChannelPathsCount) DELETE

Class	hcdCssDevice
Description	Describes a device from the Channel Subsystem viewpoint
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdProcessorConfig
Must Contain	hcdDeviceNumber, objectClass
May Contain	hcdDeviceSuffix, hcdDeviceRange, hcdUnitAddress, hcdStatusDetection, hcdTimeOut, hcdPreferredChannelPath, hcdCandidatePartitions, hcdLogicalControlUnit, hcdSubchannelSetId
Supported Requests	SEARCH MODIFY (hcdDeviceRange, hcdUnitAddress, hcdStatusDetection, hcdTimeOut, hcdPreferredChannelPath, hcdCandidatePartitions)
Special Notes	For a MODIFY request, hcdDeviceRange specifies the number of devices to which the request will be applied.

Class	hcdDevice
Description	Describes an I/O device
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdIodf
Must Contain	hcdDeviceNumber, hcdUnit, objectClass
May Contain	hcdDescription, hcdModel, hcdDeviceSuffix, hcdDeviceRange, hcdSerialNumber, hcdVolser, hcdConnControlUnits
Supported Requests	SEARCH ADD MODIFY (hcdDeviceRange, hcdUnit, hcdDescription, hcdModel, hcdSerialNumber, hcdVolser, hcdConnControlUnits) DELETE
Special Notes	For ADD and MODIFY requests, hcdDeviceRange specifies the number of devices to which the request will be applied.

Class	hcdDistPackage
Description	Describes a distribution package of I/O configurations
Type	structural
OID	
Derived from	top
Auxiliary Classes	

Class	**hcdDistPackage**
Possible Superiors	hcdIodf
Must Contain	hcdDistPackageId, objectClass
May Contain	hcdDescription, hcdTargetNode, hcdTargetUser, hcdIsAttended, hcdTargetIodf, hcdTargetVolser, hcdSentDate, hcdSentTime, hcdOsConfigs, hcdProcessorConfigs
Supported Requests	SEARCH ADD MODIFY (hcdDescription, hcdTargetNode, hcdTargetUser, hcdIsAttended, hcdTargetIodf, hcdTargetVolser, hcdOsConfigs, hcdProcessorConfigs) DELETE

Class	**hcdEligibleDeviceTable**
Description	Describes an Eligible Device Table of an OS configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdOsConfig
Must Contain	hcdEligibleDeviceTableId, objectClass
May Contain	hcdDescription, hcdLastUpdateDate, hcdUpdatedBy
Supported Requests	SEARCH ADD MODIFY (hcdDescription) DELETE

Class	**hcdEsotericDeviceGroup**
Description	Describes an esoteric device group of an EDT of an OS configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdEligibleDeviceTable
Must Contain	hcdEsotericDeviceGroupId, objectClass
May Contain	hcdEsotericDeviceGroupToken, hcdVirtualIO, hcdDeviceRanges
Supported Requests	SEARCH ADD MODIFY DELETE
Special Notes	Attribute hcdVirtualIO is only shown if set to Yes.

Class	hcdGenericDeviceType
Description	Describes an update to a generic device type for an EDT of an OS configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdEligibleDeviceTable
Must Contain	hcdGenericDeviceTypeId, objectClass
May Contain	hcdDevicePreferenceValue, hcdVirtualIO
Supported Requests	SEARCH MODIFY
Special Notes	Entries of class hcdGenericDeviceType are implicitly added when the first device entry with the corresponding generic device type is added in class hcdOsDevice. An entry of this class is deleted, if the last device with the corresponding generic device type is deleted from class hcdOsDevice. Attribute hcdVirtualIO is only shown if set to Yes.

Class	hcdIocds
Description	Describes an IOCDS of a processor configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdProcessorConfig
Must Contain	hcdIocdsId, objectClass
May Contain	hcdIocdsName, hcdLastUpdateDate, hcdLastUpdateTime, hcdProcessorConfigMode
Supported Requests	SEARCH
Special Notes	Entries in this class are implicitly added when an entry in class hcdProcessorConfig is added. Entries in this class are implicitly deleted if the appropriate entry in class hcdProcessorConfig is deleted.

Class	hcdIodf
Description	Describes the I/O configurations defined in an IODF
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	
Must Contain	hcdIodfId, objectClass

Class	**hcdIodf**
May Contain	hcdIodfType, hcdIodfDescription, hcdBackupIodf, hcdBlocksAllocated, hcdBlocksUsed, hcdCreationDate, hcdLastUpdateDate, hcdLastUpdateTime
Supported Requests	SEARCH MODIFY (hcdIodfDescription)
Special Notes	Entries of this class cannot be added or deleted with the HCD LDAP Backend.

