IBM zEnterprise 196 Configuration Setup

- Discusses configuration planning techniques
- Describes the configuration options
- Provides step-by-step configuration examples

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Note: Before using this information and the product it supports, read the information in “Notices” on page xxv.

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Preface

This IBM® Redbooks® publication helps you install, configure, and maintain the IBM zEnterprise 196 server. The z196 offers new functions that require a comprehensive understanding of the available configuration options. This book presents configuration setup scenarios, and discusses implementation examples in detail.

This book is intended for systems engineers, hardware planners, and anyone who needs to understand IBM System z® configuration and implementation. Readers should be generally familiar with current IBM System z technology and terminology. For details about the z196 server, see *IBM zEnterprise System Technical Introduction*, SG24-7832 and *IBM System z196 Enterprise Class Technical Introduction,* SG24-7833.

The team who wrote this book

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1

Channel Subsystem overview

In this chapter, we present an overview of the Channel Subsystem.

We discuss the following topics:

- Channel Subsystem
- Logical partitions
- Subchannel sets
- Channels
- The definition for multiple CSSs and the third subchannel set
- Activation

1.1 Channel Subsystem

Note: This book is third in a series The first two are *IBM zEnterprise System Technical Introduction*, SG24-7832 and *IBM System z196 Enterprise Class Technical Introduction,* SG24-7833.

The channels in the Channel Subsystem (CSS) permit the transfer of data between main storage and I/O devices or other servers under the control of a channel program. Through these channel connections, the CSS enables communication from server memory to peripherals.

The CSS allows channel I/O operations to continue independently of other operations within the server. This functionality allows other functions to resume after an I/O operation has been initiated. Brief descriptions of some key entities that comprise the CSS are:

Channel	The communication path from the Channel Subsystem to the connected control units and I/O devices. The channel subsystem communicates with I/O devices by means of channel paths between the channel subsystem and control units.
Physical Channel ID (PCHID)	A Physical Channel ID, or PCHID, reflects the physical location of a channel-type interface. A PCHID number is based on the I/O cage location, the channel feature slot number, and the port number of the channel feature. A CHPID does not directly correspond to a hardware channel port, but is assigned to a PCHID in HCD or IOCP.
Channel Path Identifier (CHPID)	A value assigned to each channel path of the system that uniquely identifies that path. A total of 256 CHPIDs are supported by one CSS. On a IBM zEnterprise 196 system, a CHPID number is assigned to a physical location by the user using HCD or IOCP.
Subchannel	Provides the logical appearance of a device to the program, and it contains the information required for sustaining a single I/O operation. A subchannel is assigned for each device defined to the logical partition.
Control unit	Provides the logical capabilities necessary to operate and control an I/O device, and it adapts the characteristics of each device so that it can respond to the standard form of control provided by the CSS. A control unit can be housed separately, or it can be physically and logically integrated with the I/O device, the channel subsystem, or within the server itself.
Input/output (I/O) device	Provides external storage, which is a means of communication between data processing systems, or a means of communication between a system and its environment. In the simplest case, an I/O device is attached to one control unit and is accessible through one channel path.

Figure 1-1 shows the relationship between the Channel Subsystem, the channels, the control units, and the I/O devices.

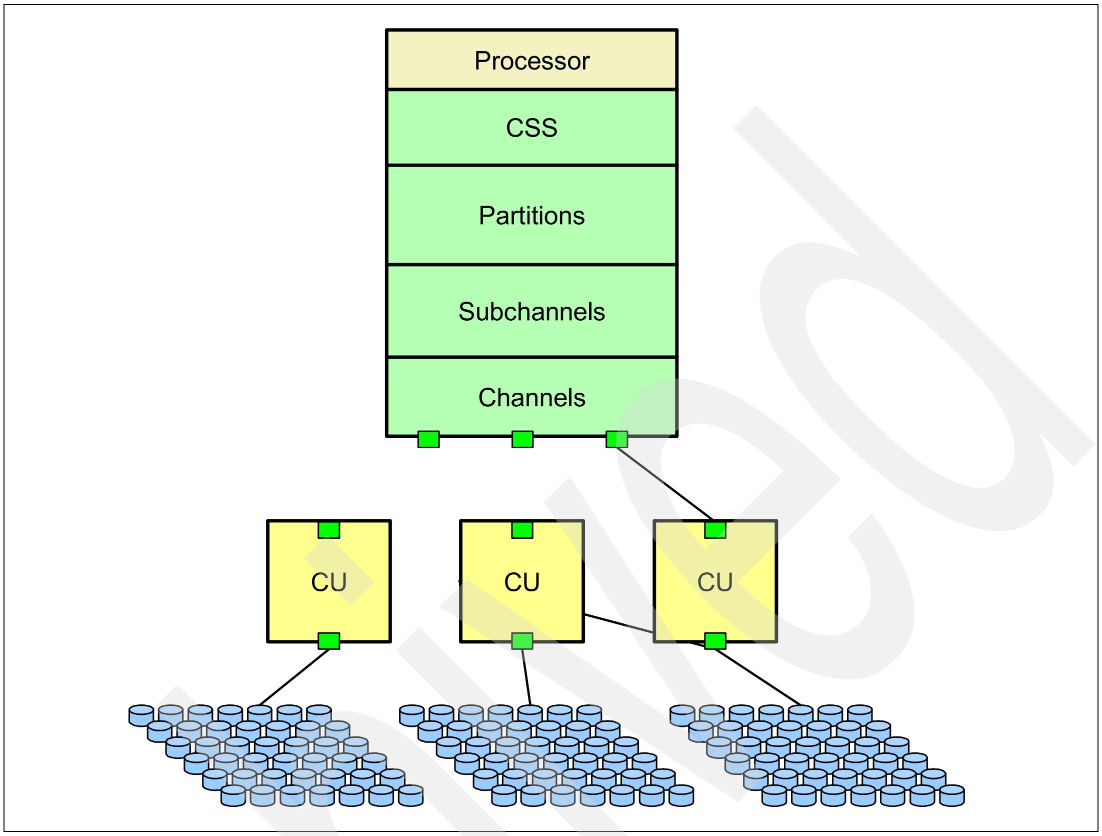


Figure 1-1 Channel Subsystem relationship to channels, control units, and I/O devices

Multiple Channel Subsystem

The multiple Channel Subsystem (CSS) concept implemented in the System z servers is designed to offer considerable increase in processing power, memory size, and I/O connectivity over previous servers.

Table 1-1 shows a summary of CSS features available on various System z models. A third subchannel set (SS2) is introduced in the z196 server that allows you to define additional 64 K subchannels in each CSS (see 1.3, "Subchannel sets" on page 6 for details).

Table 1-1 CSS features per System z model

Item	**z196**	**IBM System z10 EC and IBM System z9 EC**	**IBM System z10 BC and IBM System z9 BC**
Number of CSSs	4 per server	4 per server	2 per server
Devices in Subchannel set-0	63.75 K per CSS 255 K per server	63.75 K per CSS 255 K per server	63.75 K per CSS 255 K per server
Devices in Subchannel set-1	64 K-1 per CSS 256 K-4 per server	64 K-1 per CSS 256 K-4 per server	64 K-1 per CSS 256 K-4 per server
Devices in Subchannel set-2	64 K-1 per CSS 256 K-4 per server	N/A	N/A

Item	**z196**	**IBM System z10 EC and IBM System z9 EC**	**IBM System z10 BC and IBM System z9 BC**
Partitions	15 per CSS 60 per server	15 per CSS 60 per server	15 per CSS 30 per server
CHPIDs	256 per CSS 1024 per server	256 per CSS 1024 per server	256 per CSS 512 per server

On a System z server, all channel subsystem images are defined within a single I/O Configuration Data Set (IOCDS) that is loaded into the server's Hardware System Area (HSA) and initialized during a power-on reset.

Figure 1-2 shows a logical view of these relationships. The z196 supports four Channel Subsystems per server. CSSs are numbered from 0 to 3; these designations are sometimes referred to as the "CSS Image ID" or "CSSID" (CSSID 0, 1, 2, or 3 for z196, z10 EC, and System z9 EC, and CSSID 0 and 1 for z10 BC and System z9 BC).

Each channel subsystem may have from 1 to 256 channels, and may in turn be configured with 1 to 15 logical partitions, with a maximum of 60 logical partitions.

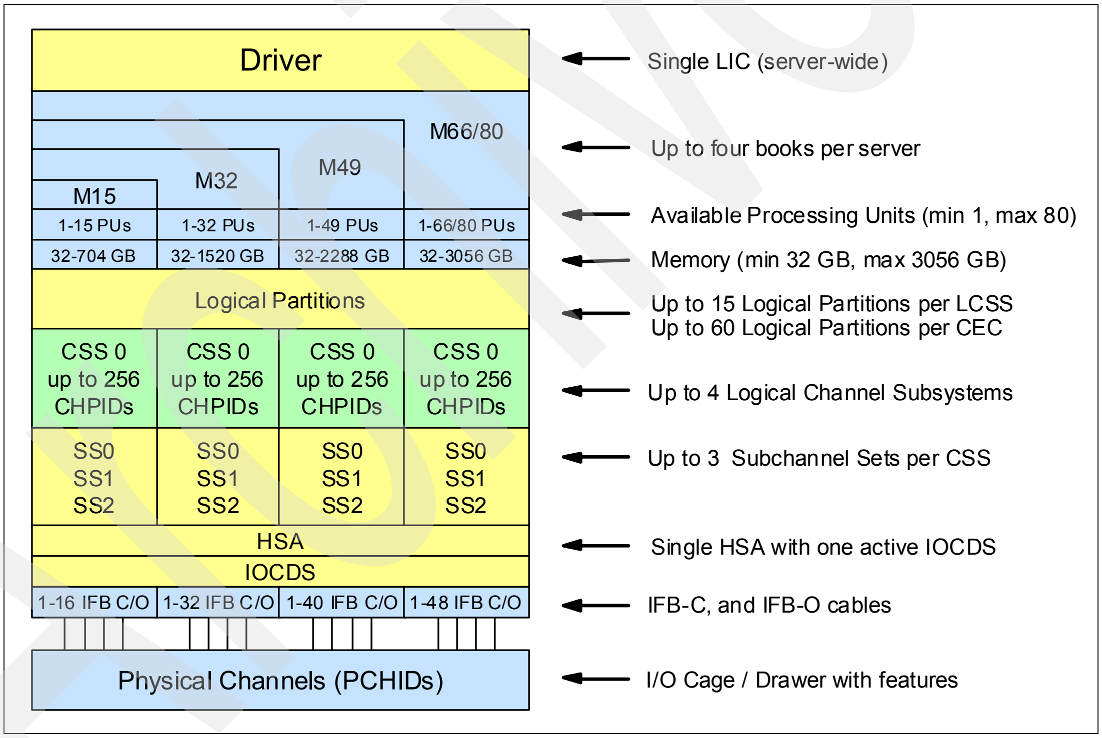


Figure 1-2 Logical view of multiple CSSs in a z196 server

MIF

Multiple Image Facility (MIF) enables resource sharing across logical partitions within a single CSS. When a channel is shared across logical partitions in multiple CSSs, this is known as "spanning." See Table 1-2 on page 10 for more information.

1.2 Logical partitions

A logical partition (LPAR) supports the running of an operating system, such as z/OS, and provides Central Processors (CPs), memory, subchannels, and access to channels. The z196 server does not support basic mode; only LPAR mode can be defined.

The following definitions apply to System z servers:

Logical partition name

Defined by the user through HCD or IOCP. It is the name in the RESOURCE statement in the IOCP. The logical partition names must be unique across all CSSs in the server.

Logical partition identifier

A number in the range of 00 to 3F; it is assigned in the image profile through the Support Element or the Hardware Management Console. It is unique across the server and may also be referred to as the User Logical Partition ID (UPID).

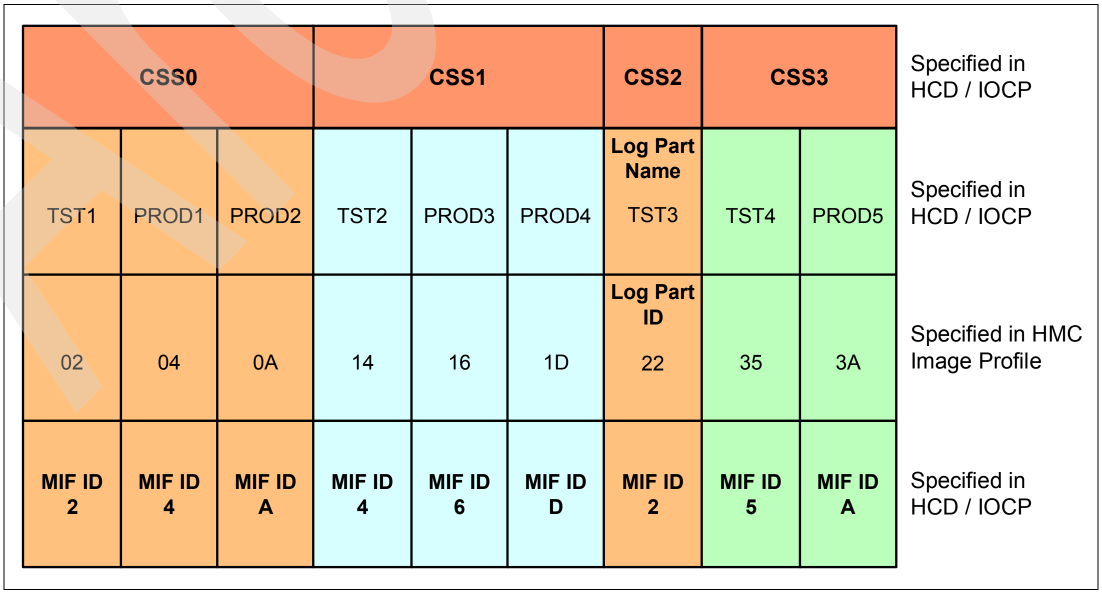
We suggest that you establish a numbering convention for the logical partition identifiers. We use the CSS number concatenated to the MIF Image ID, which means logical partition ID “3A” would be in CSS “3” with MIFID “A”. This convention fits within the allowed range of logical partition IDs and conveys useful information.

MIF ID

Defined using HCD or IOCP in the RESOURCE statement. It is in the range of x'1' to x'F' and is unique within a CSS, but not unique across multiple CSSs.

Multiple CSSs can specify the same MIF ID. The MIF ID is also known as Image ID (IID).

Figure 1-3 shows the relationship between CSSs, logical partitions, and associated MIFIDs. TST1, PROD1, and PROD2 are defined to CSS 0. TST2, PROD3, and PROD4 are defined to CSS 1. TST3 is defined to CSS 2. TST4 and PROD5 are defined to CSS 3. Notice that PROD2 and PROD5 have the same MIFID, although logical partition IDs are different for them. Users should understand that the HCD and HCM panel refers to the definition of a MIF ID in each CSSID.



CSS0			CSS1			CSS2	CSS3		Specified in HCD / IOCP
TST1	PROD1	PROD2	TST2	PROD3	PROD4	**Log Part Name** TST3	TST4	PROD5	Specified in HCD / IOCP
02	04	0A	14	16	1D	**Log Part ID** 22	35	3A	Specified in HMC Image Profile
MIF ID 2	**MIF ID 4**	**MIF ID A**	**MIF ID 4**	**MIF ID 6**	**MIF ID D**	**MIF ID 2**	**MIF ID 5**	**MIF ID A**	Specified in HCD / IOCP

Figure 1-3 CSS and logical partition definition of a z196 server

I/O operations for a logical partition are identified as originating from a Channel Image (CI). The Channel Image is defined as CI = CSSID + MIFID.

For FICON® I/O operations, the addressing is CI (+ CHPID) + S_ID + D_ID + CUI + UA, where the terms are defined as:

S_ID	Source ID
D_ID	Destination ID
CUI	Control Unit ID
UA	Unit Address

The FICON control unit logical addressing for CTCs is CSSID.MIFID.

1.3 Subchannel sets

In IBM System zArchitecture, each I/O device is represented by a separate set of controls for each logical partition, called a *subchannel*, which is used by the operating system to pass an I/O request from the SCP to the channel subsystem. To a program, the subchannel would appear as a device. In the channel subsystem, the primary control block for an I/O is the *Subchannel* represented by a control block called the Unit Control Word (UCW). UCWs are part of the Hardware System Area (HSA).

Multiple subchannel sets

The number of devices that can be addressed by a logical partition can be a limitation for some installations. The concept of *multiple subchannel sets* (MSS) provides relief for this problem.

Usually, a subchannel represents an addressable I/O device. A disk control unit with 30 drives uses 30 subchannels (for base addresses), and so on. An addressable device is associated with a device number and the device number is commonly, but incorrectly, known as the *device address*.

Subchannel numbers are limited to four hexadecimal digits by hardware and software architectures. Four hexadecimal digits provides up to 64 K addresses, known as a *set*. IBM reserved 256 subchannels, leaving 63.75 K subchannels for general use.

The advent of Parallel Access to Volumes (PAV) has made this 63.75 K subchannels limitation a problem for larger installations. One solution is to have *multiple* sets of subchannels, with a current implementation of three sets in a z196 server.

The third subchannel set is introduced and implemented to each logical channel subsystem by the z196 server. Subchannel set 0 (SS0) provides a total of 63.75 K subchannels, while Subchannel set 1 (SS1) and Subchannel set 2 (SS2) provide to the installation the full range of 64 K-1 addresses. With z/OS V1.12, you can define the following devices in SS1 and SS2:

- Parallel Access Volume (PAV) alias devices
- PPRC secondary devices
- IBM DB2® data backup volumes

Figure 1-4 shows the channel subsystems (CSS) and the associated subchannel sets (SS).

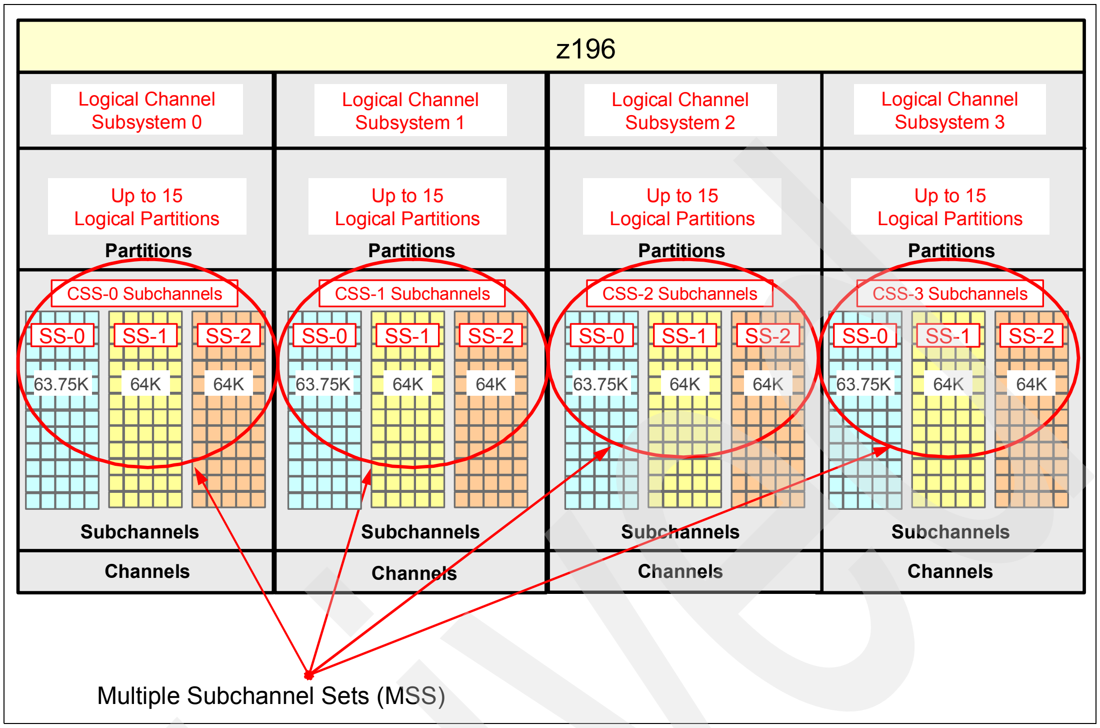


Figure 1-4 Multiple subchannels sets

Each CSS has three subchannel sets, as shown in Figure 1-4. The three subchannel sets enable a total of 63.75 K subchannels in set 0, 64 K-1 subchannels in set 1, and an additional 64 k-1 subchanels in set 2.

The current implementation in z/OS allows the use of Subchannel set 0 (SS0) to define any type of device allowed today as base, alias, and secondary devices. The second and third subchannel sets (SS1 and SS2) allow you to define disk alias devices (of both primary and secondary devices), and Metro Mirror secondary devices only.

The appropriate subchannel set number must be included in IOCP definitions or in the HCD definitions that produce the IOCDS. The subchannel set number defaults to zero.

With the availability of HyperPAV, the requirement for PAV devices is greatly reduced. HyperPAV allows an alias address to be used to access any base on the same control unit image per I/O base. It also allows different HyperPAV hosts to use one alias to access different bases, which reduces the number of alias addresses required. HyperPAV is designed to enable applications to achieve equal or better performance than is possible with the original PAV feature alone, while also using the same or fewer z/OS resources. HyperPAV is an optional feature on the IBM System Storage® DS8000® series.

Figure 1-6 on page 11 and Example 1-1 on page 12 illustrate the use and definition of multiple subchannel sets.

1.4 Channels

The channel subsystem communicates with I/O devices by means of channel paths between the channel subsystem and control units. A *channel* is the communication path from the Channel Subsystem to the connected control units and I/O devices.

Channel Path ID

A Channel Path Identifier (CHPID) is a value assigned to each channel path of the system that uniquely identifies that path. A total of 256 CHPIDs are supported by each CSS. A CHPID number is assigned to a physical channel (PCHID) by the user using HCD or IOCP.

Physical Channel ID

A Physical Channel ID (PCHID) reflects the physical location of a channel-type interface. A PCHID number is based on the I/O cage location, the channel feature slot number, and the port number of the channel feature. A CHPID no longer directly corresponds to a hardware channel port, but is assigned to a PCHID using HCD or IOCP.

You can address 256 CHPIDs within a single channel subsystem. This address space provides a maximum of 1024 CHPIDs when four CSSs are defined. Each CHPID within a CSS is associated with a single channel. The physical channel, which uniquely identifies a connector jack on a channel feature, is known by its PCHID number.

PCHIDs identify the physical ports on cards located in I/O cages and I/O drawers and follows the numbering scheme defined for the processor model. PCHID values are shown in Table 1-6 on page 18 and Table 1-7 on page 18 for I/O cages, and in Table 1-9 on page 20 for I/O drawers.

Adapter ID

The Adapter ID (AID) assigned to each InfiniBand Host Channel Adapter (HCA) used for coupling initially reflects the physical location of the HCA.

The Adapter ID specifies the adapter identifier associated with the host channel adapter (HCA) on which this channel path is defined. It is determined from the PCHID Report when a host channel adapter is ordered. An AID is assigned for HCA2-O adapters and is required for all Coupling over InfiniBand (CIB) channel path definitions. The AID is a two-digit hexadecimal number between x”00” and x”1F”. A maximum of 16 CIB channel paths can be defined for the same AID across both ports.

For more information about InfiniBand, see *Getting Started with InfiniBand on System z10 and System z9,* SG24-7539.

Control unit

A *control unit* (CU) provides the capabilities necessary to operate and control an I/O device. The control unit acts as an interface between the Channel Subsystem and the I/O device, masking the uniqueness of the I/O device from the CSS. A control unit can be housed separately, or it can be physically and logically integrated with the I/O device, the Channel Subsystem, or within the server itself.

I/O device

An *input/output* (I/O) device is the end-point in the “conduit” between a server and a peripheral. Although the channel does not communicate directly with I/O devices (it communicates with control units), it is useful to mention them here because we previously discussed subchannels, which appear as I/O devices to programs.

An I/O device has the characteristics of the peripheral that it represents. It could provide external storage, a means of communication between data-processing systems, or a means of communication between a system and its environment. In the simplest case, an I/O device is attached to one control unit and is accessible through one channel path.

Channel path sharing

There are now two possibilities for channel path sharing:

- MIF

  This possibility enables channel sharing among logical partitions running in one channel subsystem.

- Spanning

  This possibility extends the MIF concept of sharing channels across logical partitions in a single CSS to sharing channels across logical partitions *and* multiple channel subsystems.

  Spanning is the ability for the channel to be configured to multiple channel subsystems. When defined that way, the channels can be transparently shared by any or all of the configured logical partitions, regardless of the channel subsystem to which the logical partition is configured.

MIF-shared channels

PR/SM™ allows sharing of resources across logical partitions. MIF enables channel sharing among logical partitions, but sharing is limited to partitions defined to one channel subsystem.

It is important to understand qualifiers that apply to a logical partition definition. The following definitions for z196, z10 EC, z10 BC, System z9 EC, and System z9 BC are described in 1.2, "Logical partitions" on page 5:

- Logical partition name
- Logical partition identifier
- MIF ID

Spanned channels

Spanning is the ability of channels to be configured to multiple CSSs, and be transparently shared by any or all of the configured logical partitions configured in these CSSs.

Figure 1-5 shows an example with two CSSs using spanned channels. There are spanned external channels (with associated PCHIDs) and spanned internal channels (no associated PCHIDs).

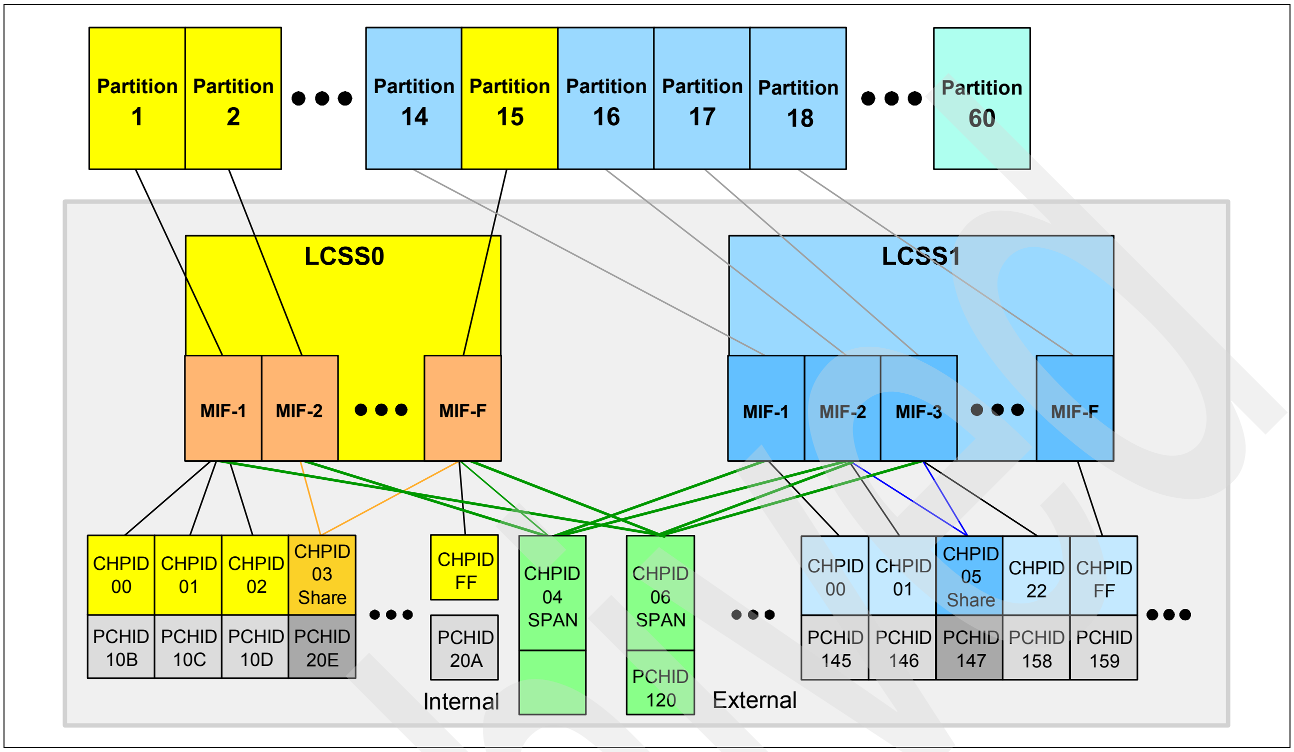


Figure 1-5 MIF-shared and spanned channels

It should be noted that there are certain channels commonly used on earlier servers that cannot be spanned. For example, ESCON® channels can be MIF-shared within one CSS, but cannot be spanned across multiple CSSs. Table 1-2 shows channels that can be shared and spanned by CHPID type on a z196 server.