Class	**hcdOsConfig**
Description	Describes an OS configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdIodf
Must Contain	hcdOsConfigId, hcdOsConfigType, objectClass
May Contain	hcdDescription
Supported Requests	SEARCH ADD MODIFY (hcdDescription) DELETE

Class	**hcdOsDevice**
Description	Describes an I/O device from the OS viewpoint
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdOsConfig
Must Contain	hcdDeviceNumber, hcdUnit, objectClass
May Contain	hcdDeviceSuffix, hcdDeviceRange, hcdModel, hcdGenericDeviceTypeId hcdDeviceParameters, hcdDeviceFeatures, hcdConsoleNumber, hcdSubchannelSetId
Supported Requests	SEARCH ADD (requires the existence of an object in class hcdDevice with the same RDN) MODIFY (hcdDeviceRange, hcdDeviceParameters, hcdDeviceFeatures, hcdConsoleNumber) DELETE
Special Notes	For ADD and MODIFY requests, hcdDeviceRange specifies the number of devices to which the request will be applied.

Class	hcdPartition
Description	Describes a logical partition (LP) of a processor configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdProcessorConfig
Must Contain	hcdPartitionId, objectClass
May Contain	hcdDescription, hcdPartitionNumber, hcdPartitionUsage
Supported Requests	SEARCH ADD MODIFY DELETE
Special Notes	You can use the hcdPartitionNumber attribute to identify a reserved partition.

Class	hcdPort
Description	Describes a port of an ESCON director
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdSwitch
Must Contain	hcdPortId, objectClass
May Contain	hcdPortName, hcdIsOccupied, hcdIsInstalled, hcdConnPort
Supported Requests	SEARCH MODIFY
Special Notes	Attribute hcdIsOccupied is only shown if set to Yes. Entries of this class are implicitly added or deleted if the corresponding switch entry in class hcdSwitch is added or deleted, respectively.

Class	hcdPortConfig
Description	Describes a port configuration of a switch configuration
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdSwitchConfig
Must Contain	hcdPortId, objectClass
May Contain	hcdAllowedDynConnPorts, hcdProhibitedDynConnPorts, hcdDedicatedPort, hcdIsBlocked

Class	**hcdPortConfig**
Supported Requests	SEARCH MODIFY
Special Notes	Entries in this class are implicitly added or deleted if the corresponding entry in class hcdSwitchConfig is added or deleted, respectively.

Class	**hcdProcessorConfig**
Description	Describes a processor configuration or, if it is identified by an RDN of the form hcdProcessorConfigId+CssId, it describes a channel subsystem of an XMP processor.
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdIodf
Must Contain	hcdProcessorConfigId, hcdUnit, hcdProcessorConfigMode, objectClass
May Contain	hcdModel, hcdDescription, hcdSerialNumber, hcdNetworkName, hcdSystem, hcdSupportLevel, hcdCssId, hcdSetZeroMaxDevices, hcdSetOneMaxDevices, hcdLocalSystemName
Supported Requests	SEARCH ADD MODIFY DELETE
Special Notes	Adding a channel subsystem requires that the processor configuration has already been added. To add, change or delete a channel subsystem, an RDN consisting of `hcdProcessorConfigId+hcdCssId` has to be used. The only applicable further attributes for a channel subsystem are *hcdDescription*, *hcdSetZeroMaxDevices* and *hcdSetOneMaxDevices*. The values of the required parameters *hcdUnit* and *hcdProcessorConfigMode* are ignored.

Class	**hcdSwitch**
Description	Describes a switch (ESCON or FICON Director or Fibre Channel switch)
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdIodf
Must Contain	hcdSwitchId, hcdUnit, objectClass
May Contain	hcdDescription, hcdModel, hcdSerialNumber, hcdSwitchAddress

Class	hcdSwitch
Supported Requests	SEARCH ADD MODIFY DELETE

Class	hcdSwitchConfig
Description	Describes a configuration of an ESCON Director
Type	structural
OID	
Derived from	top
Auxiliary Classes	
Possible Superiors	hcdSwitch
Must Contain	hcdSwitchConfigId, objectClass
May Contain	hcdDescription, hcdDefaultConn
Supported Requests	SEARCH ADD MODIFY DELETE

IODF attribute table

The following table describes the names and the properties of the attributes (alias names are given in parentheses).

Notes:

1. All attribute type names ending with the plural ″s″ represent multi-valued attributes. HCD interprets the values as an ordered list. This is important if there are two lists which have corresponding list items.
2. In a request, a mix of base names and alias names for attributes is not supported.