Table 1-2 Spanned and shared channels on z196

Channel type		CHPID definition	MIF-shared channels	Spanned channels
FICON Express8	External	FC and FCP	Yes	Yes
FICON Express4[a]	External	FC and FCP	Yes	Yes
ESCON[b]	External	CNC and CTC	Yes	No
		CVC and CBY	No	No
OSA-Express3 10GbE	External	OSD and OSX	Yes	Yes
OSA-Express3 GbE	External	OSD and OSN	Yes	Yes
OSA-Express3 1000BASE-T	External	OSD, OSE, OSC, OSN, and OSM	Yes	Yes
OSA-Express2[a] GbE	External	OSD and OSN	Yes	Yes
OSA-Express2[a] 1000BASE-T	External	OSD, OSE, OSC, and OSN	Yes	Yes

Channel type		CHPID definition	MIF-shared channels	Spanned channels
ISC-3[c]	External	CFP	Yes	Yes
PSIFB	External	CIB	Yes	Yes
IC	Internal	ICP	Yes	Yes
HiperSockets™	Internal	IQD	Yes	Yes

a. Available only if carried forward during an upgrade.
b. The z196 server is the last server to allow ordering of ESCON channels.
c. The z196 server is the last server to allow ordering of ISC-3 coupling links.

Each channel type is described in more detail in Chapter 2, “Configuration planning” on page 25.

Figure 1-6 shows a server with four CSSs using a third subchannel set:

- The logical CHPID numbers 50, 54, 58, and 5C are shared channels between the logical partitions. These CHPIDs are defined as spanned channel for each physical FICON (TYPE=FC) channels, PCHID numbers 241, 250, 1A2, and 5D1.
- All logical partitions in each CSSs are using the subchannel sets SS0, SS1, and SS2 to address the same DASD. They use SS0 to address the base addresses D000-D070, SS1 to address the alias addresses D071-D09F, and SS2 to address the alias addresses D0A0-D0FF.

Example 1-1 on page 12 shows the IOCDS definitions for four CCSs and three subchannel sets.

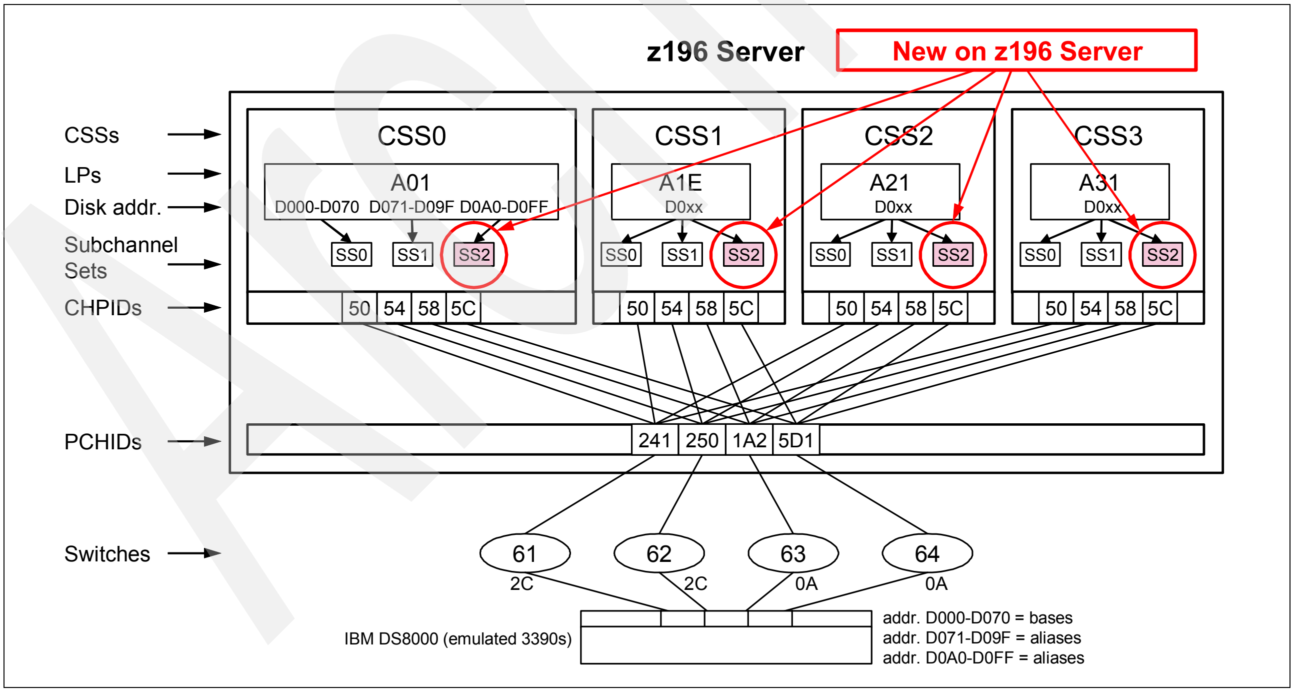


Figure 1-6 Configuration example with CSSs, MSSs, and PCHIDs

The IOCP statements in Example 1-1 are not intended to represent a real server, but are used to illustrate the new elements involved. In the past, dummy LPARs needed to be defined in the IOCP to enable the user to add them dynamically later. Now IOCP automatically reserves all available CSSs and LPs not explicitly defined, up to four CSSs with 15 LPs each.

Example 1-1 IOCP definition example

```
ID    MSG1='IODF49',MSG2='ZHW05.IODF49 - 2010-06-22 11:38',   *
      SYSTEM=(2817,1),LSYSTEM=SCZP301,                        *
      TOK=('SCZP301',008000013BD52817113832040110173F00000000,*
      00000000,'10-06-22','11:38:32','ZHW05','IODF49')
RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
      0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
      06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1E,E),(A1F,F),(*
      A11,1),(A12,2)))
CHPID PATH=(CSS(0,1,2,3),50),SHARED,                          *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),SWITCH=61,PCHID=241,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),54),SHARED,                          *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),SWITCH=62,PCHID=250,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),58),SHARED,                          *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),SWITCH=63,PCHID=1A2,TYPE=FC
CHPID PATH=(CSS(0,1,2,3),5C),SHARED,                          *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),SWITCH=64,PCHID=5D1,TYPE=FC
CNTLUNIT CUNUMBR=D000,                                        *
      PATH=((CSS(0),50,54,58,5C),(CSS(1),50,54,58,5C),(CSS(2),*
      50,54,58,5C),(CSS(3),50,54,58,5C)),UNITADD=((00,256)),  *
      LINK=((CSS(0),2C,2C,0A,0A),(CSS(1),2C,2C,0A,0A),(CSS(2),*
      2C,2C,0A,0A),(CSS(3),2C,2C,0A,0A)),CUADD=0,UNIT=2107
IODEVICE ADDRESS=(D000,113),CUNUMBR=(D000),STADET=Y,UNIT=3390B
IODEVICE ADDRESS=(D071,047),CUNUMBR=(D000),STADET=Y,SCHSET=1, *
      UNIT=3390A
IODEVICE ADDRESS=(D0A0,096),CUNUMBR=(D000),STADET=Y,SCHSET=2, *
      UNIT=3390A
```

The SCHSET parameter in the IODEVICE statement defines the subchannel set used for a specific address range. If no subchannel set is defined, it defaults to subchannel set 0. The following devices are defined in the IOCDS:

- Bases D000-D070 → CSS0-3 → SS0
- Aliases D071-D09F → CSS0-3 → SS1
- Aliases D0A0-D0FF → CSS0-3 → SS2

Channel Program

A Channel Program (CP) is a set of Channel Command Words (CCW). Channel programs are built by the requester of the I/O and then control is passed to the next phase of the I/O, which is performed by the System Assist Processor.

System Assist Processor

A System Assist Processor is a special-purpose PU responsible for handling I/O. System Assist Processors are sometimes referred to as I/O Processors (IOPs).

Hardware System Area

The Hardware System Area (HSA) is an area of memory in the processor main storage used by the hardware. It is established during power-on reset (POR) using the configuration information from the IOCDS. A fixed amount of 16 GB is reserved for HSA storage size and is fenced off from customer purchased memory. The HSA contains the subchannels (UCWs).

Fanout card and adapters

A fanout card is designed to provide the path for data between memory and I/O using feature cards and cables. The z196 server can have one to four books installed in the central processing complex (CPC). Each book includes up to eight fanout slots, with a maximum of 24 fanout cards for a four-book structure. Each fanout has two ports to connect a fiber or a copper cable, depending on the type of fanout. There are two types of host channel adapters (HCA): one uses an optical interface (HCA2-O) for coupling, the other uses copper cable (HCA2-C) to connect to an I/O cage.

Each slot can hold one of the following fanouts:

- Host Channel Adapter (copper) (HCA2-C): Provides connectivity to the InfiniBand MultiPlexer (IFB-MP) card in the I/O cage or I/O drawer.
- Host Channel Adapter (optical) (HCA2-O): Provides coupling links connectivity to other z196 servers (HCA2-O), z10 servers (HCA2-O), or System z9 servers (HCA1-O) for a maximum distance of 150 m (492 feet).
- Host Channel Adapter (optical) (HCA2-O LR): Provides coupling link connectivity to other z196 servers (HCA2-O LR) or z10 servers (HCA2-O LR) for a maximum distance of 10 km (6.2 miles).

> **Note:** A Memory Bus Adapter (MBA) used for copper cable ICB-4 links is not supported on a z196 server.

The HCA2-O and the HCA2-O LR fanout used for coupling links have an assigned Adapter ID number (AID), which must be used for definitions in IOCDS to have a relation between the physical adapter location and the CHPID number. For AID number assignment, refer to "Adapter ID and port assignment" on page 90.

I/O cage and I/O drawer

The z196 server supports up to three I/O cages and up to six I/O drawers, or a combination of both depending on the required I/O slots for your configuration. On newly built machines, the number of I/O cages and I/O drawers is determined by the number of required I/O cards. Table 1-3 shows the number of I/O cages and I/O drawers required for newly built servers, depending on the number of I/O cards ordered.

Table 1-3 Number of I/O cages and I/O drawers on new build servers

Required I/O slots	**I/O cages**	**I/O drawer**	**HCA fanouts**	**Space for concurrent installation**	
				I/O drawers	**I/O slots**
1-8	0	1	2	5	40
9-16	0	2	2	4	32
17-24	0	3	4	3	24
25-32	0	4	4	2	16

Required I/O slots	I/O cages	I/O drawer	HCA fanouts	Space for concurrent installation	
				I/O drawers	I/O slots
33-36	1[a]	1	6	3	24
37-44	1	2	6	2	16
45-56	2[a]	0	8	2	16
57-64	2	1	10	1	8
65-72	2	2	10	0	0
73-84	3[b]	0	12	0	0

a. This cage is an I/O cage added to keep space open for a concurrent install of an I/O drawer.

b. The third I/O cage is available through RPQ 8P2506.

If a channel upgrade Miscellaneous Equipment Specification (MES) requires the installation of a new I/O cage or I/O drawer, first an I/O drawer must be installed concurrently as long as there is physical space available in a frame for the I/O drawer. If a total of six drawers are installed and more then 48 I/O slots are required on an MES upgrade, an I/O cage is required, replacing two of the drawers. Adding an I/O cage is disruptive. For more then 72 I/O slots, a third I/O cage is always required.

Figure 1-7 shows the maximum possible combination of zero to six I/O drawers and zero to three I/O cages and the related PCHID address range in I/O drawers and I/O cages. The PCHID address range for each I/O slot in an I/O cage is listed in Table 1-6 on page 18 and Table 1-7 on page 18, and the PCHID address range for each slot in an I/O drawer is listed in Table 1-9 on page 20.

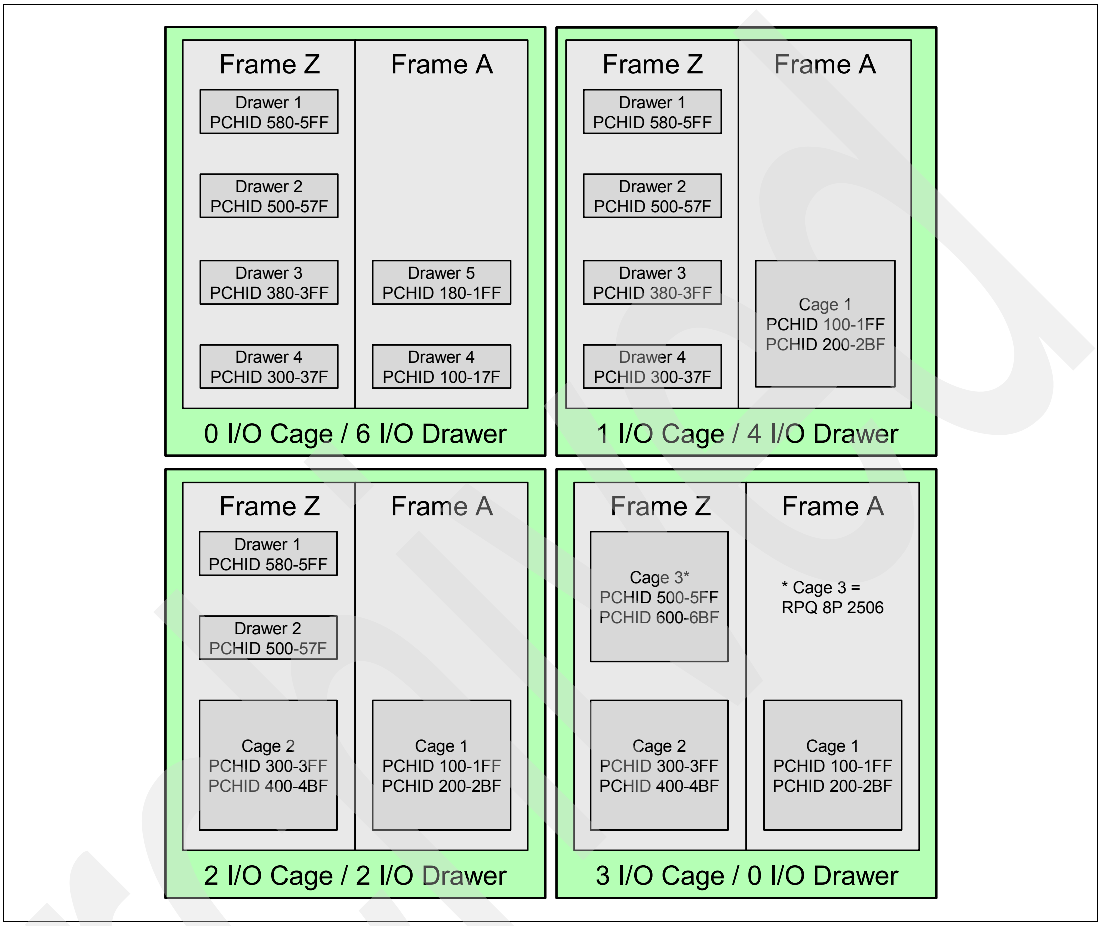


Figure 1-7 I/O cage and I/O drawer locations

As shown in Figure 1-7, all spaces in Frame A and Frame Z can be covered by mixing I/O cages and I/O drawers. While a I/O drawer can be added on MES upgrades concurrently, adding an I/O cage is always disruptive.

Table 1-4 lists all possible combinations of zero to three I/O cages and zero to six I/O drawers.

Table 1-4 Valid combination of I/O cages and I/O drawers

# of Drawer	**# of Cages**			
	0	**1**	**2**	**3**
0	Yes[a]	Yes	Yes	Yes[b]
1	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No
3	Yes	Yes[c]	No	No
4	Yes	Yes[c]	No	No

# of Drawer	# of Cages			
	0	1	2	3
5	Yes[c]	No	No	No
6	Yes[c]	No	No	No

a. Coupling links only.
b. The third I/O cage is available through RPQ 8P2506.
c. Available only on MES upgrades.

Each I/O cage supports up to seven I/O domains and a total of 28 I/O cards. Each I/O domain supports four I/O cards, as shown in Figure 1-8 on page 17.

Each I/O drawer supports two I/O domains and a total of eight I/O cards. Each I/O domain supports four I/O cards, as shown in Figure 1-9 on page 20.

Each I/O domain requires an IFB-MP card in the I/O cage or I/O drawer and a copper cable connected to a Host Channel Adapter (HCA) fanout in the CPC cage.

An I/O drawer has two I/O domains. while an I/O cage has seven I/O domains. An eighth domain connection is required for a z196 server I/O cage in which all seven domains are used to have the redundant I/O interconnect function be available to all domains. The eighth domain connection is only used if the primary IFB-MP for the last domain is disabled.

Figure 1-8 shows the physical layout of the I/O cage, with the I/O slots and the I/O domains. The assignment of slots to domains in each I/O cage is identified in Table 1-5.

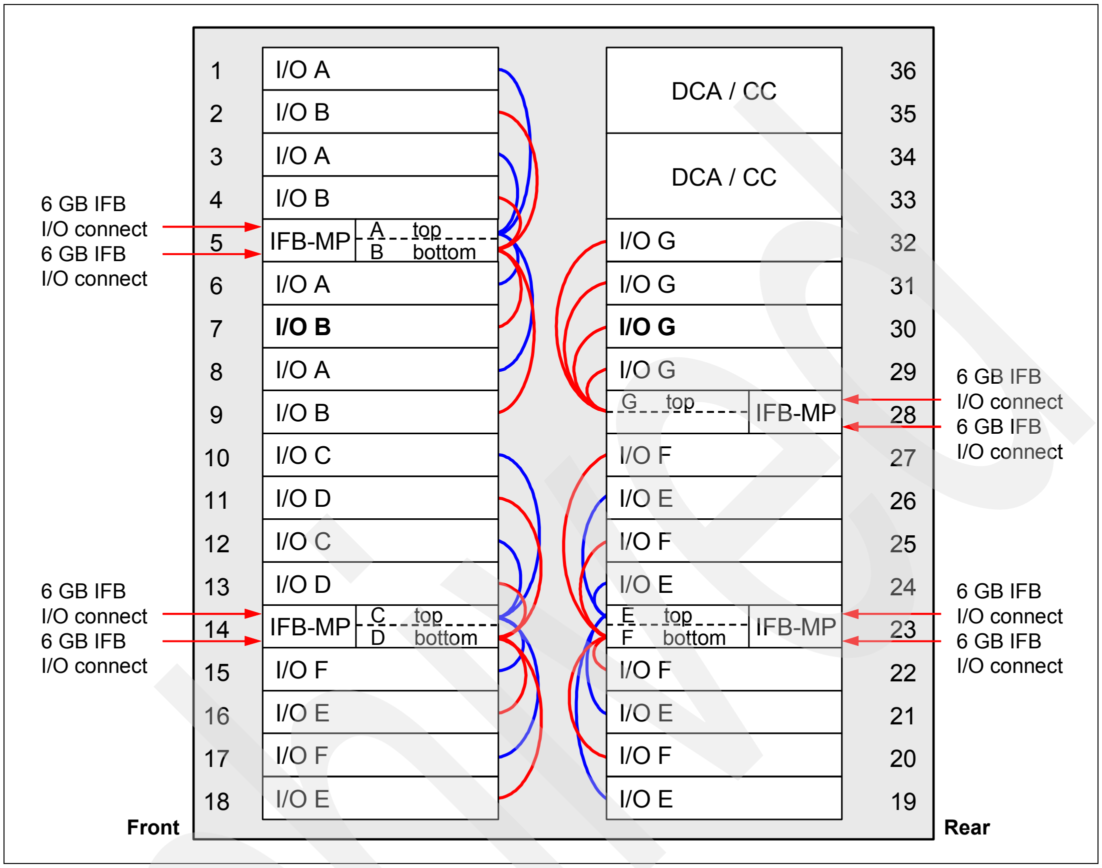


Figure 1-8 z196 I/O cage

Table 1-5 I/O domain assignment in I/O cage

I/O domain	I/O slots in domain
0 (A)	1, 3, 6, and 8
1 (B)	2, 4, 7, and 9
2 (C)	10. 12, 15, and 17
3 (D)	11, 13, 16, and 18
4 (E)	19, 21, 24, and 26
5 (F)	20, 22, 25, and 27
6 (G)	29, 30, 31, and 32

I/O slots 5, 14, 23, and 28 contain the IFB/MP cards used for IFB connections. Assuming a fully-loaded I/O cage, there are two IFBs in each of these slots.

One IFB/MP card in slot 28 serves only I/O domain 6 in slots 29 to 32. Two IFB connections are still provided to allow redundant I/O interconnect.

If you order the Power Sequence Control (PSC) feature, the PSC24V card is always plugged into slot 29 of domain G. Installing a PSC24V card is always disruptive.

Note: IBM intends that the z196 server will be the last high-end server that supports the ordering of the Power Sequence Control (PSC) feature. The PSC feature can only be ordered for a newly built z196 or a family upgrade to a z196.

The address of each PCHID is determined by the physical location of the card in the I/O cage. Each slot in an I/O cage supports up to 16 PCHID addresses. Table 1-6 lists the PCHID addresses used for front locations in each I/O cage.

Table 1-6 PCHIDs address range per I/O cage and I/O slot (front)

I/O slot #	I/O Domain	PCHID I/O cage 1 Front	PCHID I/O cage 2 Front	PCHID I/O cage 3 Front
1	A	100-10F	300-30F	500-50F
2	B	110-11F	310-31F	510-51F
3	A	120-12F	320-32F	520-52F
4	B	130-13F	330-33F	530-53F
5	IFB-MP			
6	A	140-14F	340-34F	540-54F
7	B	150-15F	350-35F	550-55F
8	A	160-16F	360-36F	560-56F
9	B	170-17F	370-37F	570-57F
10	C	180-18F	380-38F	580-58F
11	D	190-19F	390-39F	590-59F
12	C	1A0-1AF	3A0-3AF	5A0-5AF
13	D	1B0-1BF	3B0-3BF	5B0-5BF
14	IFB-MP			
15	C	1C0-1CF	3C03CF	5C0-5CF
16	D	1D0-1DF	3D0-3DF	5D0-5DF
17	C	1E0-1DF	3E0-3EF	5E0-5EF
18	D	1F0-1FF	3F0-3FF	5F0-5FF

Table 1-7 lists the PCHID addresses used for the rear locations in each I/O cage.

Table 1-7 PCHIDs address range per I/O cage and I/O slot (rear)

I/O slot #	I/O Domain	PCHID I/O cage 1 Rear	PCHID I/O cage 2 Rear	PCHID I/O cage 3 Rear
19	E	200-20F	400-40F	600-60F
20	F	210-21F	410-41F	610-61F
21	E	220-22F	420-42F	620-62F

I/O slot #	I/O Domain	PCHID I/O cage 1 Rear	PCHID I/O cage 2 Rear	PCHID I/O cage 3 Rear
22	F	230-23F	430-43F	630-63F
23	IFB-MP			
24	E	240-24F	440-44F	640-64F
25	F	250-25F	450-45F	650-65F
26	E	260-26F	460-46F	660-66F
27	F	270-27F	470-47F	670-67F
28	IFB-MP			
29	G	280-28F	480-48F	680-68F
30	G	290-29F	490-49F	690-69F
31	G	2A0-2AF	4A0-4AF	6A0-6AF
32	G	2B0-2BF	4B0-4BF	6B0-6BF
33	DCAs			
34				
35	DCAs			
36				

Figure 1-9 on page 20 shows the physical layout of the I/O drawer, with the I/O slots and the I/O domains. The assignment of slots to domains in each I/O drawer is identified in Table 1-8.

Table 1-8 I/O domain assignment in I/O drawer

I/O domains	I/O slots in domain
0 (A)	2, 5, 8, and 10
1 (B)	3, 4, 7, and 11

If the Power Sequence Control (PSC) feature is ordered, the PSC24V card is always plugged into slot 11 of the first I/O drawer. Installing the PSC24V card is always disruptive.

Note: IBM intends that the z196 server will be the last high-end server to support the Power Sequence Control feature.

I/O slot 9 contains the IFB-MP card used for IFB connections. Two IFB connections are always provided to allow redundant I/O interconnect (Figure 1-9).

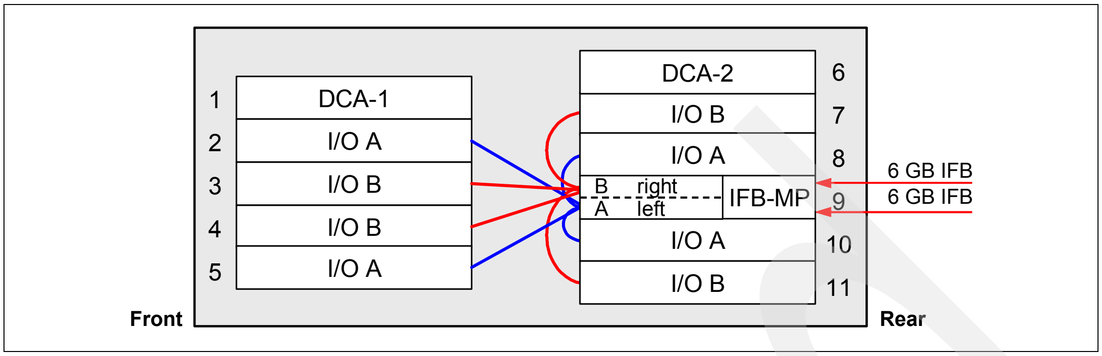


Figure 1-9 z196 I/O drawer

The PCHID number range for each I/O card is determined by the physical location of the I/O card in an I/O drawer. The physical location of I/O drawers is shown in Figure 1-7 on page 15. Table 1-9 lists the PCHID number range for each I/O slot in each I/O drawer.

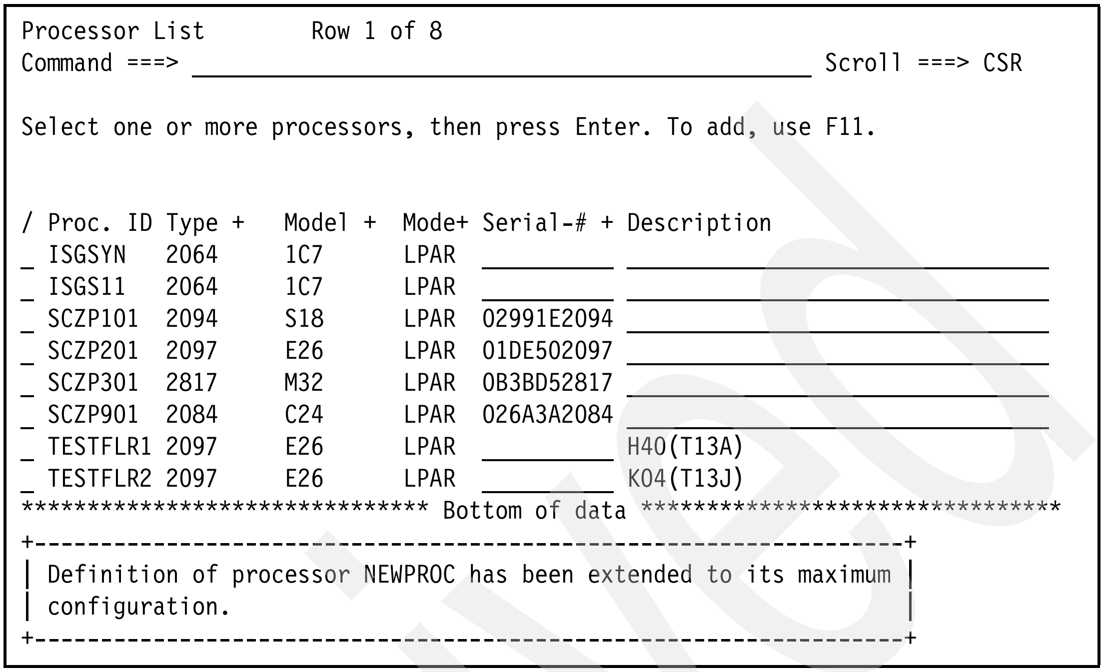
Table 1-9 PCHIDs address range per I/O drawer and I/O slot

I/O slot #	I/O domain	PCHID					
		Drawer 1	Drawer 2	Drawer 3	Drawer 4	Drawer 5	Drawer 6
2	A	580-58F	500-50F	380-38F	300-30F	180-18F	100-10F
3	B	590-59F	510-51F	390-39F	310-31F	190-19F	110-11F
4	B	5A0-5AF	520-52F	3A0-3AF	320-32F	1A0-1AF	120-12F
5	A	5B0-5BF	530-53F	3B0-3BF	330-33F	1B0-1BF	130-13F
7	B	5C0-5CF	540-54F	3C0-3CF	340-34F	1C0-1CF	140-14F
8	A	5D0-5DF	550-55F	3D0-3DF	350-35F	1D0-1DF	150-15F
10	A	5E0-5EF	560-56F	3E0-3EF	360-36F	1E0-1EF	160-16F
11	B	5F0-5FF	570-57F	3F0-3FF	370-7F	1F0-1FF	170-17F

1.5 The definition for multiple CSSs and the third subchannel set

This section explains the new IODF definition for the z196 processor. For more information, see *Hardware Configuration Definition Planning,* GA22-7525 and *Input/Output Configuration Program User’s Guide for ICP IOCP,* SB10-7037.

When the definition of a new processor of type 2817 is added by HCD, the maximum number of logical partitions is automatically generated in IODF. See the message in Figure 1-10.

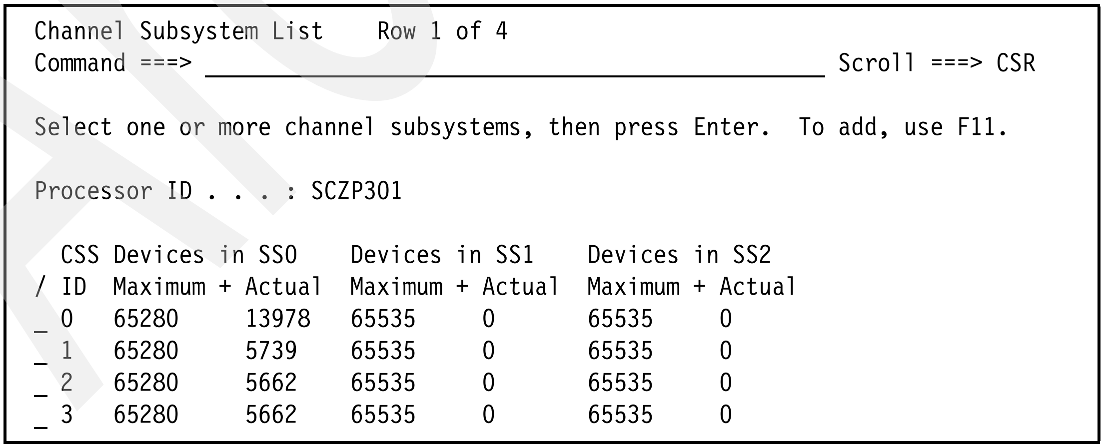


```
Processor List       Row 1 of 8
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
******************************* Bottom of data ********************************
+-------------------------------------------------------------------+
| Definition of processor NEWPROC has been extended to its maximum |
| configuration.                                                    |
+-------------------------------------------------------------------+
```

Figure 1-10 HCD: Add a new z196 processor

Figure 1-11 shows the channel subsystem list after a new 2817 processor is defined. The z196 supports the maximum of four CSSs in a processor and three subchannel sets for each CSS. You notice that three subchannel sets are defined in each channel subsystem, which is the maximum number supported, as follows:

- The maximum number of devices is 65280 per CSS for Subchannel set 0.
- The maximum number of devices is 65535 per CSS for Subchannel set 1.
- The maximum number of devices is 65535 per CSS for Subchannel set 2.

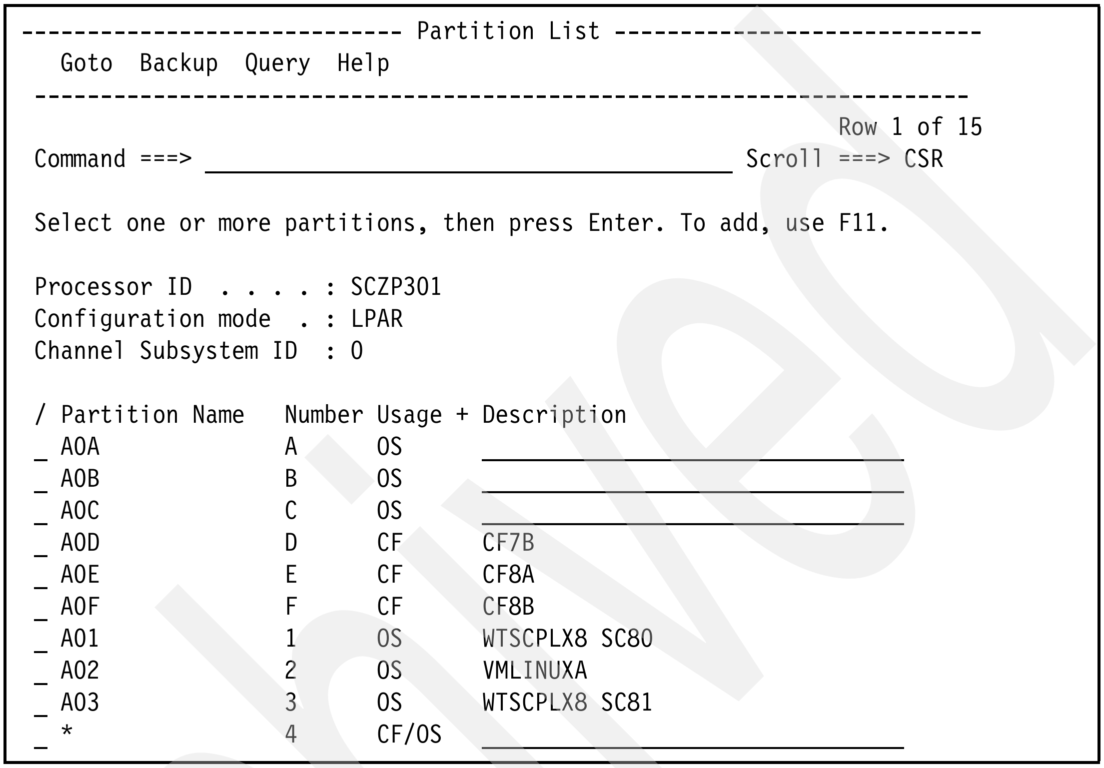


```
Channel Subsystem List    Row 1 of 4
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID . . . : SCZP301

  CSS Devices in SS0    Devices in SS1    Devices in SS2
/ ID  Maximum + Actual  Maximum + Actual  Maximum + Actual
_ 0   65280     13978   65535     0       65535     0
_ 1   65280     5739    65535     0       65535     0
_ 2   65280     5662    65535     0       65535     0
_ 3   65280     5662    65535     0       65535     0
```

Figure 1-11 Channel subsystem list after defining a new z196 processor

Each CSS can have a maximum of 15 logical partitions defined, so a z196 system can have up to 60 logical partitions, including reserved logical partitions.

Figure 1-12 shows the partition list in a channel subsystem. Initially, all 15 LPARs supported by a CSS are assigned as “reserved”. This means that all numbers (between x'1' and x'F') of the partition in each channel subsystem are already defined as “reserved.” This is indicated by an asterisk (*) in the partition name field. The asterisk ensures that the CSS treats this logical partition as a reserved logical partition. This allows dynamic activation of an LPAR.



```
----------------------------- Partition List -----------------------------
   Goto  Backup  Query  Help
 -----------------------------------------------------------------------
                                                             Row 1 of 15
 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP301
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 0

 / Partition Name   Number Usage + Description
 _ A0A              A      OS      ________________________________
 _ A0B              B      OS      ________________________________
 _ A0C              C      OS      ________________________________
 _ A0D              D      CF      CF7B
 _ A0E              E      CF      CF8A
 _ A0F              F      CF      CF8B
 _ A01              1      OS      WTSCPLX8 SC80
 _ A02              2      OS      VMLINUXA
 _ A03              3      OS      WTSCPLX8 SC81
 _ *                4      CF/OS   ________________________________
```

Figure 1-12 Partition list after defining a new z196 processor

The partition usage is also defined at this point as CF/OS (that is, partition number 4), which means that these reserved logical partitions can be used as an operating system, Coupling Facility, or Linux® logical partition.

During the initial configuration setup (the definition of the new z196 processor) in HCD, change only the definitions for the number of partitions with which you want to work.

The reserved logical partitions can only be seen as definitions in HCD or HCM, or in the IOCP deck produced by HCD. The Resource Partition statement in IOCP shows the reserved partitions with * in the name field. Space is allocated in the HSA. Of course, the reserved logical partition is not visible yet on the Contents of CPC in the HMC.

Note that in the IOCP deck produced by HCD, the RESOURCE PARTITION statement shows the reserved partitions with * in the name field, as shown in Figure 1-13. The sample extract of an IOCP shows that there are “reserved” partitions in CSS1, CSS2, and CSS3.

```
ID    MSG1='IODF49',MSG2='ZHW05.IODF49 - 2010-06-22 11:38',   *
      SYSTEM=(2817,1),LSYSTEM=SCZP301,                        *
      TOK=('SCZP301',008000013BD52817113832040110173F00000000,*
      00000000,'10-06-22','11:38:32','ZHW05','IODF49')
RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
      0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
      06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1E,E),(A1F,F),(*
      A11,1),(A12,2),(*,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
      ,(*,A),(*,B),(*,C),(*,D)),(CSS(2),(A21,1),(*,2),(*,3),(**
      ,4),(*,5),(*,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D*
      ),(*,E),(*,F)),(CSS(3),(A31,1),(*,2),(*,3),(*,4),(*,5),(*
      *,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,*
      F)))
```

Figure 1-13 Sample extract of IOCP deck

> **Note:** IOCP ignores the MAXDEV keyword on the RESOURCE statement for a z10 and a z196 and always reserves the maximum number of subchannel sets and subchannels.

Refer to Chapter 10, “Reserved logical partitions” on page 477 for detailed information about how to manage reserved logical partitions.

1.6 Activation

No single component or single part of the CPC completely defines the channel subsystem on the z196. It should be seen more like an architected construct that comprises many CPC resources, both hardware or IBM licensed internal code (LIC). These resources work together to support I/O operations across the CPC: I/O queuing, de-queuing, priority management, and identification of all I/O operations performed by logical partitions.

During initialization of the server, Channel Subsystem rules are enforced. Initialization of the server includes definition and activation of the logical partitions. The activation steps are as follows:

1. Reset the profile to activate the z196 CPC.
   - Build the CSS HSA contents based on the I/O configuration definition in the selected IOCDS.
   - Initialize all defined channel types.
   - Initialize FICON and ESCON links.
2. Activate the required logical partitions (Image Profile).
   - Initialize the logical partition per the logical partition image profile.
   - Assign storage to the logical partition; the storage is never shared with other logical partitions.
   - For FICON and ESCON channels, establish logical paths.

3. Load the initial program/load (Load Profile or Manual Load).
   - Perform an I/O system reset for the logical partition for all defined channel paths. The operating system starts the required I/O operations.

Dynamic addition or deletion of a logical partition

All logical partitions within a CSS are reserved by HCP/IOCP. The HSA for the z196 server is now a separately reserved area of memory outside of customer purchased memory. It is no longer required to plan for reserving space for future additional definitions in the Input/Output Configuration Data Set (IOCDS) or to do a power-on reset (POR) to support these HSA activities.

When the definition of a new processor with 2817 type is added by HCD, the maximum number of logical partitions, channel subsystems, and subchannel sets is automatically generated in the IODF. A detailed example of reserved logical partitions is provided in Chapter 10, “Reserved logical partitions” on page 477.

2

Configuration planning

In this chapter, we describe the planning steps to take when you install an IBM zEnterprise 196 (z196). These steps apply whether you are upgrading from an existing server or installing a new z196. We discuss the following topics:

- Tools
  - Resource Link
  - Hardware Configuration Definition
  - Hardware Configuration Manager
  - Input/Output Configuration Program
  - CHPID Mapping Tool
  - Worldwide Port Name tool
  - Other tools
- Hardware Management Console and Support Element Configuration Planning
  - Hardware Management Console Application V2.11.0
  - HMC access
  - Application enhancements
  - Configuration and services
  - Simple Network Management Protocol
  - Remote Support Facility
  - Capacity on Demand
  - ETR Function Removal
  - Connectivity for HMC and the Support Element
- Channel considerations
  - Parallel channels
  - ESCON channels
  - FICON channels
  - Open System Adapter
  - HiperSockets
  - Parallel Sysplex over InfiniBand (PSIFB) links
  - Coupling links
  - Configuration rules

2.1 Tools

This section summarizes the various tools available for the IBM System z platforms. Table 2-1 lists the machine types for the current IBM System z platforms.

Table 2-1 Tools for System z platforms

Server	Abbreviated name	Machine type
IBM zEnterprise 196	z196	2817
IBM System z10 Business Class	z10 BC	2098
IBM System z10 Enterprise Class	z10 EC	2097
IBM System z9 Business Class	z9 BC	2096
IBM System z9 Enterprise Class	z9 EC	2094
IBM eServer zSeries 890	z890	2086
IBM eServer zSeries 990	z990	2084

The examples in this book use tools, such as Hardware Configuration Manager (HCD) and CHPID Mapping Tool (CMT), which refer to the machine type as opposed to server names.

2.1.1 Resource Link

The first step in planning for the installation of the z196 is to access Resource Link™. You need to register with Resource Link by providing a client site number, ID, and a valid email address. Your IBM representative can assist you with this registration process.

After you have an IBM ID, you can customize your profile to accommodate the servers for which you are responsible.

Once you can access Resource Link, you have access to a number of resources and tools that are needed for the installation process, as well as information regarding the z196. A number of tools are available to simplify the installation process of a z196. Even if you have worked with most of them before, be sure to check for the latest versions that are relevant to z196. The tools include the CHPID Mapping Tool and the Coupling Facility Structure Sizer Tool.

Under the Education and Library tab, you will find many information about the IBM System z® family and some online tutorials. Under the Tools tab, you can download the latest frequently used tools or get machine information and configuration.

Resource Link can be found at the following address:

`http://www.ibm.com/servers/resourcelink`

2.1.2 Hardware Configuration Definition

The Hardware Configuration Definition (HCD) is a tool that supplies an interactive dialog to generate the I/O Definition File (IODF) and subsequently the Input/Output Configuration Data Set (IOCDS). We strongly recommend that you use HCD or HCM to generate the I/O configuration, as opposed to writing your own IOCP statements. The validation checking that HCD performs as you enter data helps minimize the risk of errors.

HCD support for the z196 is available on all supported z/OS levels with 2817 DEVICE PSP and z/VM® beginning with Version 5.4. HCD provides the capability to make both dynamic hardware and software I/O configuration changes. For z/OS, HCD is required for Dynamic I/O reconfiguration.

z/OS V1.7[1] HCD with z196 DEVICE PSP or higher is required to support InfiniBand coupling technology. This is required to be able to define CIB type CHPIDs.

z/OS V1.10 HCD with z196 DEVICE PSP or higher is required to support the OSA for zBX management network channel paths (TYPE=OSM) and the OSA for zBX data network channel paths (TYPE=OSX)

2.1.3 Hardware Configuration Manager

Hardware Configuration Manager (HCM) provides a graphical user interface for HCD and its IODF. It also has the ability to define and store more information about the physical hardware to which the IODF is defined.

If your installation requires this feature, or if you prefer to build and maintain the IODFs using this interface, then you will find HCM to be a useful tool.

Note that HCM does not replace HCD, but instead is used in conjunction with HCD and its selected IODF. However, HCM can be used in a stand-alone mode after an IODF is built and the configuration files (`IODF##.HCM` or `IODF##.HCR`) are created on your HCM workstation.

HCM V1.12 SL1 is now available; it introduces some support for the CHPID Mapping tool, which is described in more detail in the following section.

You can get the most updated information about HCM from the Resource Link, found at the following address:

`http://www.ibm.com/systems/z/os/zos/features/hcm/index.html`

2.1.4 Input/Output Configuration Program

ICP IOCP V3.1.0 is required for a z196 server. Though it is possible to define the z196 configuration using only IOCP, we strongly recommend that you use HCD because of its error detection and management features. Using ICP IOCP, it is possible to write an IOCDS in preparation for a CPC upgrade. You can write an IOCDS to a z9 EC or z10 EC, regardless of whether the operating system supports z196:

- In z/OS or VSE, specify the CHECKCPC=NO keyword in the PARM field of the EXEC statement.
- In CMS, use the NOCHKCPC option.
- When using HCD, tell it to build an IOCDS in anticipation of an upgrade.
- To support the OSA for zBX management network channel paths (TYPE=OSM) and the OSA for zBX data network channel paths (TYPE=OSX), you must use ICP IOCP Version 3 Release 1.0 or higher.

The IOCDS cannot be used to power-on reset the CPC until it is upgraded to a z196. You can also write an IOCDS when preparing to upgrade to a z196 from a z9 EC or a z10. This is the recommended way to have an IOCDS ready for your new z196. IOCP can write an IOCDS in

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[1] z/OS V1.7 with the IBM Lifecycle Extension with PTFs. z/OS.e is not supported.

preparation for an upgrade to a CPC for which IBM does not offer an upgrade path. The IOCDS will be unusable on the earlier CPC.

Stand-Alone IOCP

Stand-Alone IOCP programs run in a logical partition (LPAR). If you are moving from a z10 or previous server to a z196 server and you are running an earlier operating system version not supported on a z196 server, you might have to create a stand-alone IOCP for the new environment.

One approach is to upgrade to level of z/OS or z/VM that supports z196 prior to the upgrade, apply the supporting HCD and IOCP PTFs, and follow the guidance in Chapter 4, “Upgrading from an IBM System z9 EC/z10 EC to an IBM zEnterprise 196” on page 135 about writing an IOCDS in anticipation of an upgrade. If you are a z/VM user who does not use HCD or a VSE user, apply the IOCP PTF that supports z196, use IOCP to verify your z196 IOCP input statements, and then write an IOCDS with IOCP using the write regardless option (CHECKCPC=NO parm). If neither of these options are available, the user needs to have access to an operating system that can have the supporting IOCP PTF applied, generate his IOCP statements, verify they are correct using IOCP (WRTCDS=NO parm), then transfer his IOCP input statements to a USB flash drive to be provided to the installation team so they can use it as an input for running a stand-alone IOCP during the installation.

For more details about the changes and requirements for ICP IOCP, refer to *IOCP User’s Guide,* SB10-7037**.**

2.1.5 CHPID Mapping Tool

The CHPID Mapping Tool (CMT) provides a mechanism to map PCHIDs to CHPIDs as required on a z196. The CHPID Mapping Tool is optional, but we strongly recommend that you use the CMT as opposed to manually mapping the PCHIDs onto CHPIDs. Using the CMT provides the best availability recommendations for a particular configuration.

HCD and the CMT

The HCD process flow for a new z196 installation is shown in Figure 2-1.

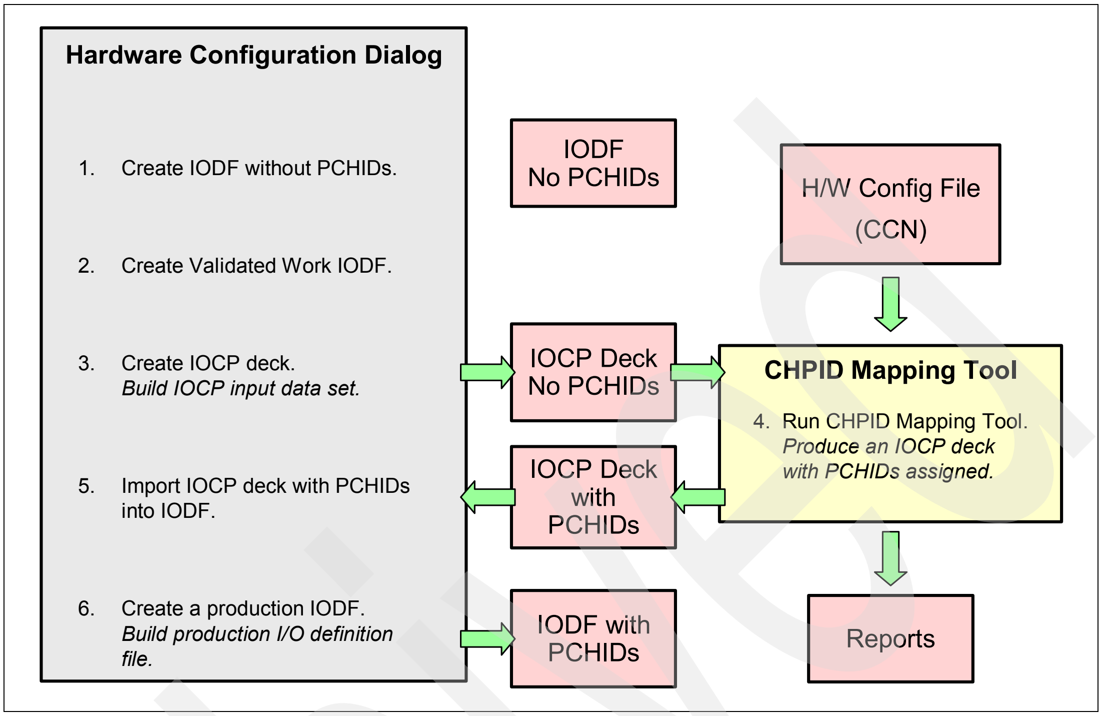

Figure 2-1 Tools: z196 I/O configuration definition flow for a new installation

Note: Figure 2-1 shows a new build process. When doing an upgrade from a z10 or z9, the PCHID values from the z10 or z9 must be retained in the IOCP input to the CHPID Mapping Tool.

To download the CHPID Mapping Tool you must be logged into the Resource Link site, which can be found at the following address:

`https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument`

After the web page opens, select **CHPID Mapping Tool** under the Servers column on the Tools page and perform the following steps:

1. Under Downloads, click **CHPID Mapping Tool**. You can either download the complete CMT program or a file that upgrades an existing CMT program that you might already have installed on your workstation.
2. Click the appropriate link and install or upgrade the CHPID Mapping Tool program.

For more information about this topic, refer to *CHPID Mapping Tool User's Guide,* GC28-6825.

CHPID Mapping Tool support in HCM (without HCD)

HCM for z/OS V1.9[2] interfaces with the CHPID Mapping Tool, which assists in the process of exporting and importing an IODF, and launching the CHPID Mapping Tool. It also creates an IOCP statements file and transfers the file to your workstation and from your workstation back to the host.

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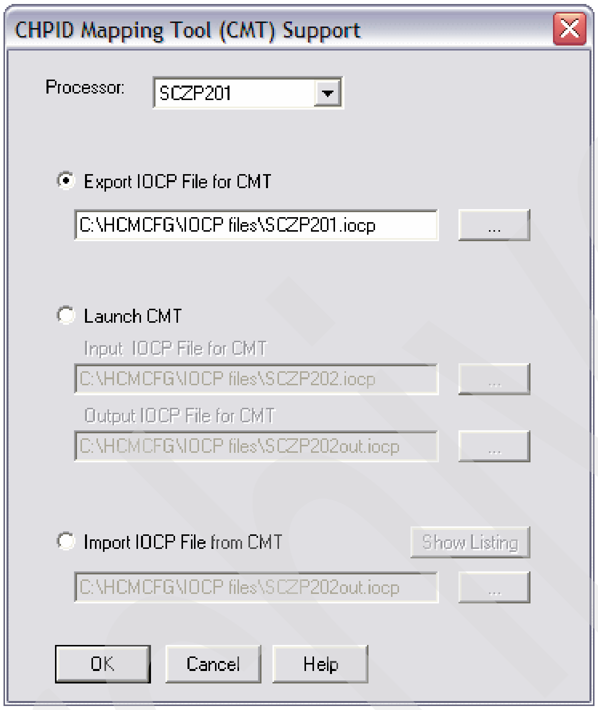
[2] z/OS Version 1 Release 9 with the IBM Lifecycle Extension with PTFs. z/OS.e is not supported.

You need to be logged on to HCM and using the “work” IODF that contains the server that requires processing by the CMT. You also need to have the CHPID Mapping Tool installed on the same workstation.

To use the tool, select **Utilities** → **CHPID Mapping Tool Support**. Figure 2-2 shows the options that you may select:

- Export IOCP File for the CHPID Mapping Tool (CMT)
- Launch the CHPID Mapping Tool (CMT)
- Import IOCP File from the CHPID Mapping Tool (CMT)



Processor: SCZP201

● Export IOCP File for CMT

C:\HCMCFG\IOCP files\SCZP201.iocp

○ Launch CMT

Input IOCP File for CMT: C:\HCMCFG\IOCP files\SCZP202.iocp

Output IOCP File for CMT: C:\HCMCFG\IOCP files\SCZP202out.iocp

○ Import IOCP File from CMT

C:\HCMCFG\IOCP files\SCZP202out.iocp

Figure 2-2 CHPID Mapping Tool Support

Note: Always check IBM Resource Link website to verify that you have the latest version of the CHPID Mapping Tool installed. You can find this link at the following address:

`https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument`

I/O Configuration Data (Customer Control Number)

The Customer Control Number (CCN) is generated by your IBM Client Representative when building your configuration order. This number is entered into Resource Link to download a CFReport file, which is used as input into the CHPID Mapping Tool. Ensure that you have the most current CCN that incorporates any change that may have been made to your z196 order.

To enter the CCN and download the CFReport, perform the following steps:

1. Go to the following address:

   `https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument`

2. Open the Tools window and, under Servers, Select **CHPID Mapping Tool**.
3. Under Downloads, click **CFReport (I/O Configuration Data)**. The CFReport download page opens and you can enter your Customer Control Number.
4. At the CFReport download page, enter your 8 digit CCN and click **Submit**.
5. You are prompted to save the `nnnnnnnn.CFR` file to your workstation. Save the `nnnnnnnn.CFR` file for later input into the CHPID Mapping Tool.

If you have any problems or require more information, click **Help about CFReport download**.

Availability mapping

When planning and configuring the z196 server, you must plan for maximum server and device availability in the event of a channel failure or multiple channel failures.

To help you configure z196 to ensure maximum availability based on the characteristics of the server, the CHPID Mapping Tool has an Availability Mapping option that assigns channel paths to avoid a single point of failure. You also have the option of switching to manual mapping. In addition, you can map CHPIDs with the availability option and manually make changes afterwards.

When using the availability option, you must first provide a copy of the system's IOCP source. Then, using the CHPID Mapping Tool, you must define priorities for the control units. The CMT can assign CHPIDs to the I/O ports and produce a new CHPID report that has maximum availability. This goal is achieved by distributing channel paths across different channel cards and different Host Channel Adapters (HCAs) or, on earlier generations of servers, the Self Timed Interconnect (STI) links.

When using the availability option within the CMT, you can assign priorities to control units, which is useful when multiple control units provide a common function, for example, multiple OSA control units that attach to the same network, or the control units for the primary and backup operator consoles. Priorities can also direct the CMT pick PCHIDs for certain control units before others.

The PCHIDs are fixed on the z196 and CHPIDs are mapped by the CMT and assigned in the IOCP deck. The output from the CMT consists of tailored reports for your reference and for your IBM service representative.

The CMT will not automatically map AIDs and ports to CIB CHPIDs; you must perform this task manually. However, through the availability function, the CMT provides intersect information if multiple CIB CHPIDs to a control unit are defined on the same HCA.

There is also an IOCP deck with PCHIDs mapped to CHPIDs by CSS. As an output of CMT, the PCHIDs are re-migrated into the validated work IODF that was used to generate the input of the CHPID Mapping Tool.

Note: The IOCP source file that is modified from the CHPID Mapping Tool must be migrated back into HCD. It cannot be used directly by IOCP. Any attempt to use the IOCP source created by the CHPID Mapping Tool in the IOCP program fails.

2.1.6 Worldwide Port Name tool

If you need to plan a Storage Area Network (SAN) environment, IBM provides a stand-alone tool to assist with this planning prior to the installation.

The Worldwide Port Name (WWPN) Prediction Tool for System z Fibre Channel Protocol (FCP) Channels (WWPN Prediction Tool) assists you in preparing configuration files that are required or generated by System z machines when FCP Channels are installed. In particular, this tool helps during the installation of new machines and machine upgrades.

One of the most important configuration parameters are worldwide port names (WWPNs), which uniquely identify physical or virtual Fibre Channel ports. They are typically used in Fibre Channel switches to assign the corresponding ports to zones of a storage area network (SAN) and in storage subsystems to grant access from these ports to specific storage devices, identified by logical unit numbers (LUNs).