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdAccessingPartitions (hcdAccList)	Channel path access list (up to 8 char partition names)	cis / 8	multi	normal
hcdAllowedDynConnPorts (hcdAllowedList)	Ports to which an allowed dynamic connection exists (2 hexadecimal digit port address)	cis / 2	multi	normal
hcdBackupIodf (hcdBkupIodf)	Data set name of backup IODF (up to 35 character full-qualified IODF data set name)	cis / 35	single	normal
hcdBlocksAllocated (hcdAllocBlks)	Number of allocated blocks for IODF (up to 6 digit decimal number, read-only)	cis / 6	single	normal

Attribute **(alias name in parentheses)**	**Description**	**Syntax**	**Valued**	**Access Class**
hcdBlocksUsed (hcdUsedBlks)	Number of used blocks in IODF (up to 6 digit decimal number, read-only)	cis / 6	single	normal
hcdCandidatePartitions (hcdCandList)	Partition candidate list (up to 8 character partition names or a 0 (zero) for a null device candidate list)	cis / 8	multi	normal
hcdChannelPathId (hcdChpId)	Channel path identifier (2 digit hexadecimal number)	cis / 2	single	normal
hcdChannelPathType (hcdChpType)	Channel path type (4 character channel path type acronym)	cis / 4	single	normal
hcdConnChannelPath (hcdConnChp)	Connected channel path of a coupling facility connection (qualified coupling facility connection: prid.chpid.cunum.devn (it the target is an SMP processor) or prid.cssid.chpid.cunum.devn (if the target is an XMP processor), where prid is a up to 8 character processor name, cssid is a one hexadecimal digit channel subsystem ID, chpid is a 2 hexadecimaldigit channel path, cunum is a 4 hexadecimaldigit control unit number, devn is a 4 hexadecimaldigit device number) If the values for cunum and devn are missing, they are defaulted as needed.	cis / 24	single	normal
hcdConnChannelPaths (hcdChpList)	Connected channel paths / link addresses (pp or pp.ll or pp.llll, where pp is the 2-digit hexadecimal number of the channel path, optionally qualified by ll as a 2 hexadecimal number for the link address or by llll as a 4 hexadecimal number for the link address)	cis / 7	multi	normal
hcdConnControlUnits (hcdCuList)	Connected control units (4 hex digit numbers)	cis / 4	multi	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdConnPort	Connected switch port (qualified port address ss.pp, where ss is the 2 digit hexadecimal switch number, pp is the 2 digit hexadecimal port address)	cis / 5	single	normal
hcdConnPorts (hcdConnPortList)	List of connected switch ports (qualified port addresses ss.pp, where ss is the 2 digit hexadecimal switch number, pp is the 2 digit hexadecimal port address)	cis / 5	multi	normal
hcdConsoleNumber (hcdConsole)	Console order number (up to 2 digit decimal number)	cis / 2	single	normal
hcdControlUnitAddress (hcdCuadd)	Logical control unit address (up to 2 hex digit number)	cis / 2	single	normal
hcdControlUnitNumber (hcdCu)	Control unit number (4 hex digit number)	cis / 4	single	normal
hcdControlUnitProtocol (hcdProt)	Control unit protocol (D, S, S4)	cis / 2	single	normal
hcdCreationDate	Creation Date (yyyy-mm-dd, read-only)	cis / 10	single	normal
hcdCssId	Channel subsystem identifier (1 digit hexadecimal number)	cis / 1	single	normal
hcdDedicatedPort (hcdDedicated)	Port to which a dedicated connection exists (2 digit hexadecimal number)	cis / 2	single	normal
hcdDefaultConn	Dynamic connection default of a switch configuration (ALLOW, PROHIBIT)	cis / 10	single	normal
hcdDescription	Description field (up to 32 character string)	cis / 32	single	normal
hcdDeviceFeatures (hcdFeatList)	Device feature list (up to 10 character identifier)	cis / 10	multi	normal
hcdDeviceNumber (hcdDev)	Device number (4 digit hexadecimal number)	cis / 4	single	normal
hcdDeviceParameters (hcdParmList)	Device parameter list (keyword=value1,...)	cis / 50	multi	normal
hcdDevicePreferenceValue (hcdPrefVal)	Device preference value (up to 8 digit decimal number)	cis / 8	single	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdDeviceRange (hcdRange)	Range of devices with same attributes (up to 4 digit decimal number)	cis / 4	single	normal
hcdDeviceRanges (hcdDevRngeList)	Device range list (qualified value: xxxx.ddd, where xxxx is a 4 hex digit device number, ddd is a up to 3 decimal digit range number,	cis / 8	multi	normal
hcdDeviceSuffix (hcdSuf)	Device ID suffix (4 digit hexadecimal number)	cis / 4	single	normal
hcdDistPackageId (hcdPkgName)	Name of distribution package (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdDynSwitch	Dynamic switch of channel path (2 digit hexadecimal number)	cis / 2	single	normal
hcdEligibleDeviceTableId (hcdEdtId)	EDT identifier (2 character identifier)	cis / 2	single	normal
hcdEsotericDevice GroupId (hcdEsoId)	Esoteric name (up to 8 character identifier)	cis / 8	single	normal
hcdEsotericDevice GroupToken (hcdEsoToken)	Esoteric token (up to 4 decimal digit number)	cis / 4	single	normal
hcdGenericDeviceTypeId (hcdGenId)	Generic device type name (up to 8 character identifier)	cis / 8	single	normal
hcdHasPrioQueuesDisabled	Indicates if an OSD channel path has queue prioritizing disabled (Yes, No).	cis / 3	single	normal
hcdHcaAdapterId	HCA adapter ID (hexadecimal number).	cis / 2	single	normal
hcdHcaPort	HCA port (decimal number).	cis / 1	single	normal
hcdIocdsId	IOCDS identifier (2 digit hexadecimal number)	cis / 2	single	normal
hcdIocdsName	IOCDS name (up to 8 character identifier)	cis / 8	single	normal
hcdIOConcurrencyLevel (hcdIocl)	I/O concurrency level of control unit (1 digit decimal number)	cis / 1	single	normal
hcdIodfDescription (hcdIodfDesc)	IODF description (up to 128 character string)	cis / 128	single	normal
hcdIodfId	IODF name (up to 35 character full-qualified data set name)	cis / 35	single	normal
hcdIodfType	IODF type (I (initial), W (work), P (production), read-only)	cis / 1	single	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdIsAttended	Indicates if target node is attended (Yes, No)	cis / 3	single	normal
hcdIsBlocked	Indicates if the port is blocked (Yes, No)	cis / 3	single	normal
hcdIsInstalled	Indicates if object (port) is installed (Yes, No)	cis / 3	single	normal
hcdIsManaged	Indicates if a channel path is managed (Yes, No)	cis / 3	single	normal
hcdIsOccupied (hcdIsOcc)	Indicates if object (port, channel path) is occupied (Yes, No)	cis / 3	single	normal
hcdLastUpdateDate (hcdLastUpdDate)	Date of last update (yyyy-mm-dd, read-only)	cis / 10	single	normal
hcdLastUpdateTime (hcdLastUpdTime)	Time of last update (hh:mm:ss, read-only)	cis / 8	single	normal
hcdLocalSystemName	Local system name (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdLogicalControlUnit (hcdLcu)	Logical control unit number (4 digit hexadecimal number, read-only)	cis / 4	single	normal
hcdManagedChannel PathsCount	Maximum number of managed channel path connections to a control unit (1 digit decimal number)	cis / 1	single	normal
hcdMaximumFrameSize	Maximum frame size for the transmission unit on an IQD channel path in KB (decimal number)	cis / 6	single	normal
hcdModel	Model (4 character identifier)	cis / 4	single	normal
hcdNetworkName (hcdNetName)	CPC network name (up to 8 alphanumeric identifier)	cis / 8	single	normal
hcdOperationMode (hcdOpMode)	Channel path operation mode (DED, REC, SHR)	cis / 3	single	normal
hcdOsConfigId (hcdOsId)	OS configuration identifier (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdOsConfigs (hcdOsList)	List of OS configurations (up to 8 alphanumeric character identifiers)	cis / 8	multi	normal
hcdOsConfigType (hcdOsType)	OS configuration type (MVS, VM)	cis / 3	single	normal
hcdPartitionId (hcdPartId)	Logical partition name (up to 8 alphanumeric character identifier or an * for reserved partitions)	cis / 8	single	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdPartitionNumber (hcdPartNo)	Partition image number (1 digit hexadecimal number)	cis / 1	single	normal
hcdPartitionUsage (hcdPartUsage)	Partition usage (OS, CF, CF/OS)	cis / 5	single	normal
hcdPhysicalChannelId	Physical channel identifier for a channel path of an XMP processor (3 digit hexadecimal number or '*' for an over-defined channel path)	cis / 3	single	normal
hcdPortId	Switch port identifier (2 digit hexadecimal number)	cis / 2	single	normal
hcdPortName	Switch port name (up to 24 character identifier)	cis / 24	single	normal
hcdPreferredChannelPath (hcdPrefChp)	Preferred channel path (2 digit hexadecimal number)	cis / 2	single	normal
hcdProcessorConfigId (hcdProcId)	processor configuration ID (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdProcessorConfigMode (hcdConfMode)	Processor configuration mode (BASIC, LPAR)	cis / 5	single	normal
hcdProcessorConfigs (hcdProcList)	List of processor configurations (up to 8 alphanumeric character identifiers)	cis / 8	multi	normal
hcdProhibitedDynConnPorts (hcdProhibitList)	Ports to which a Prohibited dynamic connection exists (2 digit hexadecimal numbers)	cis / 2	multi	normal
hcdSentDate	Date of last distribution (yyyy-mm-dd, read-only)	cis / 10	single	normal
hcdSentTime	Time of last distribution (hh:mm:ss, read-only)	cis / 8	single	normal
hcdSerialNumber (hcdSerialNo)	Serial number (up to 10 character serial number)	cis / 10	single	normal
hcdSetOneMaxDevices	Maximum number of devices for subchannel set 1 (SS 1) in a channel subsystem of an XMP processor (6 digit decimal number).	cis / 6	single	normal
hcdSetZeroMaxDevices	Maximum number of devices for subchannel set 0 (SS 0) in a channel subsystem of an XMP processor (6 digit decimal number).	cis / 6	single	normal
hcdSpanningChannelSubsystems	List of spanning channel subsystems for a spanned channel path (1 digit hexadecimal number, read only).	cis / 1	multi	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdStatusDetection (hcdStadet)	Status detection facility of device (Yes, No)	cis / 3	single	normal
hcdSubchannelSetId	ID of the subchannel set where a device is located in a channel subsystem of an XMP processor.	cis / 1	single	normal
hcdSupportLevel	Processor support level (8 character identifier)	cis / 8	single	normal
hcdSwitchAddress	Address of a Fibre Channel switch in a fabric (2 digit hexadecimal number)	cis / 2	single	normal
hcdSwitchConfigId (hcdSwConfId)	Switch configuration identifier (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdSwitchId (hcdSwID)	Switch identifier (2 digit hexadecimal number)	cis / 2	single	normal
hcdSysplex	Sysplex name (up to 8 character alphanumeric identifier)	cis / 8	single	normal
hcdSystem	CPC system name (up to 8 character alphanumeric identifier)	cis / 8	single	normal
hcdTargetIodf	Data set name of target IODF (up to 35 character full-qualified data set name)	cis / 35	single	normal
hcdTargetNode	Target node (up to 8 character alphanumeric identifier)	cis / 8	single	normal
hcdTargetUser	Target user (up to 8 character alphanumeric identifier)	cis / 8	single	normal
hcdTargetVolser (hcdTargetVol)	Volume serial number of target IODF data set (up to 6 character alphanumeric identifier)	cis / 6	single	normal
hcdTimeOut	Time out facility (Yes, No)	cis / 3	single	normal
hcdUnit	Unit (up to 8 alphanumeric character identifier)	cis / 8	single	normal
hcdUnitAddress (hcdUa)	Unit address (2 digit hexadecimal number)	cis / 2	single	normal
hcdUnitAddressRanges (hcdUaList)	Unit address range of control unit (qualified number xx.ddd, where xx is a 2 digit hexadecimal unit address ddd is a up to 3 digit decimal range)	cis / 6	multi	normal
hcdUpdatedBy	Identifier of last update user (up to 8 alphanumeric character identifier, read-only)	cis / 8	single	normal
hcdVirtualIO (hcdVio)	Virtual I/O (Yes, No)	cis / 3	single	normal