The capability of the WWPN Prediction Tool has been extended to calculate and show WWPNs for both virtual and physical ports before system installation.

The tool assigns WWPNs to each virtual Fibre Channel Protocol (FCP) channel/port using the same WWPN assignment algorithms a system uses when assigning WWPNs for channels utilizing N_Port Identifier Virtualization (NPIV). Thus, the SAN can be set up in advance, allowing operations to proceed much faster after the server is installed. In addition, the SAN configuration can be retained instead of altered by assigning the WWPN to physical FCP ports when a FICON feature is replaced.

The WWPN Prediction Tool uses a comma separated value (CSV) file containing the FCP-specific I/O device definitions to create the WWPN assignments that are required to set up the SAN. A binary configuration file that can be imported later by the system is also created. The CSV file can either be created manually or exported from the Hardware Configuration Definition/Hardware Configuration Manager (HCD/HCM).

The WWPN Prediction Tool on z196 (CHPID type FCP) requires:

- z/OS V1.8[3], V1.9[3], V1.10, or V1.11with PTFs, or V1.12
- z/VM V5.4 or V6.1 with PTFs

The WWPN Prediction Tool is available for download at Resource Link and is applicable to all FICON channels defined as CHPID type FCP (for communication with SCSI devices) on z196. You can access the tool at the following address:

`https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/wwpnMain?OpenDocument&pathID=`

New machine installation

The WWPN Prediction Tool can be used to create WWPN assignments before the machine installation, independent from the System z machine on which these assignments will be used later, provided that the I/O configuration definition for this target machine is already known.

The WWPN Prediction Tool creates an NPIV SAN configuration file and an NPIV system configuration file. The NPIV SAN configuration file is a comma separated value file, which can be used to set up Fibre Channel switches and storage controllers. The NPIV system configuration file must be imported on your System z machine when it becomes available.

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[3] With the IBM Lifecycle Extension with PTFs. z/OS.e is not supported.

After the next (or initial) power-on reset of that machine, the information from this NPIV system configuration file is used to access FCP SANs and devices.

HCD input to WWPN

To use the WWPN Prediction Tool, perform the following steps:

1. Create the input file by using the HCD (see Figure 2-4 on page 34) or manually.
2. Provide the I/O serial number of the target System z machine (from Resource Link or from the Support Element).

   The I/O Serial Number defines the first bytes of each WWPN assigned to a virtual Fibre Channel port on System z machines. You can obtain the I/O Serial Number for your machine from IBM Resource Link at the following address:

   `https://www.ibm.com/servers/resourcelink/chpid.nsf/WebWWPNKey?OpenForm`
3. Provide the FCP I/O device definitions of the target machine, which are provided in an NPIV SAN configuration template.
4. Perform WWPN assignments.
5. Set up your SAN.
6. Import the configuration on to your system (requires a POR).

Figure 2-3 shows the required steps.

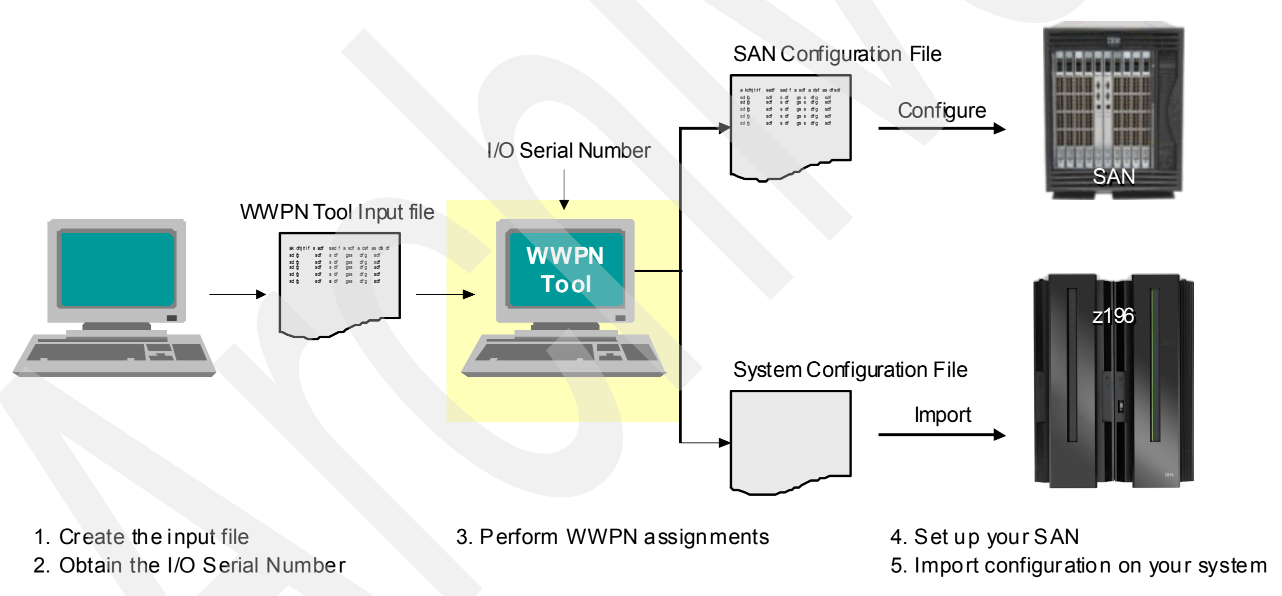


Figure 2-3 WWPN Prediction Tool flow chart for a new installation

HCM input to WWPN

Within HCM, invoke the WWPN Prediction Tool from the Utilities menu, click **Edit Processor**, and specify **WPT**.

In HCM, the WWPN Prediction Tool support dialog offers the following functions:

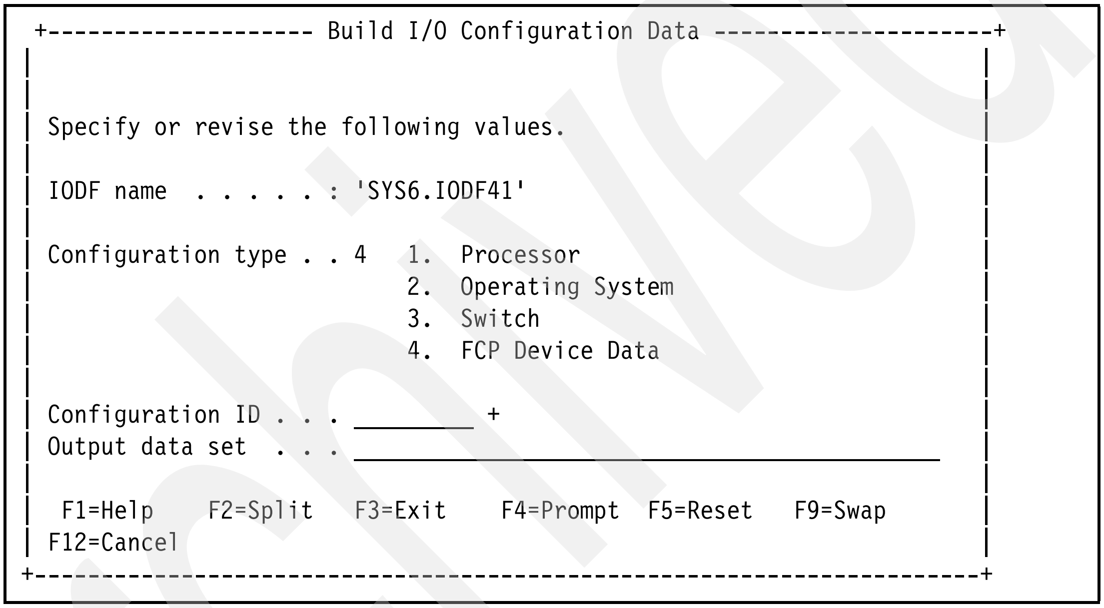
- It exports (downloads) a .csv file of the FCP I/O configuration data of a selected processor from the host (no check on the processor type will be done).
- It launches the WWPN Prediction Tool with the exported file as input. Using the WWPN Prediction Tool, you can assign WWPN values to the CHPID-device paths. A modified .csv file and a binary file are saved on the workstation.

The generated binary file must be transferred to the SE and stored in the HSA during initial microcode load (IML). The .csv file can be used with SAN Manager to set up SAN devices in the fabric. The .csv file may be stored by HCM in any directory. It is usually not needed after invoking the WWPN Prediction Tool, because the tool generates a few files and prompts you about where to store the new file. Refer to the *IBM z/OS Hardware Configuration Definition User's Guide*, SC33-7988 for more information.

Creating the NPIV SAN configuration input file using HCD

The HCD used to generate the input data for the WWPN Prediction Tool must be from z/OS V1.8[4], V1.9[5], V1.10[5], V1.11[6] or V1.12.

On the **Activate or process configuration data** → **Build I/O Configuration Data** panel of the HCD, there is an option (4) named FCP Device Data, which you can use to build an NPIV SAN configuration template output (CSV file) (Figure 2-4).



```
 +-------------------- Build I/O Configuration Data ---------------------+
 |                                                                       |
 |                                                                       |
 | Specify or revise the following values.                               |
 |                                                                       |
 | IODF name  . . . . . : 'SYS6.IODF41'                                  |
 |                                                                       |
 | Configuration type . . 4   1.  Processor                              |
 |                            2.  Operating System                       |
 |                            3.  Switch                                 |
 |                            4.  FCP Device Data                        |
 |                                                                       |
 | Configuration ID . . . ________ +                                     |
 | Output data set  . . . ________________________________________       |
 |                                                                       |
 |  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap       |
 | F12=Cancel                                                            |
+-----------------------------------------------------------------------+
```

Figure 2-4 Output Configuration file by HCD

Creating the NPIV SAN configuration input file manually

For your convenience, you may create the configuration file manually in a CSV file, or add further information to the statements of an NPIV SAN configuration file, in particular information related to your installation (Figure 2-5).

```
partitionName,cssId,iid,chpidId,ssId,deviceNumber,wwpn,npiv mode,current
configured,pchid
CF01        ,0    ,0c ,11     ,0   ,3200       ,    ,        ,               ,01c0
CF01        ,0    ,0c ,11     ,0   ,3201       ,    ,        ,               ,01c0
CF01        ,0    ,0c ,11     ,0   ,3202       ,    ,        ,               ,01c0
```

Figure 2-5 Create configuration file manually

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[4] With the IBM Lifecycle Extension with APAR OA28078

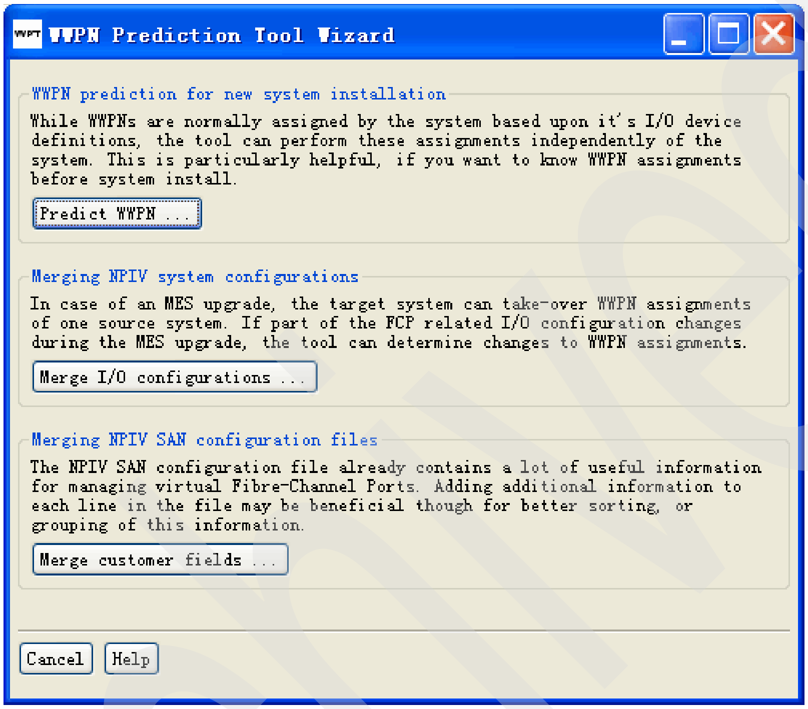
[5] With APAR OA28078

WWPN Prediction Tool steps

The WWPN Prediction Tool is a Java™ based stand-alone tool that runs on any Windows® or Linux based workstation or mobile computer. After you run it, a window with three options (Figure 2-6) opens.

Perform the following steps:

1. For a new installation, click **Predict WWPN** or select **Action** → **New machine installation**.



WWPN prediction for new system installation

While WWPNs are normally assigned by the system based upon it's I/O device definitions, the tool can perform these assignments independently of the system. This is particularly helpful, if you want to know WWPN assignments before system install.

Merging NPIV system configurations

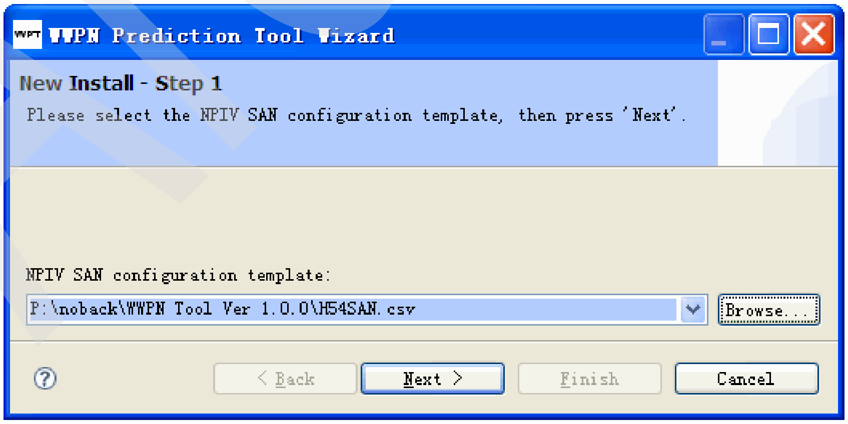
In case of an MES upgrade, the target system can take-over WWPN assignments of one source system. If part of the FCP related I/O configuration changes during the MES upgrade, the tool can determine changes to WWPN assignments.

Merging NPIV SAN configuration files

The NPIV SAN configuration file already contains a lot of useful information for managing virtual Fibre-Channel Ports. Adding additional information to each line in the file may be beneficial though for better sorting, or grouping of this information.

Figure 2-6 WWPN Prediction Tool Wizard window

2. Enter the NPIV SAN configuration, input file directory, and name and I/O Serial Number from Resource Link (Figure 2-7) by browsing to the NPIV SAN configuration template, selecting it, and click **Next**.



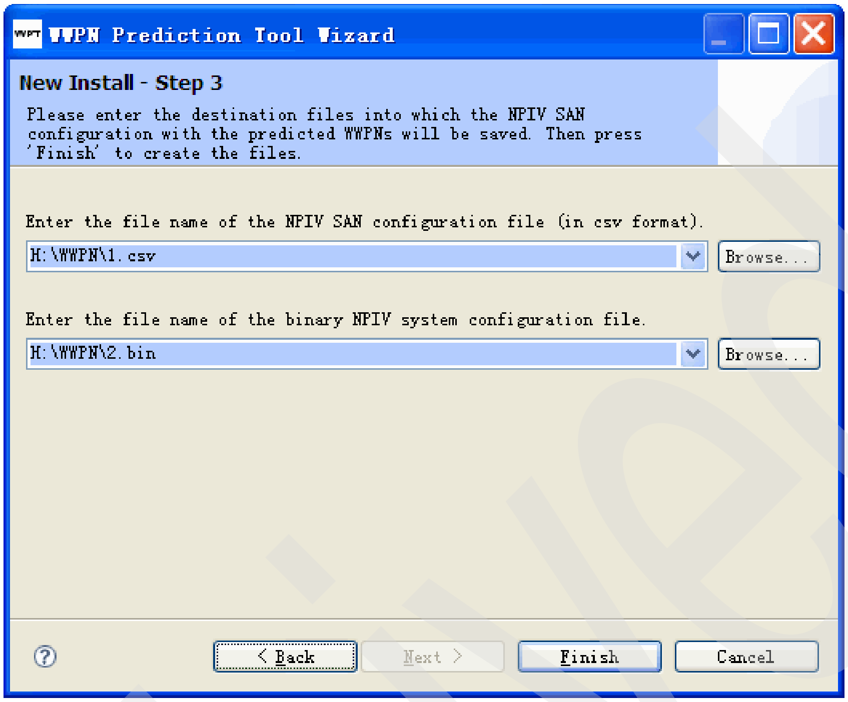
New Install - Step 1

Please select the NPIV SAN configuration template, then press 'Next'.

NPIV SAN configuration template: P:\noback\WWPN Tool Ver 1.0.0\H54SAN.csv

Figure 2-7 WWPN Prediction Tool input for New Install

3. Enter the file name of the NPIV SAN configuration file (in .csv format) and the file name of the binary NPIV system configuration file (Figure 2-8). Click **Finish**.



New Install - Step 3

Please enter the destination files into which the NPIV SAN configuration with the predicted WWPNs will be saved. Then press 'Finish' to create the files.

Enter the file name of the NPIV SAN configuration file (in csv format).

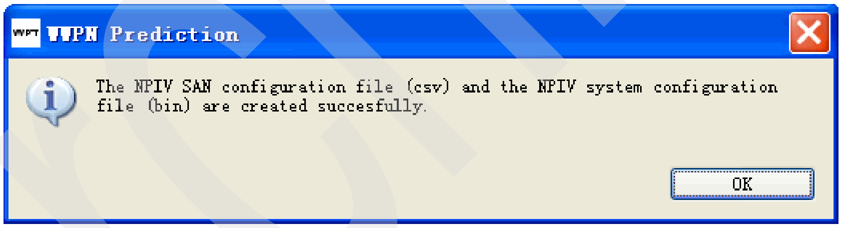
H:\WWPN\1.csv

Enter the file name of the binary NPIV system configuration file.

H:\WWPN\2.bin

Figure 2-8 WWPN Prediction Tool output for New Install

4. A message window opens and indicates that the configuration files were created successfully (Figure 2-9).



The NPIV SAN configuration file (csv) and the NPIV system configuration file (bin) are created succesfully.

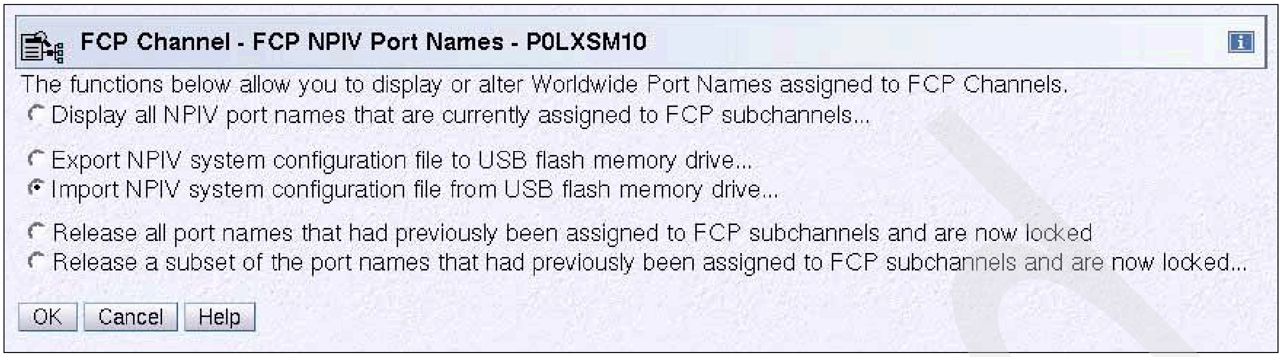
Figure 2-9 WWPN Prediction Tool creation successful

Importing the configuration on to your target machine

To import the configuration on to your target machine, perform the following steps:

1. Log on to the HMC in SYSPROG mode and initiate Single Object Operations to the SE to import the configuration on your target machine.

2. Select **FCP Configuration** → **Import NPIV system configuration file from USB flash drive** (Figure 2-10).



FCP Channel - FCP NPIV Port Names - P0LXSM10

The functions below allow you to display or alter Worldwide Port Names assigned to FCP Channels.

○ Display all NPIV port names that are currently assigned to FCP subchannels...

○ Export NPIV system configuration file to USB flash memory drive...

● Import NPIV system configuration file from USB flash memory drive...

○ Release all port names that had previously been assigned to FCP subchannels and are now locked

○ Release a subset of the port names that had previously been assigned to FCP subchannels and are now locked...

Figure 2-10 Import the NPIV System configuration file to SE

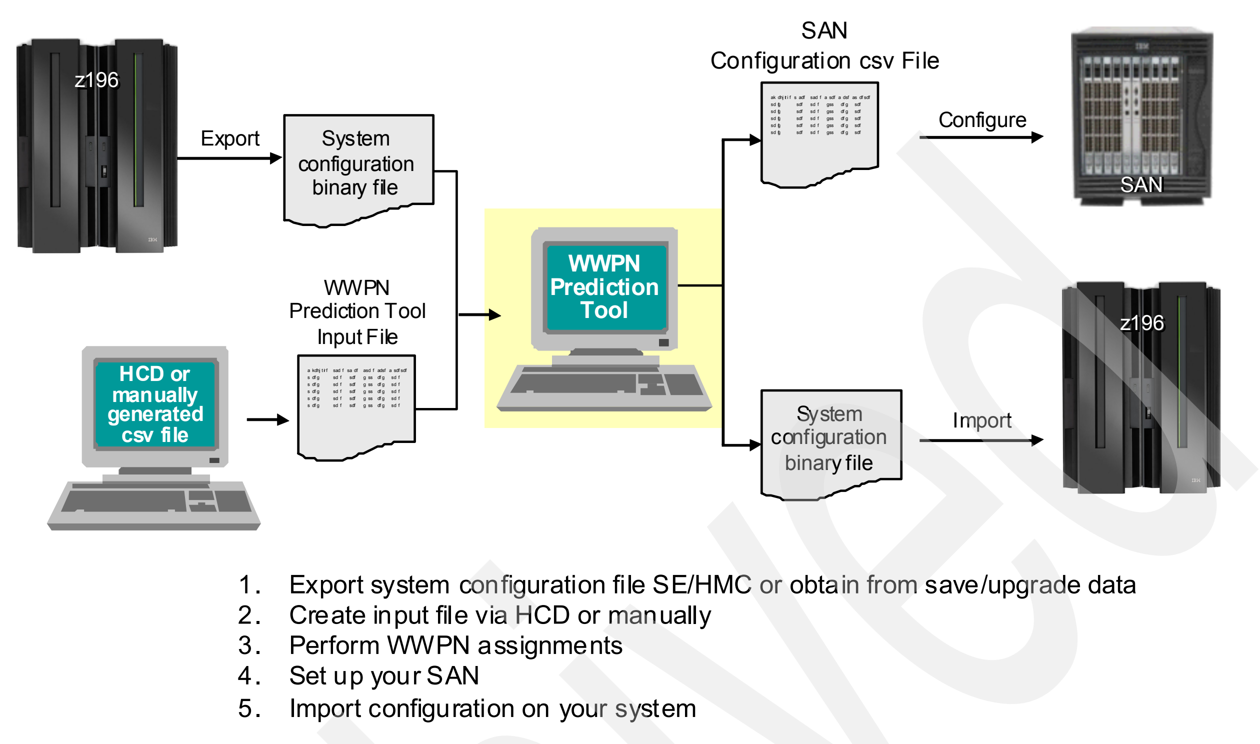
Your System z machine requires a power-on reset after importing an NPIV system configuration file. If you need to import an NPIV system configuration file on a machine that is already has completed a power-on reset, you need to disable the dynamic channel subsystem for the machine before you can import the NPIV system configuration file.

Note: Because the import of the NPIV system configuration file requires the disabling of dynamic channel subsystem capabilities, the import should be done just prior to performing the power-on reset.

Merging an I/O configuration or Miscellaneous Equipment Specification upgrade

There are other functions of the WWPN Prediction Tool to merge an I/O configuration or an Miscellaneous Equipment Specification (MES) upgrade for the existing machine. These functions require the existing NPIV system configuration file (.bin file) that is output from the SE (Figure 2-10).

Figure 2-11 shows how to accomplish this task.



1. Export system configuration file SE/HMC or obtain from save/upgrade data
2. Create input file via HCD or manually
3. Perform WWPN assignments
4. Set up your SAN
5. Import configuration on your system

Figure 2-11 WWPN Prediction Tool flow chart for merging an I/O configuration or MES

Note: Restore Upgrade Data overwrites the NPIV system configuration file. The importation thus needs to be done after performing the Restore Upgrade Data.

2.1.7 Other tools

There are other tools which may also be important and useful when you plan a new installation or MES.

Coupling Facility Structure Sizer

The Coupling Facility Structure Sizer (CFS) tool is used to monitor various aspects of Coupling Facility partitions. It is useful for gathering information about structure sizes, usage, potential bottlenecks, and coupling link availability.

Using the Coupling Facility Structure Sizer enables you to plan the amount of storage that needs to be allocated for Coupling Facility partitions more accurately.

Open System Adapter/Support Facility

The Open Systems Adapter Support Facility (OSA/SF) is an application that helps you customize and manage your OSA-Express features. It also allows you to obtain status and operational information about the HCD-defined OSA-Express features and assists in problem determination. OSA/SF is required to configure the OSA-Express features for non-QDIO mode and can be used to configure MAC addresses and speeds for QDIO mode.

Processor Capacity Reference

Processor Capacity Reference (zPCR) is a PC-based productivity tool that runs under Windows. It is designed to provide capacity planning insight for IBM System z processors running various workload environments under z/OS, z/VM, and Linux. Capacity results are based on IBM LSPR data supporting all IBM System z processors and LSPR data.

Power Estimation Tool

This tool estimates the power consumption for the specified configuration. The object of the tool is to produce an estimate of the power requirements to aid you in planning for your machine installation.

Machine information

Machine information is a set of reports based on data that the machine sends to IBM as part of its IBM maintenance agreement.

To access any of the machine information, you need to have your IBM ID authorized, which can be done by clicking **Register for machine information** on the Machine information web page found at the following address:

https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/machineinformation?OpenDocument

Perform the following steps:

1. Under Servers in the Tools window, click **Machine information**.
2. Click **View all machines**.

If none of your servers are accessible, then you need to request access from your IBM Customer Representative. Profiling is done against your Customer Number, so be sure that you have it available before you register for Machine information.

If your IBM ID is registered with your Customer Name and Number, then you are presented with a list of servers that have been profiled against your Customer Number. Click the Serial Number of the server about which you are inquiring.

Reports that are available include information about Customer data, System status, Engineering Change (EC)/Microcode Change Level (MCL), and CHPIDs.

Table 2-2 provides references to more detailed descriptions of the tools.

Table 2-2 IBM website links for the tools

Tool	Internet address for more information
HCD	http://www.ibm.com/systems/z/os/zos/zos_elefeat.html
HCM	
CMT	https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain?Opendocument
CFS	http://www.ibm.com/systems/z/cfsizer/
z/PCR	http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381
OSA/SF	http://www.ibm.com/systems/z/os/zos/zos_elefeat.html
Power Estimation Tool	https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/powerestimationmain?OpenDocument

Tool	Internet address for more information
WWPN Prediction Tool	`https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/wwpnMain?OpenDocument&pathID=`
Machine Information	`https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/machineinformation?OpenDocument`

IBM Configurator for e-business (e-Config)

The e-Config tool is available to your IBM representative. It is used to design and generate new configurations (CFReports) or upgrades to an existing configuration. It also maintains information about installed features for those configurations.

Reports generated from e-Config are helpful in understanding what changes are being made for a system upgrade, what PCHIDs have been ordered (PCHID reports), and how the final configuration appears.

2.2 Hardware Management Console and Support Element Configuration Planning

The Hardware Management Console (HMC) communicates with each central processing complex (CPC) through the CPC's support element (SE). When tasks are performed at the Hardware Management Console, the commands are sent to one or more support elements, which then issue commands to their CPCs. CPCs can be grouped at the Hardware Management Console so that a single command can be passed along to as many as all of the CPCs defined to the Hardware Management Console. One Hardware Management Console can control up to 100 support elements and one support element can be controlled by 32 Hardware Management Consoles.

2.2.1 Hardware Management Console Application V2.11.0

The z196 server comes with a new version (Version 2.11.0) of the Hardware Management Console (HMC) and will support up to two 10/100/1000 MB Ethernet LANs. 1 GB LAN support is optional. Table 2-3 shows the HMC version history.