Attribute (alias name in parentheses)	Description	Syntax	Valued	Access Class
hcdVolser (hcdVolume)	Volume serial number (up to 6 character alphanumeric identifier)	cis / 6	single	normal

Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Vol I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

z/OS information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

`http://www.ibm.com/systems/z/os/zos/bkserv/`

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Programming interface information

This guide primarily documents information that is NOT intended to be used as a Programming Interface of Hardware Configuration Definition (HCD).

This information unit also documents intended Programming Interfaces that allow the customer to write programs to obtain the services of HCD. This information is identified where it occurs, either by an introductory statement to a topic or by the following marking:

Programming Interface information

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Online message lookup

The LookAt system for online lookup of all z/OS messages has been introduced. For more information, see "Using LookAt to look up message explanations" on page 452.

Glossary

This glossary defines technical terms and abbreviations used in the Hardware Configuration Definition (HCD) documentation. If you do not find the term you are looking for, refer to the index of the appropriate HCD document or view the *IBM Glossary of Computing Terms*, available from: **http://www.ibm.com/ibm/terminology**.

A

Activity log. The activity log is a sequential data set with the name of the associated **IODF** and the suffix ACTLOG. Use the activity log to document all definitions you made to the current IODF using HCD.

B

Base. Base is the base device number of a **multiple exposure** device, which is accessible by more than one device number. You assign the first device number and the system generates the additional device numbers.

C

Central processor complex (CPC). A physical collection of hardware that consists of central storage, one or more central processors, timers, and channels.

CFReport. When a machine is ordered, the output of the order process is a binary file that represents the physical description of the final machine. One of the components of that file is the type and physical location, including the Physical Channel Identifier (PCHID) value assigned to that location, of all the I/O features in the final machine. This file is called a CFReport.

Change log. The change log is a VSAM data set with the name of the associated **IODF** and the suffix CHLOG. It will be automatically created if change logging and automatic activity logging is active. A subset of its generated entries will then be used to create the activity log entries.

Channel subsystem (CSS). A collection of subchannels that directs the flow of information between I/O devices and main storage. It uses one ore more channel paths as the communication link in managing the flow of information to or from I/O devices. Within the CSS is one subchannel set and logical partitions. One subchannel from the set is provided for and dedicated to each I/O device accessible to the CSS. Logical partitions use subchannels to communicate with I/O devices. The maximum number of CSSs supported by a processor also depends on the processor type. If more than one CSS is supported by a processor, each CSS has a processor unique single hexadecimal digit CSS identifier (CSS ID).

CHPID. A logical processor contains a number of *CHPIDs*, or Channel Path IDs, which are the logical equivalent of channels in the physical processor. See also:
- *dedicated CHPID*
- *reconfigurable CHPID*
- *shared CHPID*
- *spanned CHPID*

CHPID Mapping Tool. The CHPID Mapping Tool aids the customer in developing a CHPID-to-PCHID relationship for XMP processors. It accepts an IOCP input file without PCHID values, allows the user to assign the logical CHPID values in the input to the PCHIDs available with his ordered machine, and returns an updated IOCP input file that contains the PCHID values.

CMT. See *CHPID Mapping Tool*.

Coupling Facility (CF). The hardware element that provides high-speed caching, list processing, and locking functions in a sysplex. To enable data sharing between a CF partition and the central processor complexes, special types of high-speed, CF channels are required to provide the connectivity. A receiving CF channel path, attached to a CF partition, is to be connected to a sending CF channel path, attached to a partition in which an operating system (OS) is running.

Coupling Facility Channel. A high bandwidth fiber optic channel that provides the high-speed connectivity required for data sharing between a coupling facility and the central processor complexes directly attached to it.

CSS. See *channel subsystem*.

D

Dedicated CHPID. A CHPID can be *dedicated* to one partition; only that partition can access I/O devices on this CHPID. All CHPID types can operate in DED (dedicated) mode.

Dynamic reconfiguration. The ability to make changes to the channel subsystem and to the operating system while the system is running.

E

EDT. An EDT (eligible device table) is an installation-defined and named representation of the devices that are eligible for allocation. The EDT defines the **esoteric** and **generic** relationship of these devices. During IPL, the installation identifies the EDT that the operating system uses. After IPL, jobs can request device allocation from any of the esoteric device groups assigned to the selected EDT. An EDT is identified by a unique ID (two digits), and contains one or more esoterics and generics. Define at least one EDT for each operating system configuration.

Enterprise Systems Connection (ESCON). A set of products and services that provides a dynamically connected environment using optical cables as a transmission medium.

ESCON Manager (ESCM). A licensed program that provided host control to help manage connections that use ESCON Directors. The functionality has been incorporated into the I/O Operations component of System Automation for z/OS.

ESCON Multiple Image Facility(EMIF). EMIF is now referred to as MIF. See below.

Esoteric. Esoteric (or esoteric device group) is an installation-defined and named grouping of I/O devices of usually the same device group. **EDTs** define the esoteric and generic relationship of these devices. The name you assign to an esoteric is used in the JCL DD statement. The job then allocates a device from that group instead of a specific device number or **generic** device group.

F

FICON. Fiber Connection Environment (FICON) is an improved optical fiber communication method offering channels with high data rate, high bandwidth, increased distance and a greater number of devices per control unit for S/390 systems. It can work together with, or replace ESCON links.

G

Generic. Generic (or generic device type) is an MVS-defined grouping of devices with similar characteristics. For example: the device types 3270-X, 3277-2, 3278-2, -2A, -3, -4, and 3279-2a, -2b, -2c, -3a, -3b belong to the same generic. Every generic has a generic name that is used for device allocation in the JCL DD statement. MVS interprets this name as ″take any device in that group″. In an operating system configuration, each **EDT** has the same list of generics. This list can only vary by the **preference** values and **VIO** indicators that are assigned to the generics.

H

HCPRIO data set. The data set containing a real I/O configuration of a VM system.

Hardware Management Console. A console used to monitor and control hardware such as the System/390 microprocessors.

I

IOCDS. An input/output configuration data set (IOCDS) contains different configuration definitions for the selected processor. Only one IOCDS is used at a time. The IOCDS contains I/O configuration data on the files associated with the processor controller on the host processor, as it is used by the channel subsystem. The CSS uses the configuration data to control I/O requests. The IOCDS is built from the production **IODF.**

I/O Cluster. An I/O cluster is a sysplex that owns a managed channel path for an LPAR processor configuration.

IOCP. An IOCP (I/O configuration program) is the hardware utility that defines the hardware I/O configuration to the channel subsystem. For this definition IOCP retrieves information from the IOCP input data set about the following: the channel paths in the processor complex, control units attached to the channel paths, and I/O devices assigned to the control unit. HCD users can build the IOCP input data set from a production IODF.

IODF. An IODF (input/output definition file) is a VSAM linear data set that contains I/O definition information. This information includes processor I/O definitions (formerly specified by **IOCP** input streams) and operating system I/O definitions (formerly specified by **MVSCP** input streams). A single IODF can contain several processor and several operating system I/O definitions. See also 531.

I/O Operations. A component of System Automation for z/OS providing functionality formerly available with ESCON Manager.

Initial program load (IPL). The process that loads the system programs from the auxiliary storage, checks the system hardware, and prepares the system for user operations.

L

LCSS. Logical channel subsystems. See also *channel subsystem*.

LDAP. LDAP (lightweight directory access protocol) is an Internet protocol standard, based on the TCP/IP protocol and serves to access and manipulate data organized in a Directory Information Tree (DIT). LDAP V3 is specified in RFC 2251 and is specifically targeted at management and browser applications that provide read/write interactive access to directories. HCD makes IODF data accessible via LDAP using the z/OS Security Server LDAP Server.