Table 2-3 HMC and SE: System z HMC version history

Machine family	Machine type	Firmware driver	Version
z196	2817	86	2.11.0
z10 BC	2098	79	2.10.0
z10 EC	2097	79	2.10.0
z9 BC	2096	67	2.9.2
z9 EC	2094	67	2.9.2
z890	2086	55	1.8.2
z990	2084	55	1.8.2
z800	2066	3G	1.7.3
z900	2064	3G	1.7.3

2.2.2 HMC access

Starting with HMC Version 2.11.0, the Hardware Management Console application offers only one type of access called full function remote access. This single type of access provides the full complement of tasks and functions to all users.

If you need occasional monitoring and control of managed objects connected to a single local Hardware Management Console, then a web browser is a good choice. An example of using a web browser might be off-hours monitoring from home by an operator or system programmer.

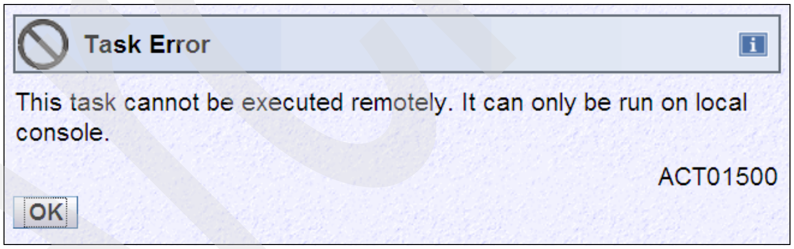
Each Hardware Management Console contains a web server that can be configured to allow remote access for a specified set of users. If a customer firewall exists between the web browser and the local Hardware Management Console, use the ports shown in Table 2-4 so that the web browser can communicate to a Hardware Management Console.

Table 2-4 HMC and SE: Port Numbers for HMC communication

Port	Usage
TCP 443	Secure browser to web server communication
TCP 9960	Browser applet communication
TCP 9950-9959	Proxy support for Single Object Operation

Using an HTML-based user interface and a supported web browser, a remote user operates in exactly the same manner as a local user working at the HMC itself.

Note that even though the same user interface is used locally and remotely, the sets of tasks available to local and remote users are not completely identical. For example, the Format Media task is only available to a local user, because it involves inserting the media into a physical HMC drive. This task is not available to a remote user in tree style. However, if you are using the classic style, an error will result (Figure 2-12).



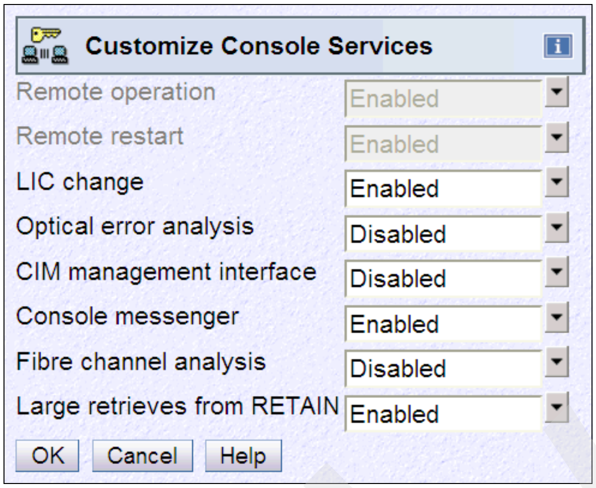
This task cannot be executed remotely. It can only be run on local console.

ACT01500

Figure 2-12 HMC and SE: Task Error message

Customize console services

While global enablement of remote access is controlled through the Customize Console Services task, as shown in Figure 2-13, individual user level remote access enablement is managed using the user profiles console actions task shown in Figure 2-14 on page 43.



Remote operation	Enabled
Remote restart	Enabled
LIC change	Enabled
Optical error analysis	Disabled
CIM management interface	Disabled
Console messenger	Enabled
Fibre channel analysis	Disabled
Large retrieves from RETAIN	Enabled

Figure 2-13 HMC and SE: Customize Console Services

The console services can be customized as follows:

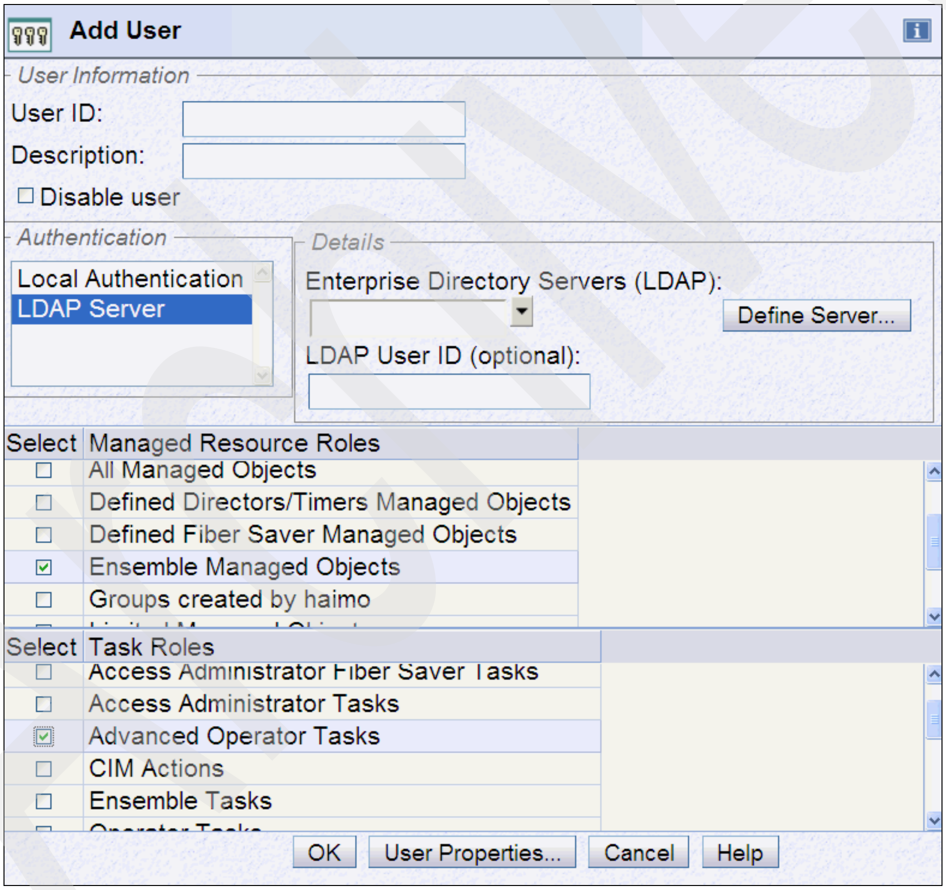
Remote operation	Use this service to control whether this Hardware Management Console can be operated using a web browser from a remote workstation.
Remote restart	Use this service to control whether this Hardware Management Console can be restarted by a user accessing it from a remote workstation. If this service is Disabled, only local users at this Hardware Management Console can use the Shutdown or Restart task.
LIC change	Use this service to control whether this Hardware Management Console provides change management operations for its defined objects and for other Hardware Management Consoles. This option must be enabled for an HMC connected to both the local and remote processors for HCD to be able to write an IOCDS to a processor on which it is not running.
Optical error analysis	Use this service to control whether this Hardware Management Console analyzes and reports optical problems for its defined objects. Optical problems are problems occurring on ESCON or coupling facility channel links.
CIM management interface	Use this service to control whether this Hardware Management Console can be remotely managed using the Common Information Model (CIM) interface.
Console messenger	Use this service to control whether the console messenger facility is active on this Hardware Management Console or not. The console messenger facility allows users of this Hardware Management Console to send and receive instant messages and broadcast messages to other users of this console and remote consoles.

Fibre Channel analysis
Use this service to control whether this Hardware Management Console analyzes and reports Fibre Channel problems.

Large retrieves from RETAIN®
Use this service to control whether this Hardware Management Console can retrieve internal code changes from RETAIN for Engineering Change (EC) streams that are expected to contain a large amount of data.

Customize user profiles

Lightweight Directory Access Protocol (LDAP) support (Figure 2-14) for HMC user authentication allows a HMC to be configured to use an LDAP server to perform user ID and password authentication at logon. The user ID is defined on the HMC along with the roles to be given to the user ID. HMC settings related to the user ID continue to reside on the HMC, and the LDAP directory is used to authenticate the user, thus eliminating the need to store the user ID's password locally. Both SSL and non-SSL connections to the LDAP server are supported.



☐ Disable user

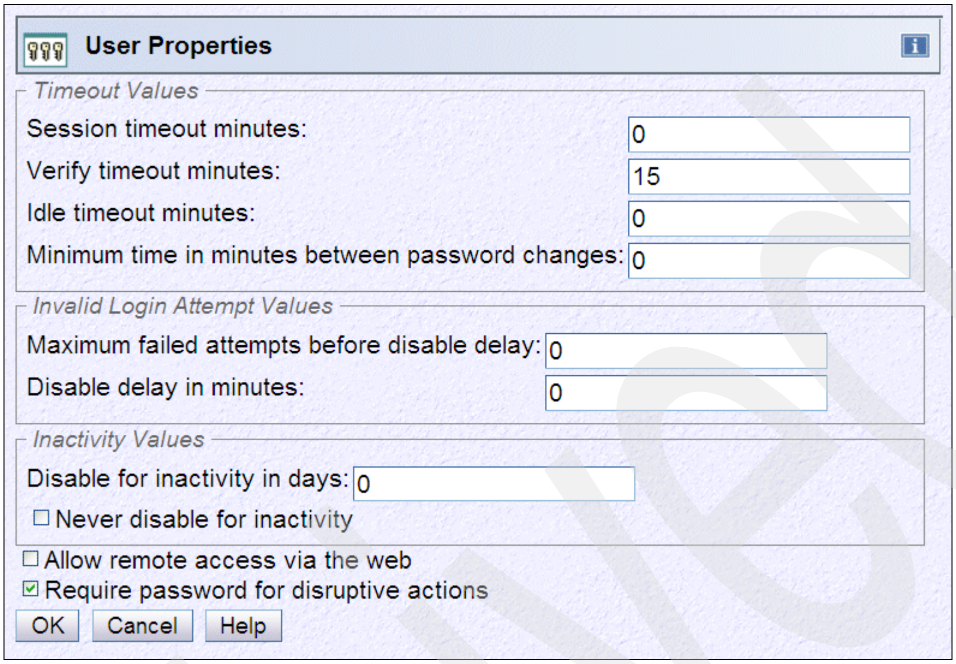
Authentication:
Local Authentication
LDAP Server (selected)

Select	Managed Resource Roles
☐	All Managed Objects
☐	Defined Directors/Timers Managed Objects
☐	Defined Fiber Saver Managed Objects
☑	Ensemble Managed Objects
☐	Groups created by haimo

Select	Task Roles
☐	Access Administrator Fiber Saver Tasks
☐	Access Administrator Tasks
☑	Advanced Operator Tasks
☐	CIM Actions
☐	Ensemble Tasks

Figure 2-14 HMC and SE: User Profiles window

Individual user remote access enablement is accomplished by checking the **Allow remote access via the web** check box on the User Properties window. For a new user profile, this box is clear by default, as shown in Figure 2-15.



Session timeout minutes: 0
Verify timeout minutes: 15
Idle timeout minutes: 0
Minimum time in minutes between password changes: 0
Maximum failed attempts before disable delay: 0
Disable delay in minutes: 0
Disable for inactivity in days: 0
☐ Never disable for inactivity
☐ Allow remote access via the web
☑ Require password for disruptive actions

Figure 2-15 HMC and SE: User Properties window

Network security

Network security is another important concern. To help meet this challenge, the HMC is configured with a firewall to limit network access in and out of the system. By default, no external connections are allowed through the firewall, although modifications to the configuration can be made.

The Customize Network Settings allows a user to alter the firewall setup for a specific set of applications defined by HMC. This is one of the Hardware Management Console Settings tasks, and it is not available to all users without permission.

Because access to the HMC is provided over an HTML-based user interface, current browser-based encryption mechanisms are employed for enhanced security. All remote browser access to HMC must use Secure Sockets Layer (SSL) encryption. Only the local user interface can use non-encrypted access, because that is inherently a secure environment. With SSL encryption required for all remote access to the HMC, a certificate is required to provide the keys used for this encryption. As shipped, the HMC provides a self-signed certificate that allows this encryption to occur.

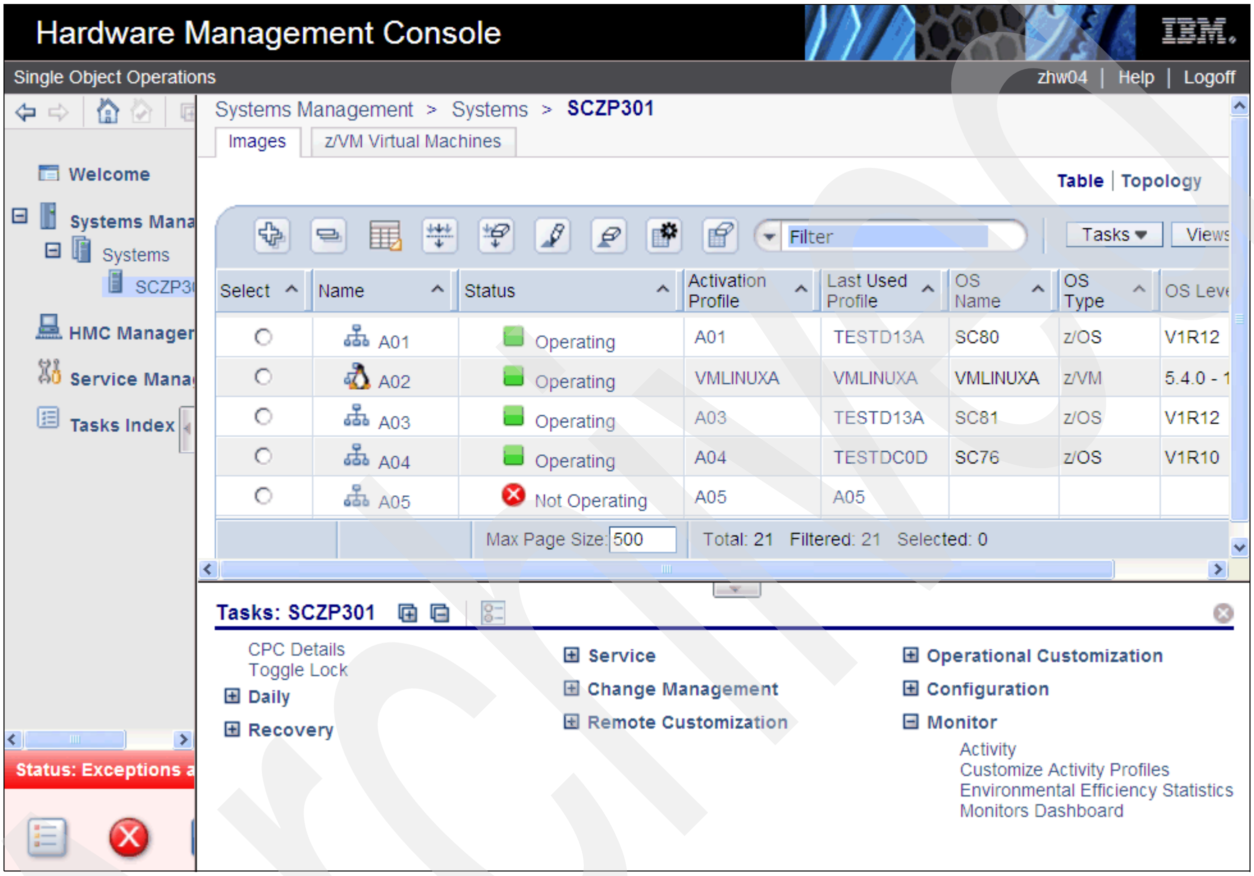
For more details, refer to *Hardware Management Console Operations Guide (V2.11.0)*, SC28-6895.

2.2.3 Application enhancements

We discuss the application enhancements in this section.

New task group

A new task group (*monitor*) was created to hold monitoring related tasks. Some existing tasks (such as Customize Activity Profiles) have been moved to this group, and new tasks are being added, both to HMC and SE (Figure 2-16).



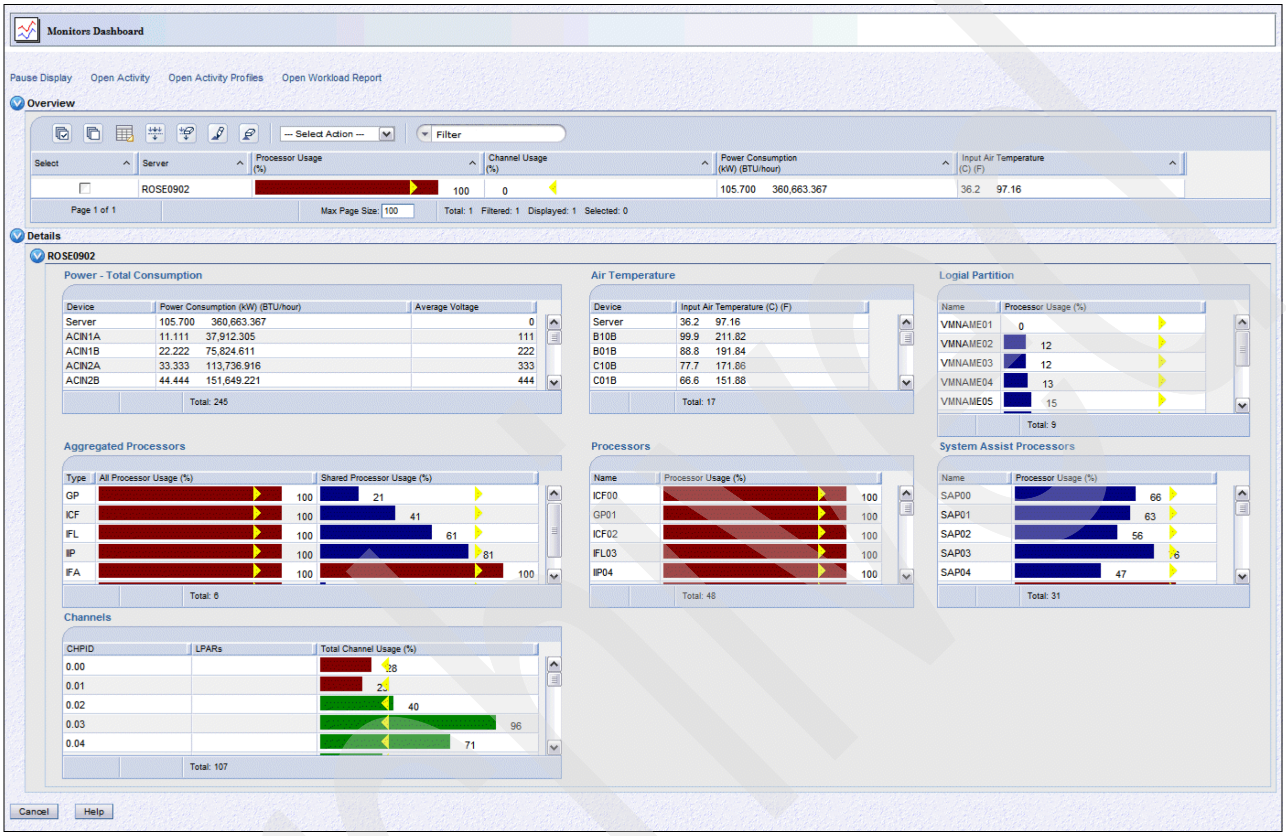
Select	Name	Status	Activation Profile	Last Used Profile	OS Name	OS Type	OS Leve
○	A01	🟩 Operating	A01	TESTD13A	SC80	z/OS	V1R12
○	A02	🟩 Operating	VMLINUXA	VMLINUXA	VMLINUXA	z/VM	5.4.0 - 1
○	A03	🟩 Operating	A03	TESTD13A	SC81	z/OS	V1R12
○	A04	🟩 Operating	A04	TESTDC0D	SC76	z/OS	V1R10
○	A05	✖ Not Operating	A05	A05			

Max Page Size: 500 Total: 21 Filtered: 21 Selected: 0

Figure 2-16 HMC and SE: New Task Group

Monitors Dashboard

The new Monitors Dashboard task (under the new Monitor task group) provides a dashboard-like display to monitor resources. You can view aggregated activity when looking at large configurations or additional details for objects with a smaller scope. This task also supports new graphical ways of displaying data, such as histogram charts of usage history and activity (Figure 2-17).



Overview

Select	Server	Processor Usage (%)	Channel Usage (%)	Power Consumption (kW) (BTU/hour)	Input Air Temperature (C) (F)
☐	ROSE0902	100	0	105.700 360,663.367	36.2 97.16

Page 1 of 1 Max Page Size: 100 Total: 1 Filtered: 1 Displayed: 1 Selected: 0

Power - Total Consumption

Device	Power Consumption (kW) (BTU/hour)	Average Voltage
Server	105.700 360,663.367	0
ACIN1A	11.111 37,912.305	111
ACIN1B	22.222 75,824.611	222
ACIN2A	33.333 113,736.916	333
ACIN2B	44.444 151,649.221	444

Total: 245

Air Temperature

Device	Input Air Temperature (C) (F)
Server	36.2 97.16
B10B	99.9 211.82
B01B	88.8 191.84
C10B	77.7 171.86
C01B	66.6 151.88

Total: 17

Logical Partition

Name	Processor Usage (%)
VMNAME01	0
VMNAME02	12
VMNAME03	12
VMNAME04	13
VMNAME05	15

Total: 9

Aggregated Processors

Type	All Processor Usage (%)	Shared Processor Usage (%)
GP	100	21
ICF	100	41
IFL	100	61
IIP	100	81
IFA	100	100

Total: 6

Processors

Name	Processor Usage (%)
ICF00	100
GP01	100
ICF02	100
IFL03	100
IIP04	100

Total: 48

System Assist Processors

Name	Processor Usage (%)
SAP00	66
SAP01	63
SAP02	56
SAP03	6
SAP04	47

Total: 31

Channels

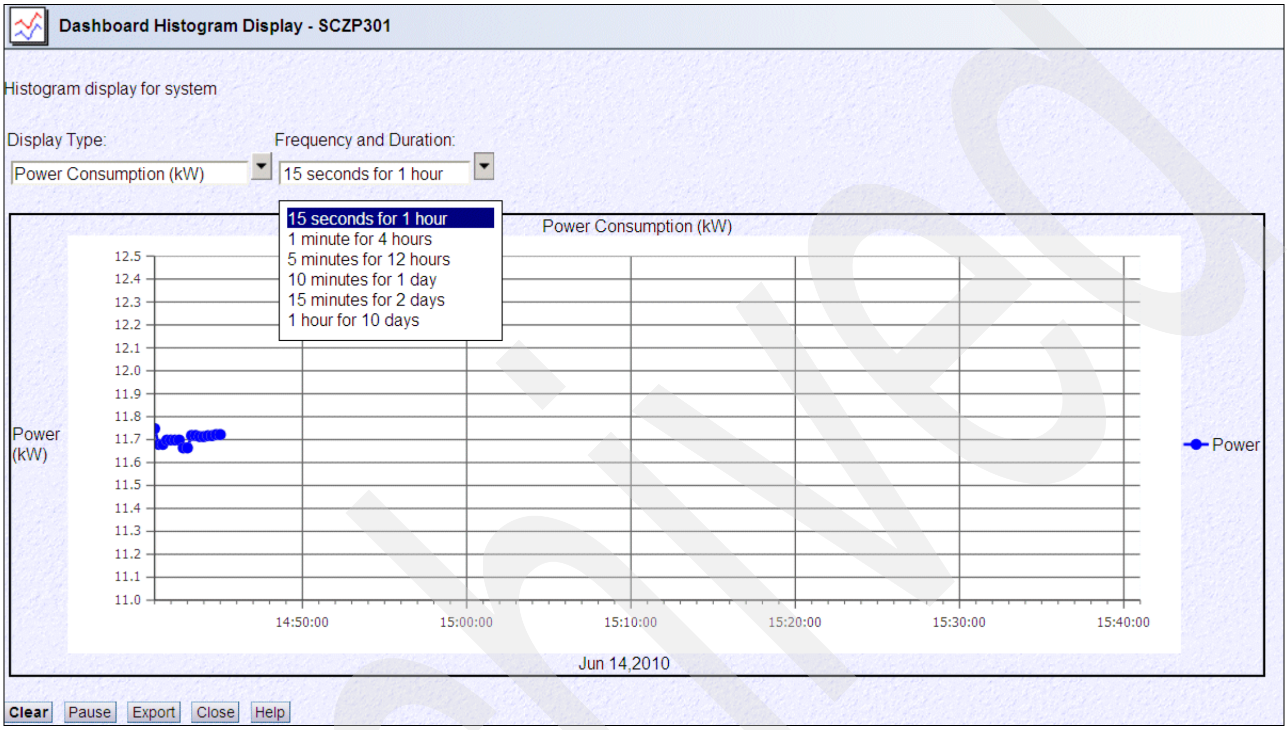
CHPID	LPARs	Total Channel Usage (%)
0.00		28
0.01		23
0.02		40
0.03		96
0.04		71

Total: 107

Figure 2-17 HMC and SE: Monitors dashboard

This dashboard:

- Provides a tree-based view of resources in a System z machine
- Allows a user to view aggregated activity when looking at large configurations
- Allows for more detail for objects with a smaller scope
- Supports new graphical ways of displaying data, such as history charts (Figure 2-18)
- Can be exported to a comma separated value (CSV) file



Dashboard Histogram Display - SCZP301

Histogram display for system

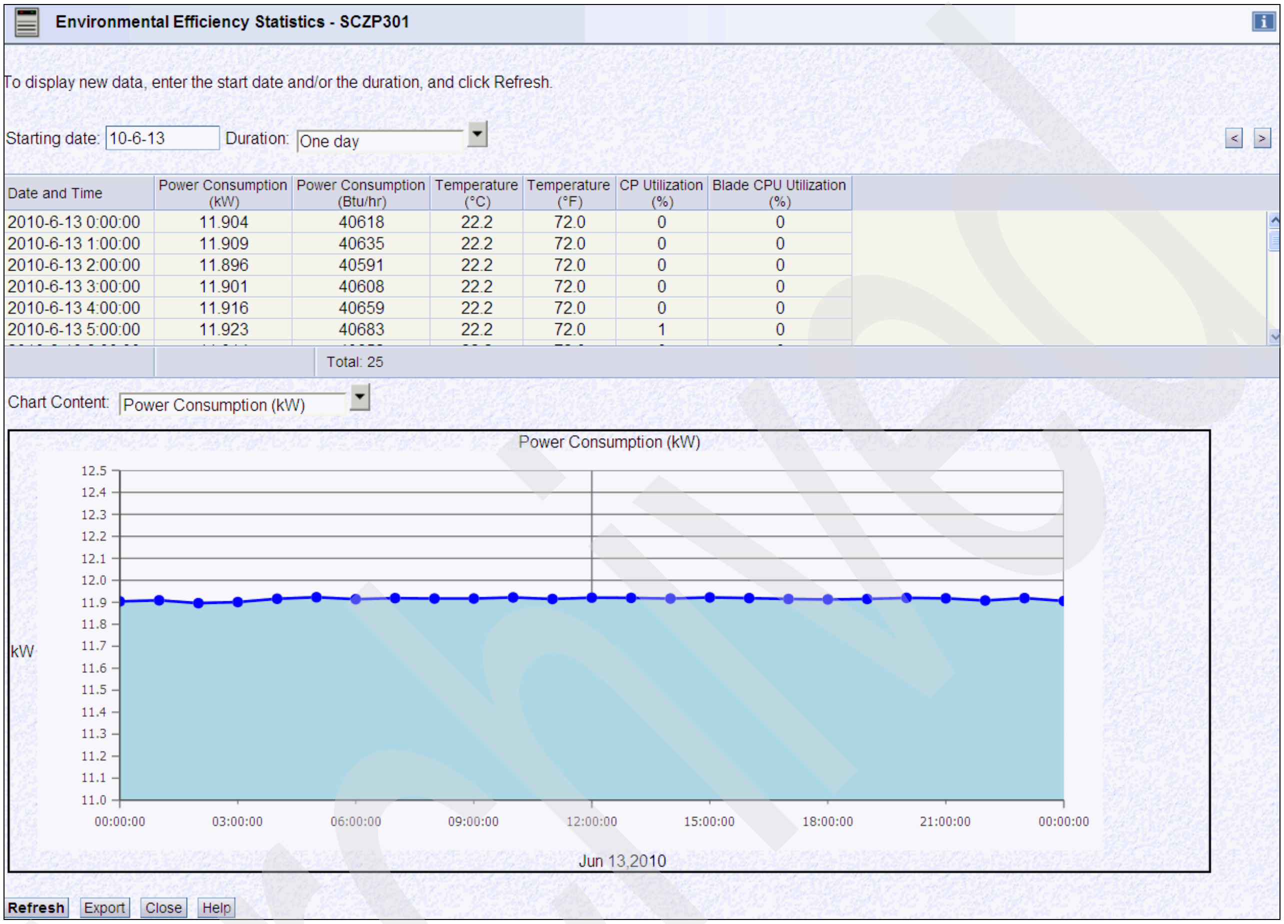
Display Type: Power Consumption (kW)

Frequency and Duration: 15 seconds for 1 hour

Figure 2-18 HMC and SE: Dashboard histogram display

Environmental Efficiency Statistics

There is a new function to show historical power consumption. The data is presented in table form or graphical ("histogram") form for a duration of 1 to 7 days. The data can also be exported to a comma separated value (CSV) file so that it can be imported into customer tools, such as Microsoft® Excel or Lotus® 1-2-3® (Figure 2-19).