Local system name. When defining an XMP processor, you can specify an optional local CPC designator. If you do not specify a local system name, and a CPC name is given, the local system name defaults to the CPC name.

Logical control unit. A logical control unit (LCU) can be a single CU with or without attached devices or a group of one or more CUs that share devices. In a channel subsystem, a logical CU represents a set of CUs that physically or logically attach I/O devices in common. A logical CU is built from the information specified in the CU definitions. The physical CUs the device is attached to form part of a logical CU.

Logically partitioned (LPAR) mode. A central processor complex (CPC) power-on reset mode that enables use of the PR/SM feature and allows an operator to allocate CPC hardware resources (including central processors, central storage, expanded storage, and channel paths) among logical partitions. Contrast with *basic mode*.

M

Master configuration file (MCF). The HCM master configuration file (MCF) is an HCM configuration stored on the host. It provides a central shared repository, allowing several HCD/HCM users to work on a single configuration cooperatively and safely.

Master IODF. A master IODF is a centrally kept IODF containing I/O definitions for several systems or even for a complete enterprise structure. Master IODFs help to maintain consistent I/O data within a system and can provide comprehensive reports. From the master IODF subset IODF may be generated to serve as production IODFs for particular systems within the structure.

MCF. See *master configuration file*.

Migration. Refers to activities that relate to the installation of a new version or release of a program to replace an earlier level. Completion of these activities ensures that the applications and resources on your system will function correctly at the new level.

Multiple Image Facility (MIF). A facility that allows channels to be shared among PR/SM logical partitions in an ESCON or FICON environment.

Multiple exposure device. A multiple exposure device is allocated by a single device number, but accessed by several device numbers, whereby each device number represents one exposure. The device number by which the device is allocated is the **base** exposure; all other device numbers are called non-base exposures.

Multi-user access. Users can define the multi-user access attribute for IODFs so that multiple users can simultaneously update this IODF. An IODF is kept in exclusive update mode only for the duration of a single transaction. If the updates of the transaction are committed, another user may update the IODF without requiring the first user to release it. Though a user's changes are not immediately refreshed in the views of the other users, each user has a consistent view of the data either from the initial access to the IODF or after each last update that he had applied to the IODF.

MVS system. An MVS image together with its associated hardware, which collectively are often referred to simply as a system, or MVS system.

MVSCP. MVSCP (MVS configuration program) is the program that defines the I/O configuration to MVS. For this definition, information about devices, **EDTs,** and **NIP** consoles is required.

N

NIP console. A NIP (nucleus initialization program) console is a device that NIP uses as a console to display system messages. To define a device as a NIP console, it must first be defined to the channel subsystem and the current operating system (OS) configuration.

P

PCHID. See *physical channel identifier*.

Peer coupling channel. A peer coupling channel is a coupling channel operating in peer mode, which means it can be used as a sender and receiver at the same time. It may be shared by several logical OS partitions (such as CF sender channels) and by a CF logical partition. In addition, peer channels provide more buffer sets and channel bandwidth than their counterparts. Peer channels are supported only on zSeries 900 servers and their successors.

Physical channel identifier (PCHID). The physical address of a channel path in the hardware. Logical CHPIDs have corresponding physical channels. Real I/O hardware is attached to a processor via physical channels. Channels have a physical channel identifier (PCHID) which determines the physical location of a channel in the processor. For XMP processors, the PCHIDs must be defined in the configuration. The PCHID is a three hexadecimal digit number and is assigned by the processor. One logical channel path (CHPID) provided by a channel subsystem may be associated with a physical channel (PCHID). There is no standard mapping between CHPIDs and PCHIDs.

The CHPID Mapping Tool aids the customer in developing a CHPID-to-PCHID relationship. See also *CHPID Mapping Tool*.

Preference value. Preference value is the value that is assigned to each **generic**. This value determines the sequence of allocation. The generics and the associated values are system-defined. The predefined order can be changed by means of the preference value.

Processor Resource/Systems Manager (PR/SM). The feature that allows the processor to use several OS images simultaneously and provides logical partitioning capability. See also *LPAR*.

Production IODF. The production IODF is used by MVS/IPL to build **UCBs** and **EDTs**. It is also used to build **IOCDSs** and IOCP input data sets. Several users can view a production IODF concurrently and make reports of it, but it cannot be modified. The production IODF that is used for IPL must be specified by a LOADxx member. The LOADxx member can reside either in SYS1.PARMLIB or SYSn.IPLPARM. If the LOADxx member resides in SYSn.IPLPARM, then SYSn.IPLPARM must reside on the IODF volume. If the LOADxx member resides in SYS1.PARMLIB, then SYS1.PARMLIB can reside on either the system residence (sysres) volume or the IODF volume.

R

Reconfigurable CHPID. A *reconfigurable CHPID* is an unshared CHPID that you can reconfigure offline from one partition, then online to another. That is, the CHPID can be reconfigured between logical partitions after a power-on reset. Only one partition can access I/O devices on this CHPID at a time. All CHPID types can operate in REC (reconfigurable) mode.

S

Server Time Protocol link. A coupling facility connection which will be used as a timing-only link, providing the Server Time Protocol (STP) function. The STP is a time synchronization feature, which is designed to provide the capability for multiple System z9 and zSeries servers to maintain time synchronization with each other. STP is designed to allow events occurring in different System z9 and zSeries servers to be properly sequenced in time.

Shared CHPID. A *shared CHPID* can be configured online to one or more partitions at the same time. One or more partitions can access I/O devices at the same time using this CHPID.

SMP processor. In this book, this term designates processors supporting a single channel subsystem. For SMP processors, the single channel subsystem is implicitly defined with the processor. This term is used in contrast to the term **XMP processor**, which designates processors supporting multiple logical channel subsystems.

SNA address. The system network architecture (SNA) address is a means to identify the support element of a CPC configured in a S/390 microprocessor cluster. It consists of the network name (the network identifier of the LAN the support element of a CPC is connected to), and the system name (the identifier of the CPC within the network). In HCD, used as part of a processor definition for a CPC, the SNA address provides the association of a processor defined in the IODF with a CPC configured in an S/390 microprocessor cluster.

Spanned CHPID. With XMP processors, supporting multiple logical channel subsystems, some types of channel paths can be shared across partitions from multiple logical channel subsystems. It is dependent on the processor support, which channel types can be defined as spanned. Such a channel path is called a ***spanned*** channel path.

A spanned channel path will be created with the same CHPID number in all channel subsystems that are using it. For example, if you have a processor MCSSPRO1 with channel subsystems 0 through 3, and you create CHPID 1A (type IQD, SPAN) and let it access partitions from CSS 0, 2, and 3, you will get this CHPID 1A in CSSs 0, 2, and 3, but not in CSS 1.

STP link. See Server Time Protocol link.

Subchannel set. With a subchannel set you can define the placement of devices either relative to a channel subsystem or to an operating system. Starting with IBM System z9 Enterprise Class (z9 EC) processors and z/OS V1R7, users can define an additional subchannel set with ID 1 (SS 1) on top of the existing subchannel set (SS 0) in a channel subsystem. This function relieves the constraint for the number of devices that can be accessed by an LPAR. The machine implementation for IBM System z9 Enterprise Class processors or later supports 63.75K devices in subchannel set 0, and up to 64K-1 devices in the additional subchannel set 1. The z/OS V1R7 implementation limits the exploitation of subchannel set 1 to parallel access volume (PAV) alias devices only (device types 3380A, 3390A of the 2105, 2107 and 1750 DASD control units).

Sysplex. A set of operating systems communicating and cooperating with each other through certain multisystem hardware components and software services to process customer workloads. See also *MVS system*.

S/390 Microprocessor Cluster. S/390 microprocessor cluster is a configuration that consists of CPCs (central processor complexes), one or more Hardware Management Consoles, and may have one or more coupling facilities. The support elements that are attached to the CPCs are connected to a network. A

Hardware Management Console connected to the same network allows the system operator to configure the CPCs, observe and control hardware operations, and perform software functions.

U

UCB. Unit control block

UIM. UIMs (unit information modules) perform the device-dependent part of the operating system configuration definition. There is a UIM for each supported device or device group. Each UIM recognizes and processes the values coded for its device or device group. HCD routines load all UIMs, either IBM or customer supplied, into virtual storage and make calls to the UIMs:
- During initialization
- During processing of an Add device or Change device request
- During generation of a print report
- During IPL

V

Validated work IODF. A validated work IODF satisfies all validation rules for building production IODFs. It may lack physical channel identifiers (PCHIDs) for XMP processors. In cooperation with HCD and the CHPID Mapping Tool a validated work IODF is required to accept new or updated PCHIDs. From such a validated work IODF, an IOCP input deck suitable for the use with the CHPID Mapping Tool is generated. As soon as all PCHIDs are inserted or updated in the validated work IODF, the production IODF can be built.

VIO. VIO (virtual input/output) is the allocation of data sets that exist in paging storage only. Only DASDs are eligible for VIO. Data sets are allocated to a paging device instead of to a real device.

W

Work IODF. The work IODF is used to update an I/O definition and reflects the most recent status of the hardware configuration. After you have completed the updates, you can use the work IODF to create a production IODF. While you can update a work IODF and generate reports from it, it cannot be used to build **UCBs** and **EDTs**, nor can it be used to generate an **IOCDS**, or an **IOCP** input data set.

X

XMP processor. In the S/390 context, this term designates processors that support multiple logical channel subsystems (LCSS). It is used in contrast to the term SMP processor, which designates processors of previous generations that support only one channel subsystem. In general, the different CSSs including their channel paths and logical partitions provided by an XMP processor operate independently from each other. Channel paths can be spanned over multiple logical channel subsystems on the same processor depending on the channel path type. See also *SMP processor* and *channel subsystem*.

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