To display new data, enter the start date and/or the duration, and click Refresh.

Starting date: 10-6-13 Duration: One day

Date and Time	Power Consumption (kW)	Power Consumption (Btu/hr)	Temperature (°C)	Temperature (°F)	CP Utilization (%)	Blade CPU Utilization (%)
2010-6-13 0:00:00	11.904	40618	22.2	72.0	0	0
2010-6-13 1:00:00	11.909	40635	22.2	72.0	0	0
2010-6-13 2:00:00	11.896	40591	22.2	72.0	0	0
2010-6-13 3:00:00	11.901	40608	22.2	72.0	0	0
2010-6-13 4:00:00	11.916	40659	22.2	72.0	0	0
2010-6-13 5:00:00	11.923	40683	22.2	72.0	1	0

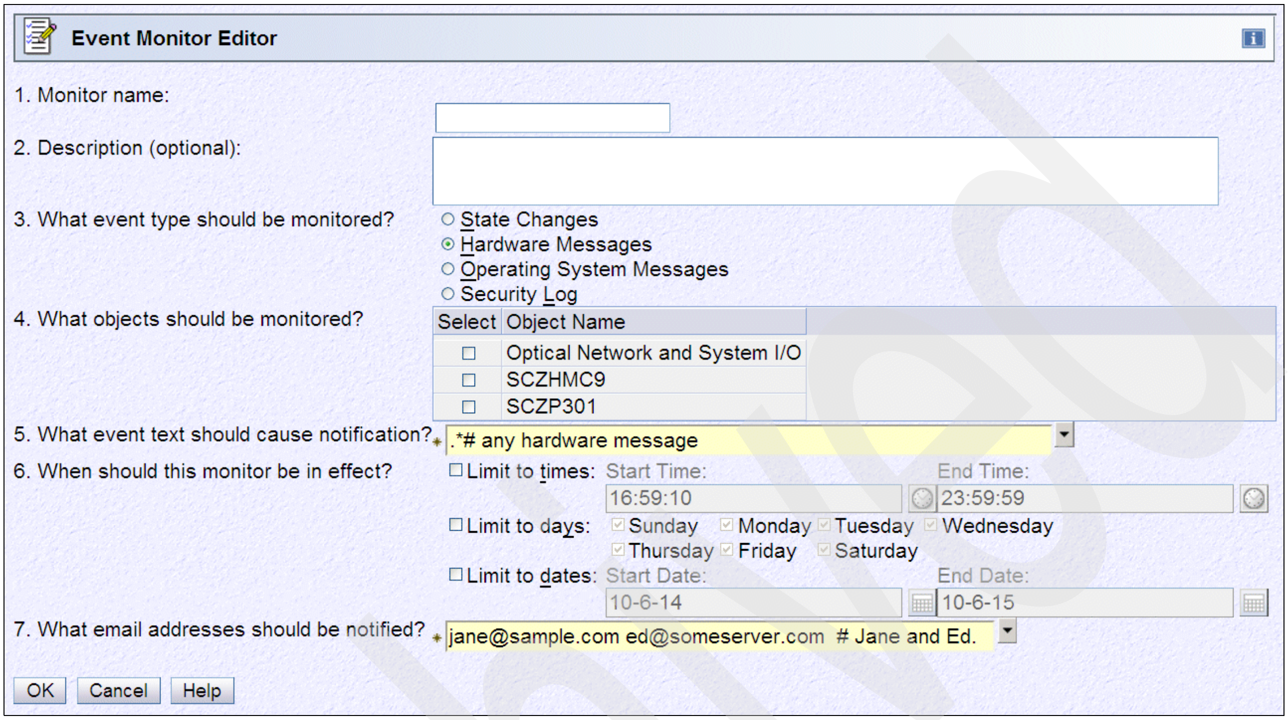
Total: 25

Chart Content: Power Consumption (kW)

Figure 2-19 HMC and SE: Environment Efficiency Statistics

Security event notification

Email notification of security events in Monitor System Events task is enhanced to support the creation of new event monitors for security logs. Any number of users can get an email when a matching security event occurs (Figure 2-20).



Event Monitor Editor

1. Monitor name:

2. Description (optional):

3. What event type should be monitored?
○ State Changes
● Hardware Messages
○ Operating System Messages
○ Security Log

4. What objects should be monitored?

Select	Object Name
☐	Optical Network and System I/O
☐	SCZHMC9
☐	SCZP301

5. What event text should cause notification? .*# any hardware message

6. When should this monitor be in effect?
☐ Limit to times: Start Time: 16:59:10 End Time: 23:59:59
☐ Limit to days: ☑ Sunday ☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday ☑ Friday ☑ Saturday
☐ Limit to dates: Start Date: 10-6-14 End Date: 10-6-15

7. What email addresses should be notified? jane@sample.com ed@someserver.com # Jane and Ed.

Figure 2-20 HMC and SE: Monitor System Events

Audit reporting capabilities

Audit and log management tasks now provide scheduled and manual methods to obtain audit reports. These reports include:

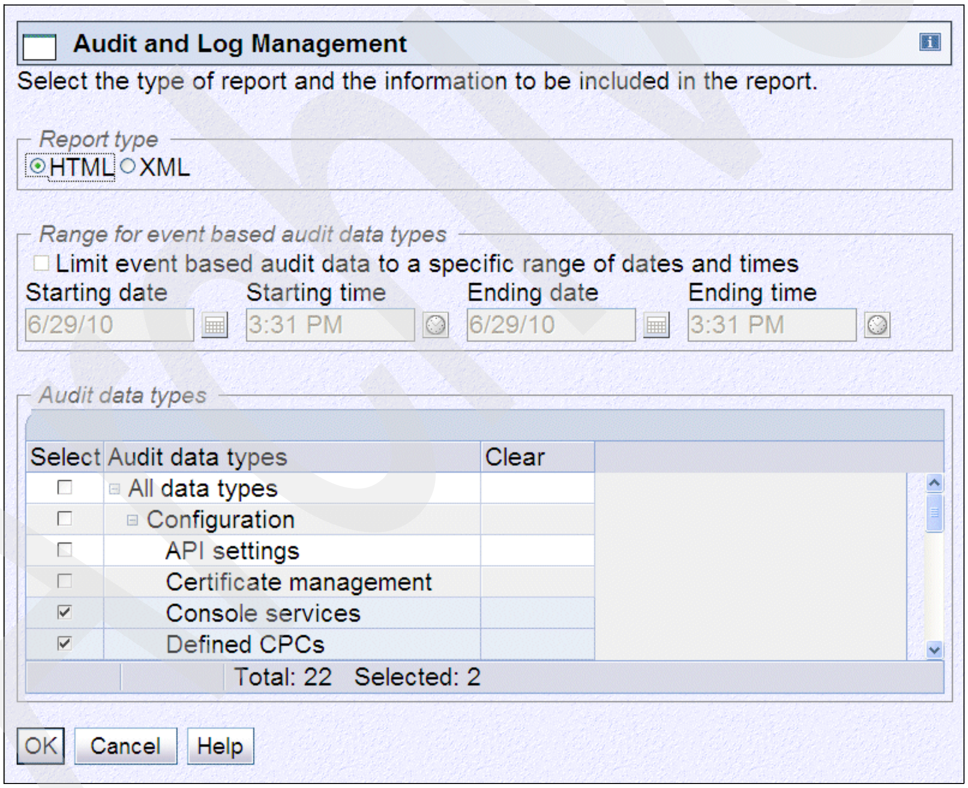
- All user related data (user IDs, user settings, roles, password rules, LDAP servers, automatic logon, and so on)
- Configuration details (remote access, automation parameters, data replication, network settings, and so on)
- Operational data (customer group definitions, associated activation profiles settings, and managed resources)
- SSL certificate information

The off-loading can be manually initiated with the new Audit and Log Management task or scheduled with the Scheduled Operations Task. The auditable types of information can be broken into three categories (Table 2-5).

Table 2-5 HMC and SE: Audit report types

Configuration	**Logs**	**User Profiles**
► API settings ► Certificate management ► Console services ► Data replication ► Defined CPCs ► Domain security ► Grouping ► Monitor system events ► Object locking ► Product engineering access ► Welcome text	► Console events ► Security log ► Audit log ► Service history ► Tasks performed log	► Default user settings ► LDAP server definitions ► Password profiles ► User roles ► Users ► User templates ► User patterns

These reports can be exported and saved remotely by using the normal browser “Save as...” function or locally to removable media (Figure 2-21).



Audit and Log Management

Select the type of report and the information to be included in the report.

Report type

● HTML ○ XML

Range for event based audit data types

☐ Limit event based audit data to a specific range of dates and times

Starting date	Starting time	Ending date	Ending time
6/29/10	3:31 PM	6/29/10	3:31 PM

Audit data types

Select	Audit data types	Clear
☐	⊟ All data types	
☐	⊟ Configuration	
☐	API settings	
☐	Certificate management	
☑	Console services	
☑	Defined CPCs	

Total: 22 Selected: 2

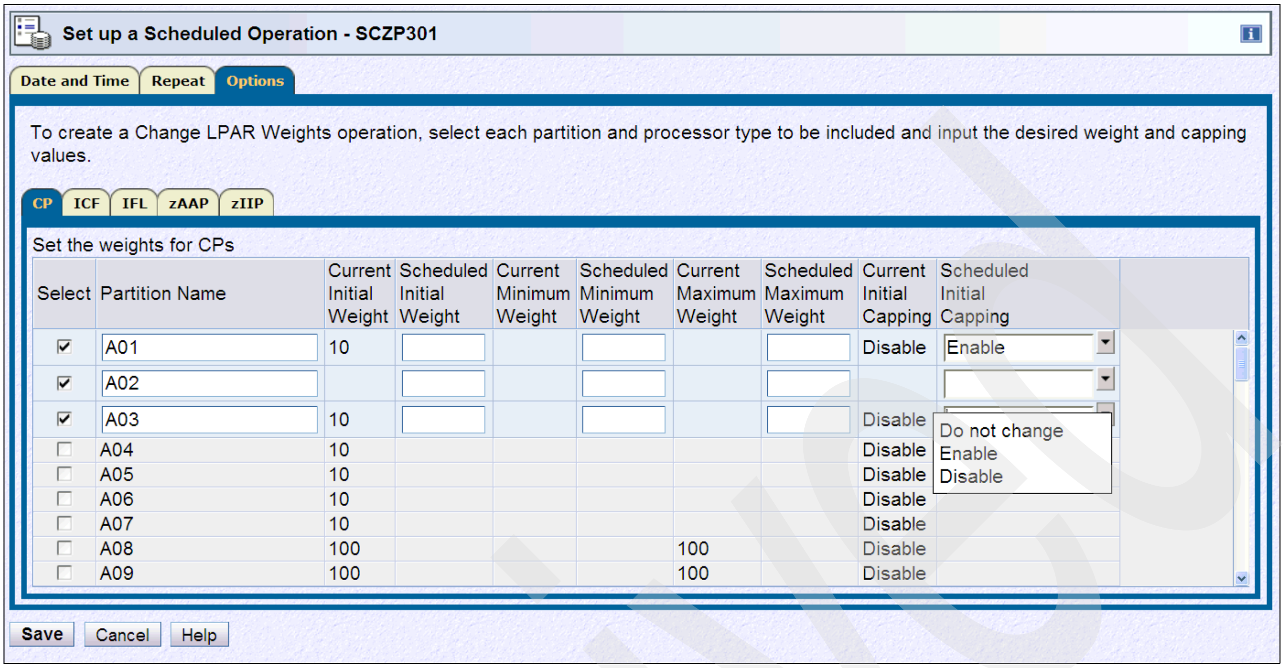
Figure 2-21 HMC and SE: Audit and Log Management

Change LPAR Controls task

The Change LPAR Controls task provides the ability to export the Change LPAR Controls table data to a CSV file, which can be used for spreadsheet programs such as Excel.

This support adds a new menu item to the window and is only available when a user is connected to the HMC remotely using a web browser.

The following enhancements (Figure 2-22) were made to the existing Change LPAR Controls scheduled operation support.



Set up a Scheduled Operation - SCZP301

To create a Change LPAR Weights operation, select each partition and processor type to be included and input the desired weight and capping values.

Set the weights for CPs

Select	Partition Name	Current Initial Weight	Scheduled Initial Weight	Current Minimum Weight	Scheduled Minimum Weight	Current Maximum Weight	Scheduled Maximum Weight	Current Initial Capping	Scheduled Initial Capping
☑	A01	10						Disable	Enable
☑	A02								
☑	A03	10						Disable	
☐	A04	10						Disable	
☐	A05	10						Disable	
☐	A06	10						Disable	
☐	A07	10						Disable	
☐	A08	100				100		Disable	
☐	A09	100				100		Disable	

Figure 2-22 HMC and SE: Change LPAR Control schedule

This support:

- Allows the partition capping value to be specified
- Allows viewing of details about an existing Change LPAR Controls schedule operation

User settings

The user settings consist of the following items:

- Customize User Controls
  - Additional control over toggle lock and details tasks
- User templates
  - Defines all the same characteristics that would normally be defined for a user
  - Restricted to LDAP authentication
- User pattern
  - Defines the pattern to be used to try and match “unknown” user IDs with a template
  - Defines a default template to be used for matching user IDs
  - Defines the retention time (in days) for modified user setting information
  - Optionally defines LDAP attributes used to determine:
    - The user template to be used
    - Domains where the pattern is valid

> **Note:** The LDAP server used for authentication can be different from the one used to specify the template and domain names.

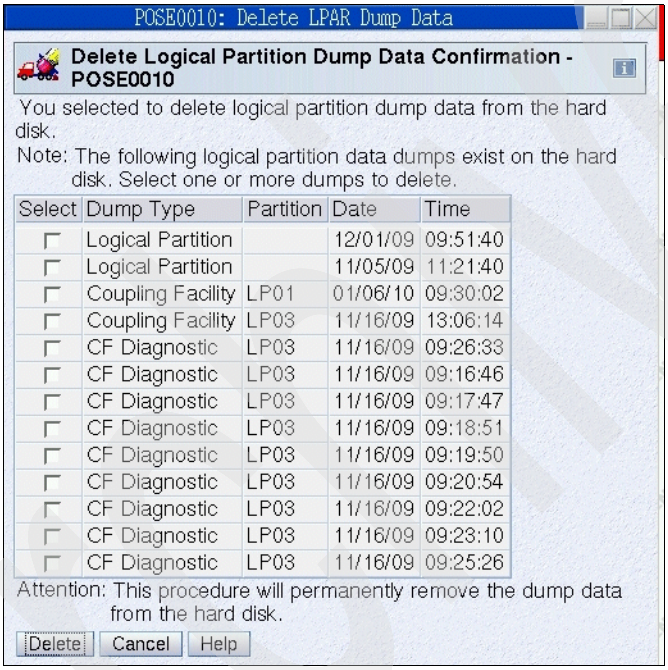
Coupling Facility Control Code Diagnostics

Coupling Facility Control Code (CFCC) Diagnostic dumps are internally triggered based on the detection of an error situation. CF dumps (a maximum of two) are triggered manually by the Dump LPAR Data task.

Improvements were made to first failure data capture support for diagnosing Coupling Facility Control Code related problems. A maximum of 10 new CFCC Diagnostic dumps may be stored on the SE. Each dump is expected to be 128 MB in size.

The following tasks were updated:

- The Delete LPAR Dump Data task was updated to display and allow manual deletion of the new CFCC Diagnostic dumps (Figure 2-23).
- The Transmit Service Data task was enhanced to process the new CFCC Diagnostic dumps. A new selection was added i to differentiate the new CFCC Diagnostic dumps from the existing CF dump.



Delete Logical Partition Dump Data Confirmation - POSE0010

You selected to delete logical partition dump data from the hard disk.

Note: The following logical partition data dumps exist on the hard disk. Select one or more dumps to delete.

Select	Dump Type	Partition	Date	Time
☐	Logical Partition		12/01/09	09:51:40
☐	Logical Partition		11/05/09	11:21:40
☐	Coupling Facility	LP01	01/06/10	09:30:02
☐	Coupling Facility	LP03	11/16/09	13:06:14
☐	CF Diagnostic	LP03	11/16/09	09:26:33
☐	CF Diagnostic	LP03	11/16/09	09:16:46
☐	CF Diagnostic	LP03	11/16/09	09:17:47
☐	CF Diagnostic	LP03	11/16/09	09:18:51
☐	CF Diagnostic	LP03	11/16/09	09:19:50
☐	CF Diagnostic	LP03	11/16/09	09:20:54
☐	CF Diagnostic	LP03	11/16/09	09:22:02
☐	CF Diagnostic	LP03	11/16/09	09:23:10
☐	CF Diagnostic	LP03	11/16/09	09:25:26

Attention: This procedure will permanently remove the dump data from the hard disk.

Figure 2-23 HMC and SE: CFCC Diagnostics dump

2.2.4 Configuration and services

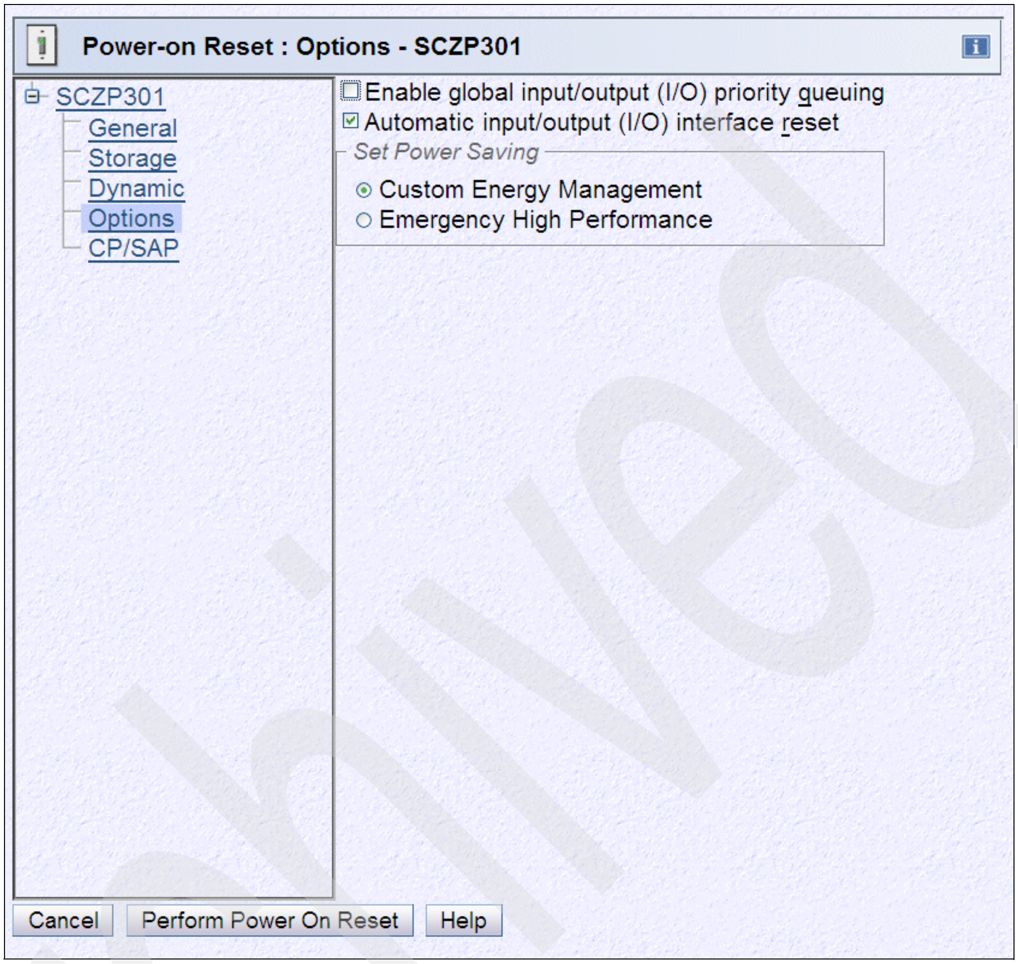
In this section, we discuss configuration and services.

Power-on reset support of Automatic I/O Interface Reset

Consistency has been improved between the Power-on Reset window and the Reset Profile:

- On servers before the z196 server, the Automatic I/O Interface Reset option is available on the Options tab of the Reset profile, but is not available on the Options tab of the Power-on Reset window.

- In the z196 server, the Power on Reset task was updated to include the Automatic I/O Interface Reset option on the Options tab (Figure 2-24).



Power-on Reset : Options - SCZP301

☐ Enable global input/output (I/O) priority queuing

☑ Automatic input/output (I/O) interface reset

Set Power Saving

● Custom Energy Management

○ Emergency High Performance

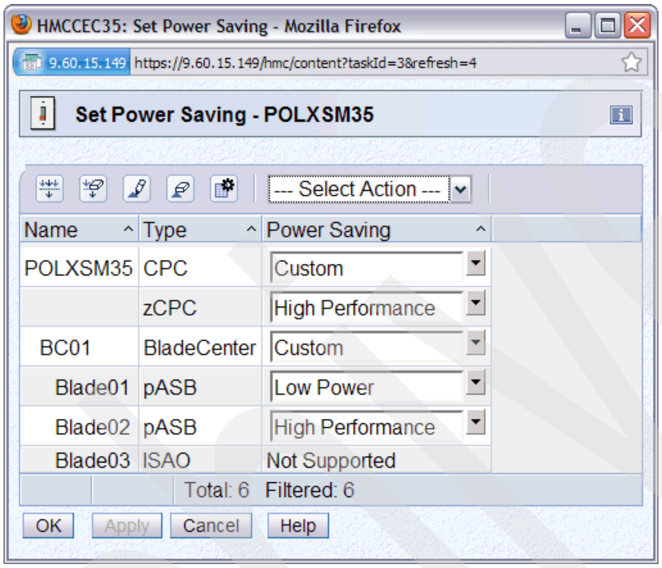
Figure 2-24 HMC and SE: Power-on Reset window

Set Power Saving feature

The Set Power Saving feature is built upon an existing mechanism for cycle and voltage steering. This feature reduces processor cycle time for all System z processors in the system. Memory and IO cycle times are not affected.

In z196, the following support was added:

- HMC and SE User Interface can enable and disable power saving (Figure 2-25).
- There is an indication on HMC and SE if the power saving mode is active.
- There is an SE-based scheduled operation to enable and disable power saving mode.
- There are Reset Profile and Power-on Reset updates to allow power saving mode to be specified.
    - Custom Energy Management uses values specified on the new **Set Power Saving** task.
    - In Emergency High Performance, all objects are placed into High Performance mode.



Name	Type	Power Saving
POLXSM35	CPC	Custom
	zCPC	High Performance
BC01	BladeCenter	Custom
Blade01	pASB	Low Power
Blade02	pASB	High Performance
Blade03	ISAO	Not Supported

Total: 6 Filtered: 6

Figure 2-25 HMC and SE: Power saving mode

> **Note:** For zCPC, there is a limit of one transition to Low Power per day.

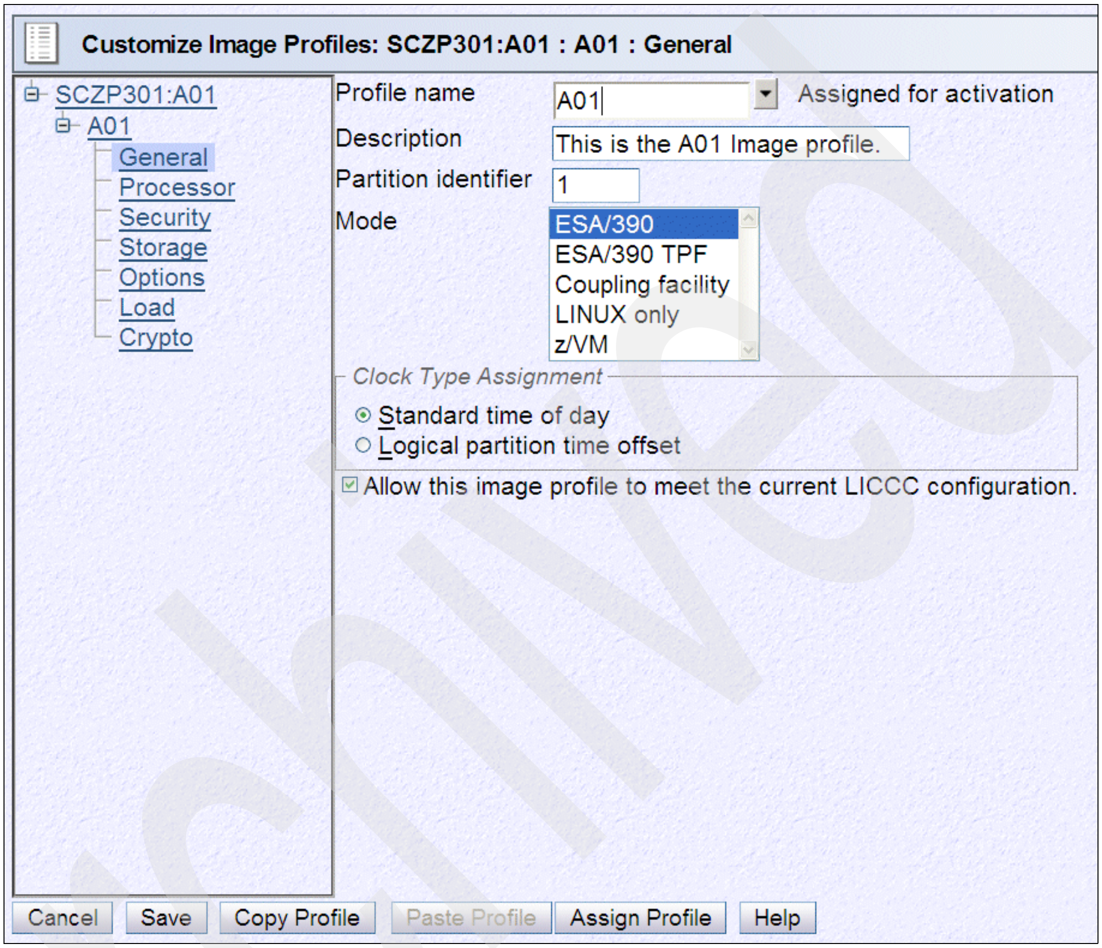
Customize/Delete Activation Profiles task

The Customize/Delete Activation Profiles task only can be run by the System Programmer role (the default is SYSPROG).

Image activation profile validation override

Image profiles validate to conform to the maximums of the Licensed Internal Code Control Code (LICCC) Permanent and Temporary (On/Off CoD, CBU, and CPE) update, for the image mode, initial processor values and types, and initial storage. When the image activation profile is saved, validation occurs automatically. Profile migration occurs for import profiles, LICCC updates, temporary record deletion, and when new GA code releases are applied, such as GA1 to GA2 or an MES upgrade to a new machine family.

There is a new image profile control that allows validation upon Save or Migration when the validate check box control is checked. This is the default and recommended setting. Careful consideration should be given about turning off validation when preparing image profiles prior to installing the LICCC records. You should check and validate the profile after the LICCC record updates are completed (Figure 2-26).



Customize Image Profiles: SCZP301:A01 : A01 : General

Profile name: A01 — Assigned for activation

Description: This is the A01 Image profile.

Partition identifier: 1

Mode: ESA/390

Clock Type Assignment

● Standard time of day

○ Logical partition time offset

☑ Allow this image profile to meet the current LICCC configuration.

Figure 2-26   HMC and SE: Customize activation profiles

When profiles are internally updated, a new hardware message is reported.

A detailed explanation about profile validation and update rules can be found at Resource Link

`http://www.ibm.com/servers/resourcelink`

Select **Library** → **z196** → **Technical Notes** → **System z Activation Profile Update and Processor Rules** to view this explanation.

Removed support for the Dynamic Internal Coupling Facility (ICF) Expansion option

The Activation Profile support has been updated to remove support for Dynamic ICF expansion both across ICFs and across a pool of shared CPs.

This update affects the Processors page of a Coupling Facility mode Image Profile. The Logical Processor Assignment section of the Processor page can be used to remove the following selections:

- Dedicated and not dedicated internal coupling facility processors
- Dedicated internal coupling facility processors and not dedicated central processors

New removable writable media to replace HMC DVD-RAM

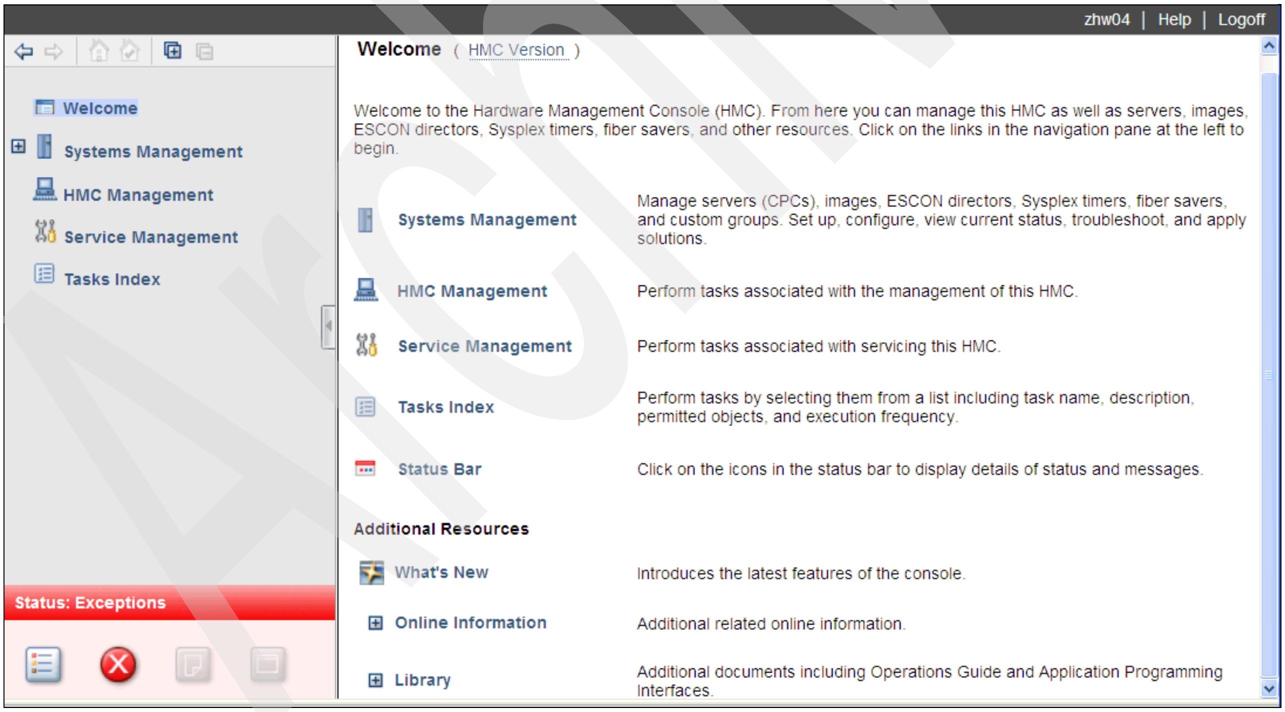
A new removable writable media is being introduced in z196 as an alternative to the HMC DVD-RAM. The new media is a USB flash memory drive (UFD). Initially, the z196 HMC will ship with both a DVD-RAM drive and a UFD, but over time the DVD-RAM drive will be phased out.

The UFD is the first media device for which there can be more than one present in the console. This is due to the fact that the Backup task requires a UFD in the console. Non-Backup tasks that access a UFD are now aware that more than one UFD can be present in the console and ensure that the correct one is accessed. When multiple UFDs are used, one should be the Backup UFD; all non-Backup Critical Data tasks (except Format Media) will ignore the Backup UFD.

User interface

Miscellaneous user interface enhancements were made in z196:

- A simple wizard called “What’s new” describes new features available on the HMC (Figure 2-27).



Welcome (HMC Version)

Welcome to the Hardware Management Console (HMC). From here you can manage this HMC as well as servers, images, ESCON directors, Sysplex timers, fiber savers, and other resources. Click on the links in the navigation pane at the left to begin.

Systems Management	Manage servers (CPCs), images, ESCON directors, Sysplex timers, fiber savers, and custom groups. Set up, configure, view current status, troubleshoot, and apply solutions.
HMC Management	Perform tasks associated with the management of this HMC.
Service Management	Perform tasks associated with servicing this HMC.
Tasks Index	Perform tasks by selecting them from a list including task name, description, permitted objects, and execution frequency.
Status Bar	Click on the icons in the status bar to display details of status and messages.

Additional Resources

What's New	Introduces the latest features of the console.
⊞ **Online Information**	Additional related online information.
⊞ **Library**	Additional documents including Operations Guide and Application Programming Interfaces.

Figure 2-27 HMC and SE: What’s New task

- Both the Tree Style User Interface and Classic Style User Interface are improved.
- Internet Explorer (IE) 8.0 is supported for accessing the HMC from a remote console.

Here is the complete list of supported browsers:

- IE 6.0 or later
- IE 7.0 or later
- IE 8.0
- Firefox 3.5
- Firefox 3.6

2.2.5 Simple Network Management Protocol

Simple Network Management Protocol (SNMP) describes management data and the protocols for exchanging that data between heterogeneous systems. The protocols include both the description of the management data, defined in the Management Information Base (MIB), and the operations for exchanging or changing that information. By implementing common protocols, management data can be exchanged between different platforms with relative ease.

SNMP defines an architecture that consists of:

- Network management applications
- Network management agents and subagents
- Network elements, such as hosts and gateways

The SNMP application can ask agents for specific information about network elements. Conversely, agents can tell the network management application when something happens to one or more network elements.

An SNMP agent can be configured for an HMC to allow other system management applications to manage the HMC applications by using HMC application programming interfaces (APIs). Enablement of the SNMP APIs is required to support z196 features, such as the z/OS Capacity Provisioning Manager (CPM), or the Active Energy Manager (AEM), which monitors the power and thermal data of a z196.

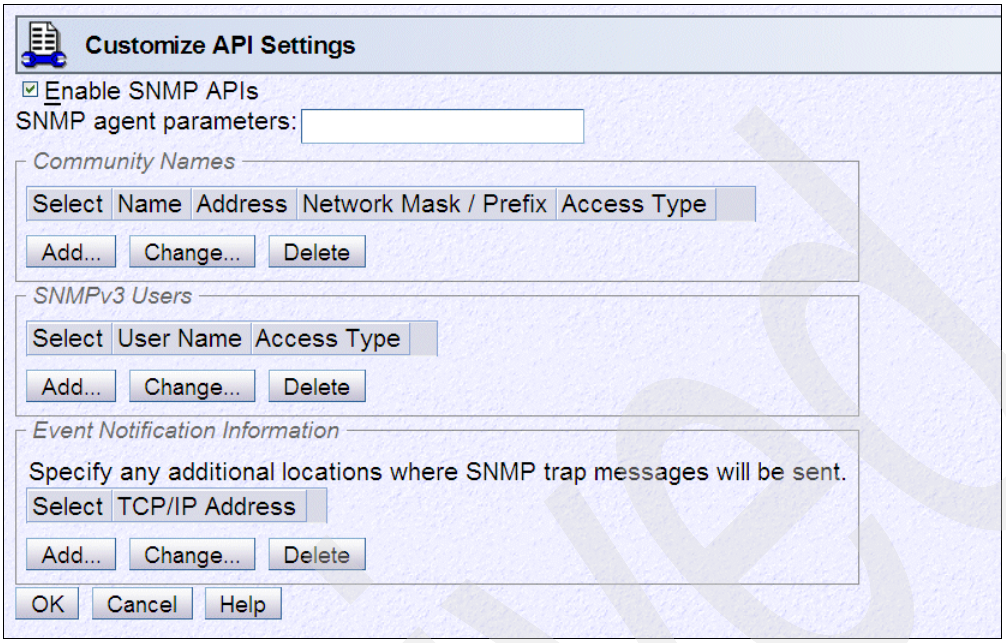
SNMPv3 is the new industry standard and provides strong security mechanisms for authentication and privacy of communications. The new SNMP API client libraries now support up to SNMPv3 to include the strong security features.

In z196, new SNMP and CIM APIs have been added to support the following functions:

- The Change LPAR Group Controls tasks gives you the ability to change group members and the group capacity setting. The SNMP and CIM API are now enhanced to allow dynamic changes to both the group members and group capacity setting.
- Enhanced SNMP and CIM APIs generate and retrieve user ID audit reports.

To configure the SNMP agent, you must log on to the HMC using the Access Administrator role. To enable the SNMP APIs and customize the SNMP agent settings, select **HMC Management** → **Customize API Settings**.

Figure 2-28 shows the Customize API Settings window, which is used to add SNMP information.


Customize API Settings

☑ Enable SNMP APIs

SNMP agent parameters:

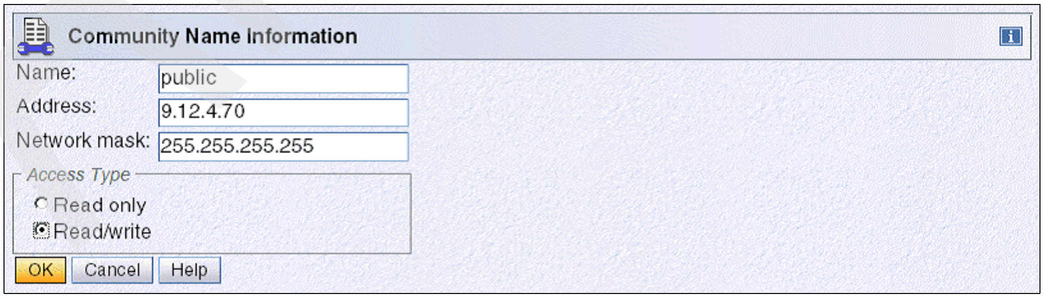
Specify any additional locations where SNMP trap messages will be sent.

Figure 2-28 HMC and SE: Customize API Settings

To allow applications to request information from the HMC, a community name must be added. Click **Add** under the Community Names section to specify one or more community names to use.

Figure 2-29 shows the Community Name Information window that is displayed after you click the **Add** button. The following information is required:

Name	Specifies the community name used to verify that a request for SNMP information is valid when a manager makes an SNMP request.
Address	Specifies the IPv4 or IPv6 Internet address.
Network mask	Specifies a network mask that is logically ANDed with the IP address of the manager making an SNMP request.
Access Type	Specifies the access, read or write, you want to allow for SNMP requests.


Community Name Information

Name: public

Address: 9.12.4.70

Network mask: 255.255.255.255

Access Type

○ Read only

● Read/write

Figure 2-29 HMC and SE: Community Name Information

Community names and access type are specified by the application. For example, z/OS Capacity Provisioning Manager requires a defined community name and read/write access.

System Director's Active Energy Manager (AEM) requires a defined community name, but read access is sufficient.

To allow applications to use SNMP APIs, click **Enable SNMP APIs**. After the SNMP APIs are enabled, the HMC must be restarted.

Note: HMC is not restarted automatically; it must be done manually. It is not possible to restart HMC remotely; it must be done directly from the console.

2.2.6 Remote Support Facility

The Hardware Management Console Remote Support Facility (RSF) provides communication to a centralized IBM support network for hardware problem reporting and service. The types of communication provided include:

- Problem reporting and repairing of data
- Delivering fixes to the service processor and Hardware Management Console
- Hardware inventory data
- On Demand enablement (optional)

You can configure the Hardware Management Console to send hardware service related information to IBM using a dialup connection over a modem or using an Internet-based connection. The advantages of using an Internet connection include:

- Significantly faster transmission speed
- Ability to send more data on an initial problem request, potentially resulting in more rapid problem resolution
- Reduced customer expense (for example, the cost of a dedicated analog telephone line)
- Greater reliability

Unless your enterprise's security policy prohibits any connectivity from the Hardware Management Console over the Internet, an Internet connection is recommended.

The following security characteristics are in effect regardless of the connectivity method chosen:

- Remote Support Facility requests are always initiated from the Hardware Management Console to IBM. An inbound connection is never initiated from the IBM Service Support System.
- All data transferred between the Hardware Management Console and the IBM Service Support System is encrypted in a high-grade Secure Sockets Layer (SSL) encryption.
- When initializing the SSL encrypted connection, the Hardware Management Console validates the trusted host by its digital signature issued for the IBM Service Support System.
- Data sent to the IBM Service Support System consists solely of hardware problems and configuration data. No application or customer data is transmitted to IBM.

If both types of connections are configured, the Internet will be tried first, and if this attempt fails, then the modem is used.

Internet connectivity

When an Internet connection is used, the Hardware Management Console can be configured to use a second network card to physically separate a private LAN connection from the Internet-enabled network. The Hardware Management Console can be enabled to connect directly to the Internet (Figure 2-30) or to connect indirectly from a customer-provided proxy server (Figure 2-31 on page 61). The decision about which of these approaches works best for your installation depends on the security and networking requirements of your enterprise.

All the communications are handled through TCP sockets initiated by the Hardware Management Console and use a high-grade SSL to encrypt the data that is transmitted. The destination TCP/IP addresses are listed in Table 2-6.

Table 2-6 HMC and SE: Destination IP address

IP Version 4	IP Version 6
129.42.26.224	2620:0:6C0:1::1000
129.42.34.224	2620:0:6C1:1::1000
129.42.42.224	2620:0:6C2:1::1000

Note: HTTPS port 443 is used for all communications.

If your Hardware Management Console can be connected to the Internet, and the external firewall can be set up to allow established TCP packets to flow outbound to the destination addresses, you can use a direct Internet connection. The use of Source Network Address Translation (SNAT) and masquerading rules to mask the Hardware Management Console's source IP address are both acceptable (Figure 2-30).

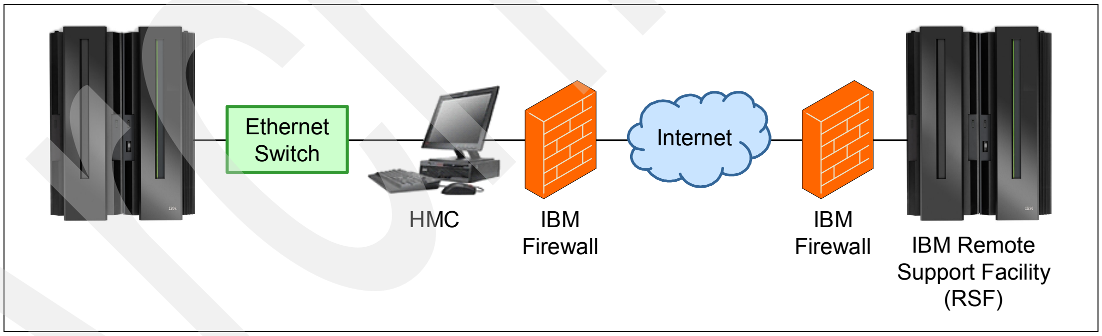


Figure 2-30 HMC and SE: Direct Internet connection

If your installation requires the Hardware Management Console to be in a private network, you may be able to use an indirect Internet connection using an SSL proxy, which can forward requests to the Internet. One of the other potential advantages of using an SSL proxy is that the proxy may support logging and audit facilities. To forward SSL sockets, the proxy server must support the basic proxy header functions (as described in RFC 2616) and the CONNECT method. Optionally, basic proxy authentication (RFC 2617) can be configured so that the Hardware Management Console authenticates before attempting to forward sockets through the proxy server (see Figure 2-31).

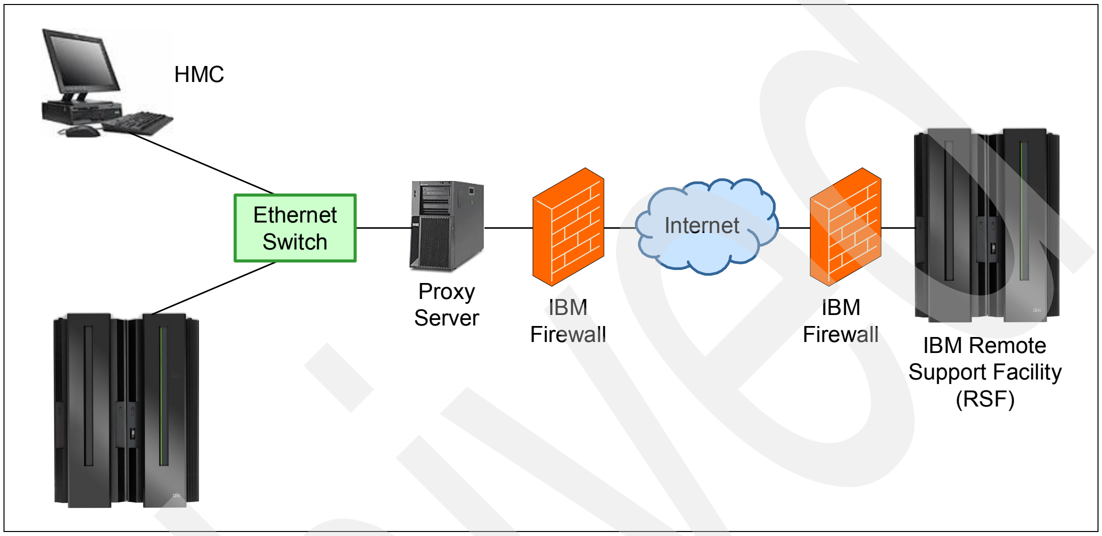


Figure 2-31 HMC and SE: Indirect Internet connection with a proxy server

Configuring outbound connections

At a high level, the following procedures are used to configure outbound connections:

1. Customize customer information.
2. Configure remote services.
3. Customize outbound connectivity.
4. Customize network settings.
5. Customize console services.

Details for these procedures are provided in the following section.

> **Note:** All of the steps needed to configure outbound connectivity require customer approval.

Step by step procedures for configuring an RSF connection

The procedures detailed in this section enable the HMC to connect to the RSF with a direct Internet connection and a dial-out modem connection, which is used for backup purposes. The Internet connection will be used as the default.

Configuring a dial-out modem connection

Begin at the Hardware Management Console Settings window and perform the following steps:

1. Select **Customize Customer Information**.
   a. Enter the Administrator information.
   b. Enter System information.
   c. Enter Account information.
   d. Close the window.

   Completing these entry fields for each managed system allows your service structure to record necessary contact information.

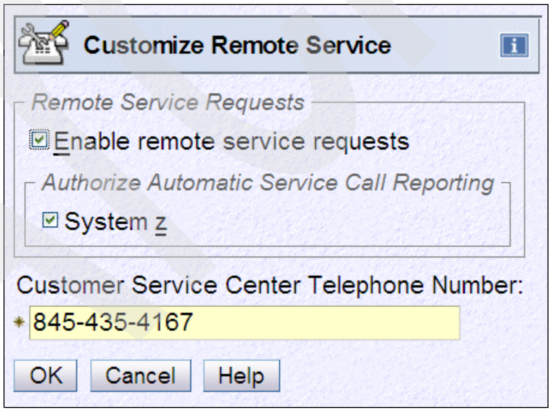
2. Select **Customize Remote Services**.

   Remote service is two-way communication between the console and the IBM Service Support System (commonly known as RETAIN) for the purpose of conducting automated service operations. Using remote service reduces the operator interaction needed to complete some service operations and provides some console tasks with another source or destination for sending or receiving service information.

   In the window (Figure 2-32), select:

   a. **Enable remote service requests**. If it is not selected, remote service is disabled. Disabling remote service does not prevent the console from detecting and analyzing problems. The console will still issue hardware messages to notify console operators of problems.
   b. **Authorize automatic service call reporting**. If this feature is selected, the console automatically reports problems and requests service.

      If service is required to correct a problem, its hardware message will include instructions for calling a customer service center to report the problem and request service.



☑ Enable remote service requests

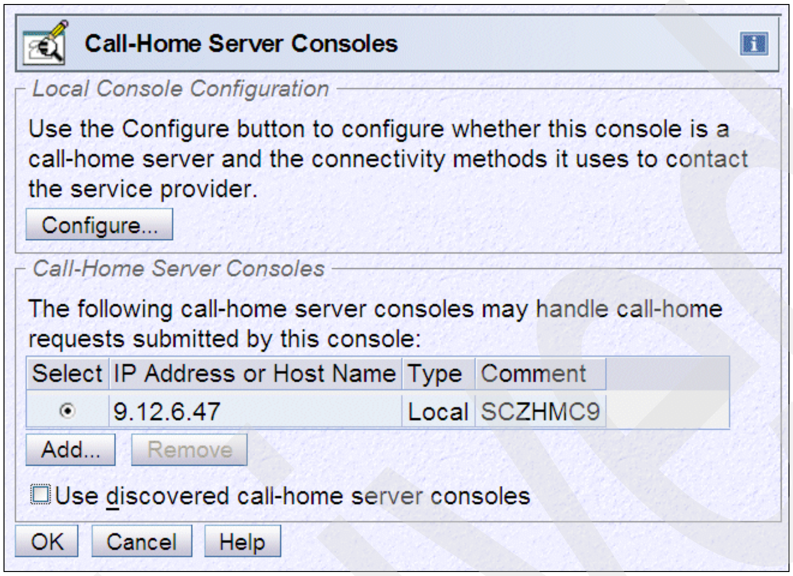
☑ System z

Customer Service Center Telephone Number: 845-435-4167

Figure 2-32 HMC and SE: Customize Remote Service

   c. Click **OK** to close the window.

3. Select **Customize Outbound Connectivity** (Figure 2-33).
    a. In the Call-Home Server Consoles window, select **Configure**. In the window that opens, check **Enable local system as a call-home server**. This action allows the local Hardware Management Console to connect to your service provider's remote support facility for call-home requests.



Use the Configure button to configure whether this console is a call-home server and the connectivity methods it uses to contact the service provider.

The following call-home server consoles may handle call-home requests submitted by this console:

Select	IP Address or Host Name	Type	Comment
●	9.12.6.47	Local	SCZHMC9

☐ Use discovered call-home server consoles

Figure 2-33 HMC and SE: Customize outbound connectivity

    b. Check **Allow local modem dialing for service**.

4. Click **Modem Configuration**. Select the necessary options to configure your modem:
    a. Specify dial type by selecting **Tone** or **Pulse**.
    b. In the Other Settings area, check **Wait for a dial tone** and **Enable speaker**. Add a prefix if required.
    c. Click **OK**.
5. Click **Add** on the Outbound Connectivity window, and the Add Telephone Number window opens.
    a. Make the following entries and selections:
        i. Select a Country or region.
        ii. Select a State or province.
        iii. Select a local phone number if available.
        iv. Add toll-free numbers if available.
        v. Add toll numbers last.
    b. Use the Up and Down buttons to move the local number to the top of the list, move the toll-free numbers to below the local numbers, and place the toll numbers at the bottom of the list.
    c. Select a phone number from the table list. Edit the phone number to enable it as a local call, if required. Click **Add**.
6. Test the modem connection:
    a. Click **Test** on the Customize Outbound Connectivity window.
    b. Click **Start** in the returned Test Telephone Number window.

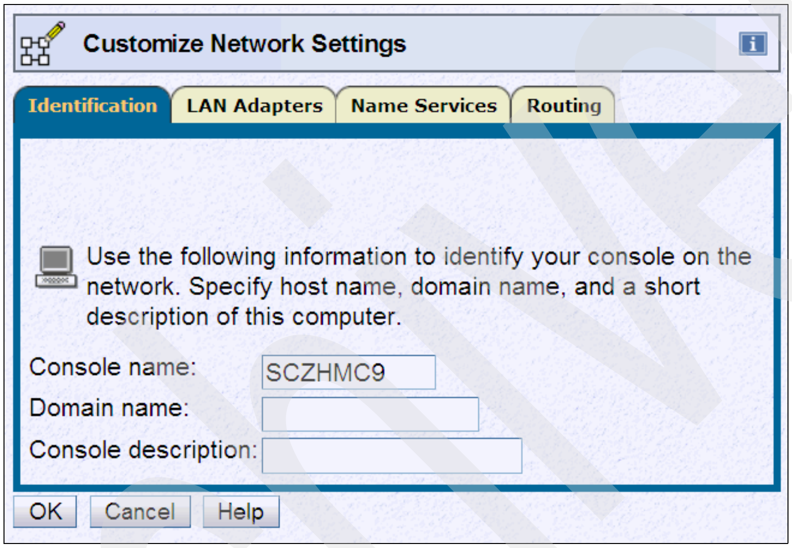
   c. When the test is completed successfully, click **Cancel**.

The outbound modem configuration is now complete. This procedure was done as a backup for the preferred method (Internet connection), which is configured in the following section.

Configuring the Internet connection

The first two steps are the same as those for the dial-out connection; perform steps 1 on page 62 and 2 on page 62. Then perform the following steps:

1. Select **Customize Outbound Connectivity** → **Configure** and click the **Internet** tab.
2. Check the **Allow an existing Internet connection for services** check box and click **Test**.
3. The Test Internet window opens. Click **Start** and wait for the results.
4. Select **Customize Network Setting** from HMC management (Figure 2-34).



Use the following information to identify your console on the network. Specify host name, domain name, and a short description of this computer.

Console name: SCZHMC9
Domain name:
Console description:

Figure 2-34 HMC and SE: Customize Network Setting

> **Note:** To get access to the Customize Network Settings window, you must be logged on as the Access Administrator role.

5. In the identification tab, enter the Console name, Domain name, and a brief description.
6. Select the **LAN Adapters** tab. Select one of the adapters.
7. Click **Details** to open the LAN Adapter Details window
8. Select the IPv4 or IPv6 setting, make the required entries, and click **OK**. Repeat this procedure for the second LAN Adapter if necessary.
9. Select the **Name Services** tab in the Customize Network Settings window:
   a. Check the **DNS enabled** check box, if required.
   b. Enter the DNS Server Search Order IP address, if required, and click **Add**.
   c. Enter the Domain Suffix Search Order, if required, and click **Add**.
10. Select the **Routing** tab in the Customize Network Setting window.

    This information is needed for connecting to RETAIN through the Internet. Check the **Enable 'routed'** check box only when there is a request. Click **New** to add the routing information.

11. Make the appropriate selections and entries on the Route Entry window:
    - Route Entry Position
    - Route Type
    - Destination, Gateway, and Subnet mask to match your network requirements
    - Adapter
12. Click **OK**. You will be taken back to the Customize Network Settings window. Enter the Gateway information and click **OK**.

A message displays and informs you that the network settings have been successfully updated.

Go back to step 4 on page 64 to check your changed network settings. Remember that you have to leave the Access Administrator role to go back to the Customize Outbound Connectivity function.

2.2.7 Capacity on Demand

To fulfill unpredictable customer needs, market opportunities, and external pressure without interrupting existing processes, your IT infrastructure must support changing business objectives. You should have access to the resources you need when you need them.

This is the basic principle underlying the Capacity on Demand (CoD) offerings for the z196. The Capacity on Demand offerings allow you to perform permanent upgrades and temporary upgrades to a z196 server.

A permanent upgrade can:

- Increase model capacity.
- Increase the number of specialty engines. These engines include:
    - Integrated Coupling Facilities (ICFs)
    - Integrated Facilities for Linux (IFLs)
    - IBM System z Application Assist Processor (zAAP)
    - IBM System z Integrated Information Processor (zIIP)
    - System Assist Processors
- Increase memory.
- Add channels.
- Add cryptos.
- Change specialty engines (re-characterization).

A temporary upgrade can:

- Increase model capacity.
- Increase the number of specialty engines. These engines include:
    - Integrated Coupling Facilities (ICFs)
    - Integrated Facilities for Linux (IFLs)
    - IBM System z Application Assist Processor (zAAP)
    - IBM System z Integrated Information Processor (zIIP)
    - System Assist Processors

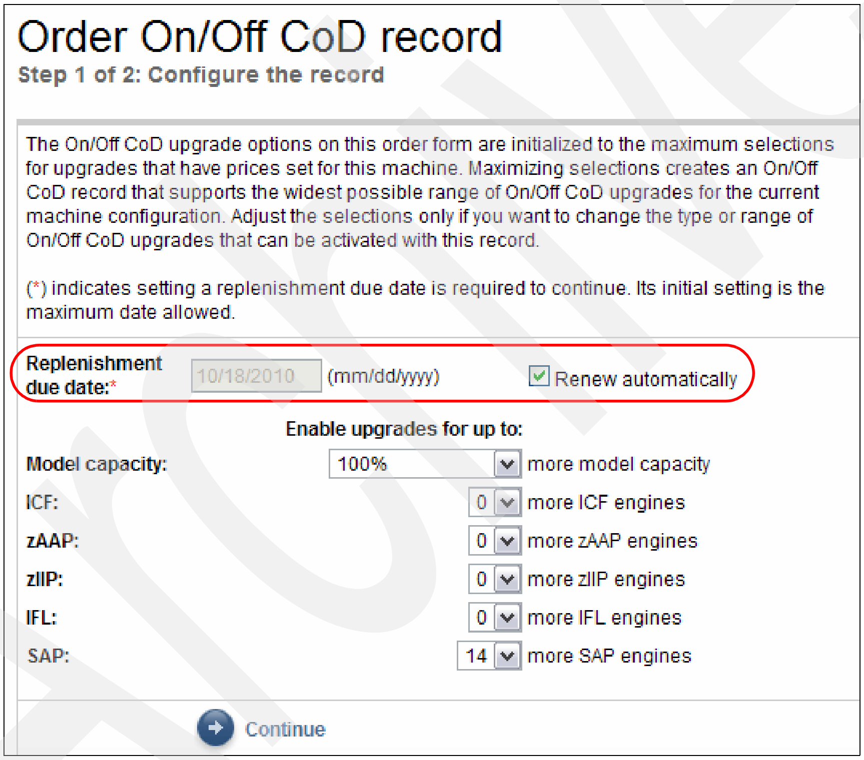
What is new in the z196 server

For z196, Resource Link reintroduces the Order Administrative On/Off CoD test record option for the standard order flow, including the approval steps - tests - order process. IBM Business Partners must use this option for machines they sell.

IBM Manufacturing installs CoD records that are ordered with the z196 processor, CBU and CPE only, while On/Off CoD records must be ordered using IBM Resource Link. Up to four preordered records will be installed. If more than four CoD records are ordered with the system, the records will be staged on the SE. Your IBM installation service representative will assist you in installing the records.

Post-paid On/Off CoD

For z196, Resource Link monitors all installed post-paid On/Off CoD records. The process will only support installed records (slotted). Records staged on the SE or on the IBM support system and not installed will not be auto-renewed. Auto-renewal will only be available to machines that can connect to the IBM support system, and it is not available to non-RSF RPQ customers. Only post-paid records are made; the prepaid records do not expire, so auto-renewal is not required (Figure 2-35).



Order On/Off CoD record

Step 1 of 2: Configure the record

The On/Off CoD upgrade options on this order form are initialized to the maximum selections for upgrades that have prices set for this machine. Maximizing selections creates an On/Off CoD record that supports the widest possible range of On/Off CoD upgrades for the current machine configuration. Adjust the selections only if you want to change the type or range of On/Off CoD upgrades that can be activated with this record.

(*) indicates setting a replenishment due date is required to continue. Its initial setting is the maximum date allowed.

Replenishment due date:* 10/18/2010 (mm/dd/yyyy) ☑ Renew automatically

Enable upgrades for up to:

Model capacity: 100% more model capacity

ICF: 0 more ICF engines

zAAP: 0 more zAAP engines

zIIP: 0 more zIIP engines

IFL: 0 more IFL engines

SAP: 14 more SAP engines

Figure 2-35 HMC and SE: CoD auto-renewal

Every 90 days, Resource Link generates a replenishment record for each installed On/Off CoD record that moves the expiration date out past 180 days. The machine must have connected to IBM in the past 14 days and provided the updated VPD / Billing history, and the record must be “enabled” for auto-renewal. IBM reserves the right to disable auto-renewal if you do not meet the contracts terms and conditions.

The next time the machine connects to the IBM support system, the replenishment record is pushed to the machine and installed. After the record is set, no user action is required.

Resource Link will still monitor records for expiration and notify you 30 and 15 days before expiration. If for some reason an auto-renewal enabled machine does not connect home, you will receive an email before the record expires.

CoD administrative test

Resource Link generates an On/Off CoD administrative test record, with all the capacity levels set to zero and the bit set to on record to identify the Administrative test record (Figure 2-36).

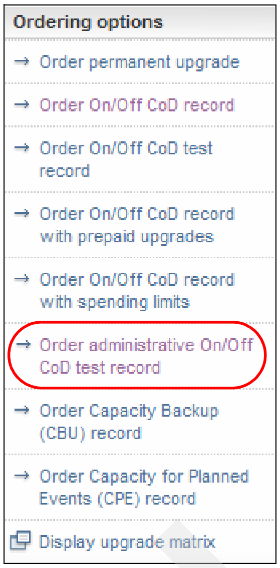
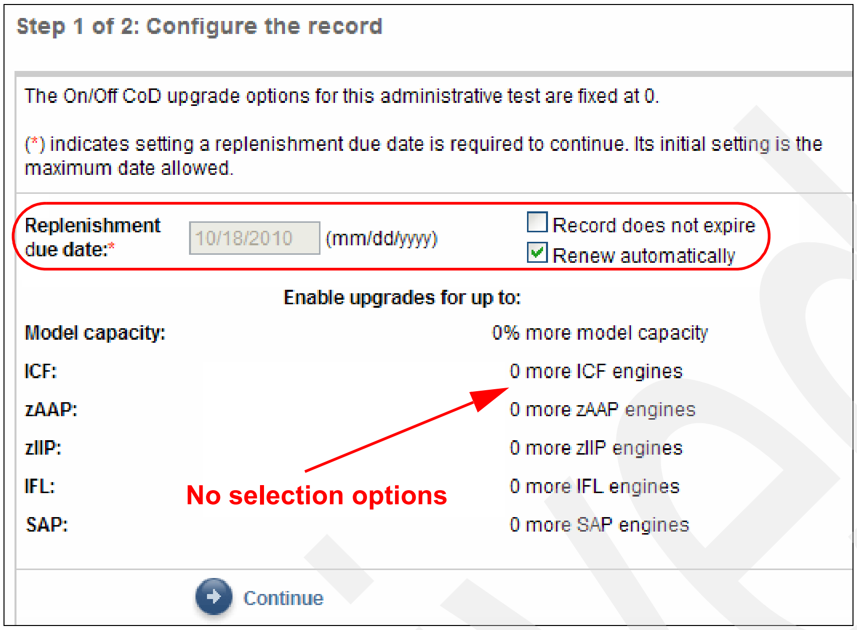


Figure 2-36 HMC and SE: CoD administrative test in Resource Link

On activation, you are not given any engine upgrade choices (even on 0% records with unassigned capacity). A record is “activated” without actually changing the activation levels.

Once activated, a record remains active until it expires or until you deactivate the record, which will prevent the activation of other On/Off CoD records (Figure 2-37).



Step 1 of 2: Configure the record

The On/Off CoD upgrade options for this administrative test are fixed at 0.

(*) indicates setting a replenishment due date is required to continue. Its initial setting is the maximum date allowed.

Replenishment due date:* 10/18/2010 (mm/dd/yyyy)

☐ Record does not expire

☑ Renew automatically

Enable upgrades for up to:

Model capacity:	0% more model capacity
ICF:	0 more ICF engines
zAAP:	0 more zAAP engines
zIIP:	0 more zIIP engines
IFL:	0 more IFL engines
SAP:	0 more SAP engines

No selection options

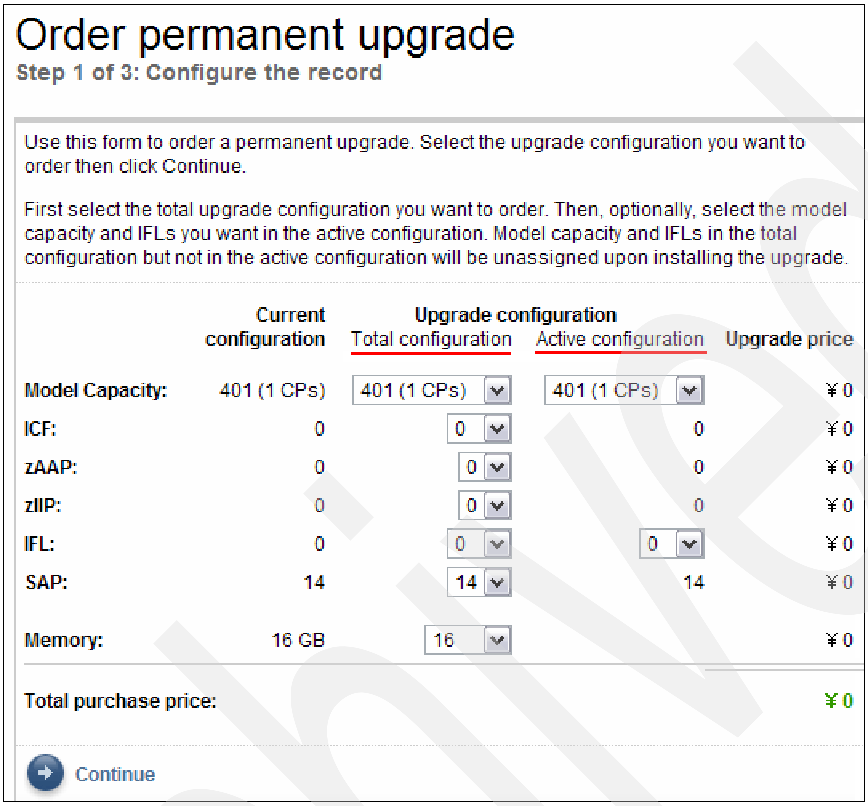
Figure 2-37 HMC and SE: CoD administrative test window

By default, administrative test records expire like all other post-paid On/Off CoD records. Auto-renewal is set by default. If auto-renewal is disabled, the default expiration is 180 days from the current date. You may optionally decide to prevent expiration by disabling auto-renewal or only making administrative test records available. You are not given capacity selection options.

Permanent upgrades by customer initiated upgrade

The customer initiated upgrade (CIU) permanent order process is more flexible. Use the updated permanent order process on IBM Resource Link to eliminate deficiencies.

You now have Total Configuration and Active configuration drop-down menus for CPs and Integrated Facility for Linux (IFL). You can only select configurations that do not exceed the CP capacity or total IFL engines of the total configuration. You can have a number of active engines that are less than the total capacity (Figure 2-38).



Order permanent upgrade

Step 1 of 3: Configure the record

Use this form to order a permanent upgrade. Select the upgrade configuration you want to order then click Continue.

First select the total upgrade configuration you want to order. Then, optionally, select the model capacity and IFLs you want in the active configuration. Model capacity and IFLs in the total configuration but not in the active configuration will be unassigned upon installing the upgrade.

	Current configuration	Upgrade configuration		
		Total configuration	Active configuration	Upgrade price
Model Capacity:	401 (1 CPs)	401 (1 CPs)	401 (1 CPs)	¥ 0
ICF:	0	0	0	¥ 0
zAAP:	0	0	0	¥ 0
zIIP:	0	0	0	¥ 0
IFL:	0	0	0	¥ 0
SAP:	14	14	14	¥ 0
Memory:	16 GB	16		¥ 0
Total purchase price:				¥ 0

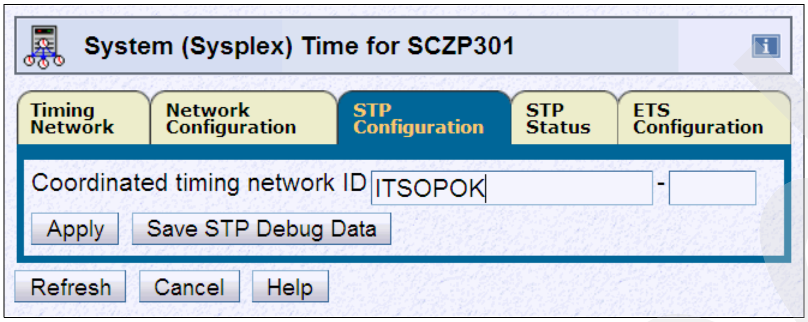
Figure 2-38 HMC and SE: Permanent upgrades by CIU

For additional details about Capacity on Demand, refer to *Capacity on Demand User's Guide,* SC28-6871.

2.2.8 ETR Function Removal

The ETR function has been removed from the z196, which now relies solely on the Server Time Protocol (STP) for time synchronization. It contains two External Clock Facility (ECF) cards that *do not* have a fiber optic connector to attach to a Sysplex Timer®, but the ECFs continue to provide support for a Pulse per Second (PPS) port.

The System (Sysplex) Time task on a z196 has changed; it only displays if STP is enabled. There *no* ETR Configuration and ETR Status tabs, but the System Time task still allows an ETR ID to be entered on the STP Configuration tab (Figure 2-39) to support participation in a Mixed Coordinated Timing Network (CTN).



Coordinated timing network ID ITSOPOK -

Figure 2-39 HMC and SE: STP configuration

A new NTP Thresholds capability function has been added, which suppresses hardware messages for Stratum Level changes (which are caused by polling the NTP server) or when a Source ID is missing for a limited time (for example, when a GPS source is blocked on a regular basis due to known reason).

The HMC can still be used to connect to an external time source (ETS) or a network time server (NTS) to maintain time accuracy for the connected CPCs. Details about the setup of the STP can be found in 8.3, “External time source setup for STP” on page 420.

2.2.9 Connectivity for HMC and the Support Element

When planning HMC and SE connectivity, you must have the following components:

- An HMC workstation with two Ethernet adapters and an HMC display.
- An Ethernet switch.
- Ethernet cables (about 15 m). These cables connect to each Ethernet adapter in each Bulk Power Hub (BPH).
- (Optional) A modem interface.

A typical SE connection of SE consists of the following items:

- A z196 SE is always connected to the Bulk Power Hub (BPH).
- Switches are connected to J01 and J02 on the Bulk Power Hubs (two switches are recommended).
- Other server SEs (not z196) may be connected to the switches.

HMC and SE connection without Ensemble enabled

If you do not need to set up an *Ensemble,* which is introduced in the z196 (refer to 11.5, “HMC/SE Ensemble requirements” on page 523), then you should set up the connections shown in Figure 2-40 for the SE and HMC.

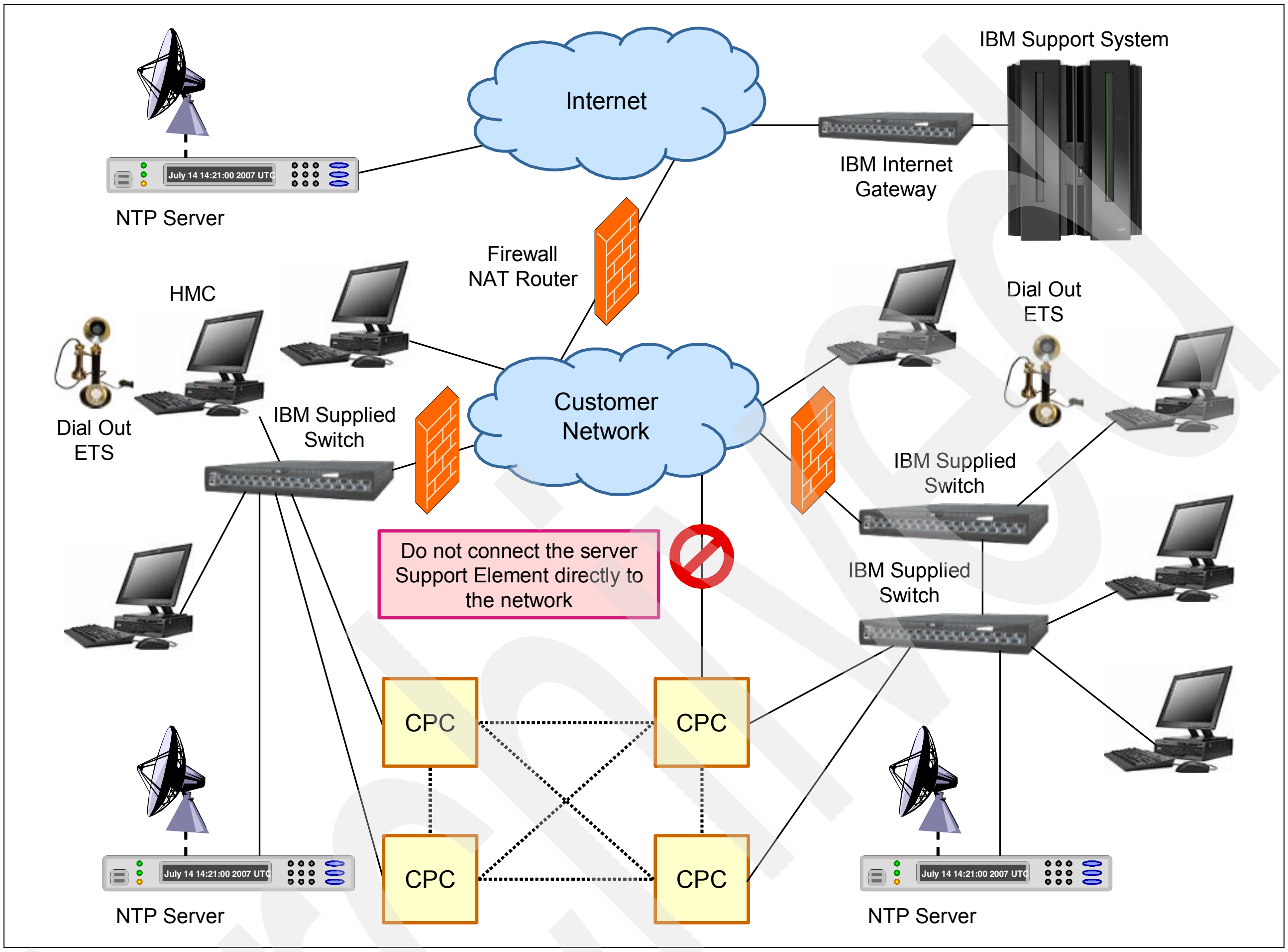


Figure 2-40 HMC and SE: HMC and SE Connection without Ensemble

HMCs and SEs can now communicate using TCP/IP Version 4 (IPv4), TCP/IP Version 6 (IPv6), or both. It is no longer necessary to assign a static IP address to an SE if it only needs to communicate with HMCs on the same subnet. An HMC and SE can use IPv6 link-local addresses to communicate with each other. Every IPv6 network interface is assigned a link-local IP address. This link-local address is for use on a single link (subnet) and is never routed. Two IPv6-capable hosts on a subnet can communicate using link-local addresses, without having any other IP addresses assigned.

HMC and SE connection with Ensemble enabled

If you need to set up an Ensemble (refer to 11.5, “HMC/SE Ensemble requirements” on page 523), you must start with a pair of HMCs and assign an Ensemble identity.

If you use the new task Create Ensemble in the z196 HMC (Version 2.11.0) by way of the Access Administrator to create an Ensemble, then CPCs, images, workloads, virtual networks, and storage pools, with or without zBXs, will be part of the Ensemble.

If a CPC is part of an Ensemble, then the CPC Details task on the SE and HMC will reflect this situation in the Ensemble name. *Two* HMCs will be required within the Ensemble for high availability Ensemble management. The HMC that creates an Ensemble (that is, uses the Create Ensemble wizard) becomes the Primary HMC, and an Alternate HMC is selected and paired with the Primary HMC.

All platform management actions for the Ensemble are conducted from the Ensemble Management HMCs. If there are any other HMCs in the Ensemble, these HMCs will be able to perform basic system management tasks, but not ensemble management tasks.

The typical configuration of a Primary/Alternate HMC and any other HMC is shown in Figure 2-41.

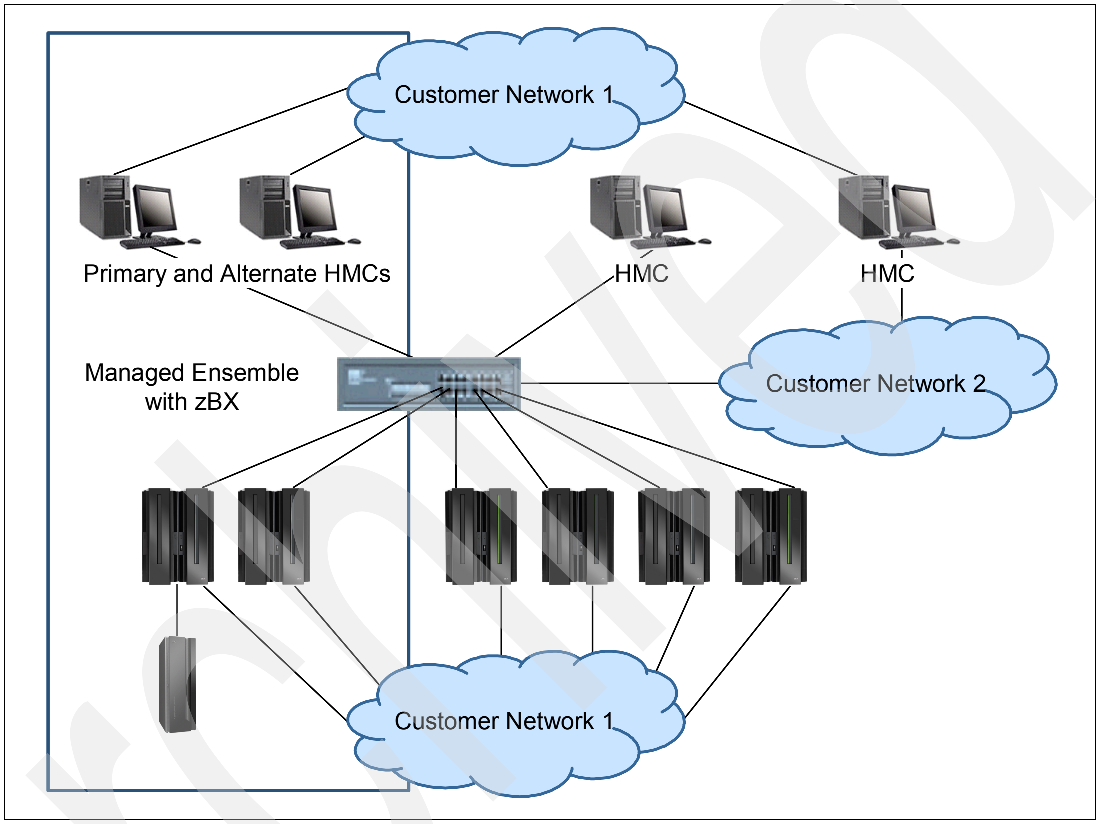


Figure 2-41 HMC and SE: HMC connection with Ensemble

2.3 Channel considerations

Two new CHPID types, OSM on OSA-Express3 1000BASE-T and OSX on OSA-Express3 10 GbE adapters, are introduced with the z196 server. An introduction to both new types is covered in 2.3.4, “Open System Adapter” on page 77.

With the introduction of InfiniBand connectivity for coupling links for the z10 EC server, new definitions and rules were introduced. The planning necessary to implement them is covered in 2.3.7, “Coupling links” on page 85.

There are certain types of channels that are no longer supported on the z196. Some Feature Codes can be carried over to the z196, but are no longer orderable features. If you have critical devices on a channel type that is no longer supported, you must make alternative arrangements for connectivity before upgrading to the z196 sever.

This section introduces the connectivity options available on a z196 server. Table 2-7 lists the channel types and definitions that are supported on a z196. The system-relevant rules for z196 are described in detail in the sections that follow.

Table 2-7 Supported channel types and definitions

Channel type	CHPID definition	MIF shared	Spanned
ESCON	CNC and CTC	Yes	No
	CVC and CBY	No	No
FICON Express4[a]	FC and FCP	Yes	Yes
FICON Express8	FC and FCP	Yes	Yes
OSA-Express2[a,b]	OSD, OSE, OSC, and OSN	Yes	Yes
OSA-Express3	OSD, OSE, OSC, OSN, OSM, and OSX	Yes	Yes
ISC-3	CFP	Yes	Yes
PSIFB	CIB	Yes	Yes
IC (Internal CHPID)	ICP	Yes	Yes
HiperSockets (Internal CHPID)	IQD	Yes	Yes

[a] This feature is only available if it is carried over by an upgrade from a previous server.

[b] OSA-Express2 10 GbE is not supported on z196.

2.3.1 Parallel channels

The z196 server does not support the direct attachment of parallel channels. Using a converter that converts ESCON connections to a parallel protocol enables devices with a parallel attachment.

Installing an FICON to ESCON converter allows you to attach an ESCON to Parallel channel converter, which enables devices with a parallel attachment to be used (Figure 2-42).

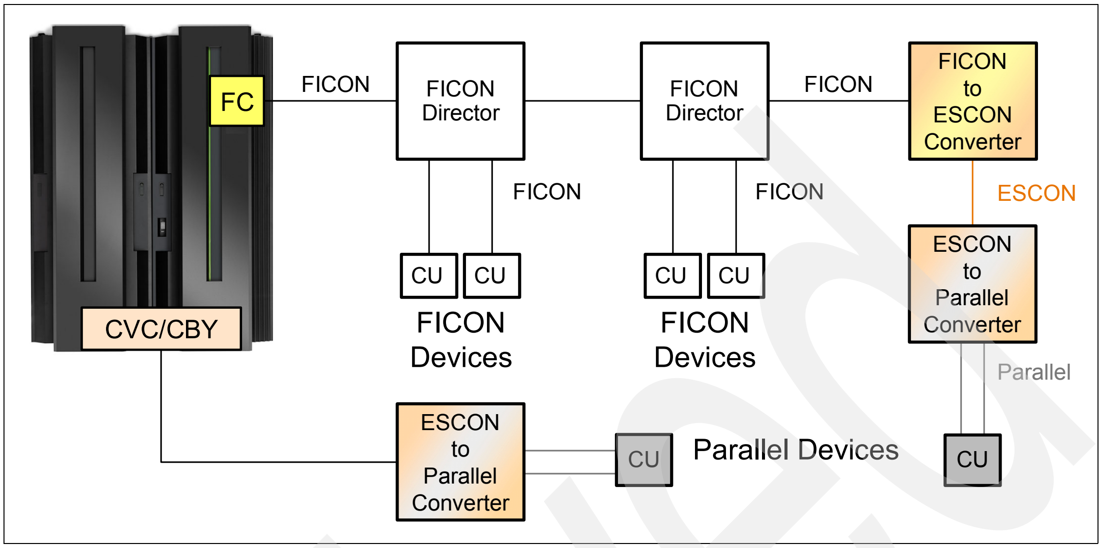


Figure 2-42 FICON to ESCON and ESCON to parallel converter

Using a FICON channel (FC) to attach parallel devices also allows you to attach FICON devices to the same PCHID. If a FICON to ESCON converter is used and a converter is connected to this ESCON channel to allow parallel attached devices, the channel type is defined as FC.

Parallel attached devices that are connected to a converter that is connected to an ESCON channel are defined as CVC or CBY (Figure 2-42). These channel types have to be defined as dedicated or reconfigurable. They cannot be defined as shared or spanned.

Note: The z196 server will be the last high-end server to offer ESCON channels for new builds, migration offerings, upgrades, and System z exchange programs. Enterprises should begin migrating from ESCON to FICON. Alternate solutions are available for connectivity to ESCON devices.

IBM Global Technology Services, through IBM Facilities Cabling Services, offers ESCON to FICON Migration (Offering ID #6948-97D), to help facilitate migration to FICON and to simplify and manage a single physical and operational environment while maximizing “green” related savings. For more information, refer to the following address:

`http://www-935.ibm.com/services/us/index.wss/itservice/igs/a1026000`

2.3.2 ESCON channels

ESCON channel support on a z196 consists of a 16-port ESCON card (Feature Code #2323). The card has 15 ports available for use, while the sixteenth is a spare port for use if one of the other ports fails. All ESCON ports in the z196 use the industry standard MT-RJ connector. A maximum of 240/360[6] ESCON channels (16 feature cards) are supported on z196.

ESCON channels cannot be defined as spanned. They can be defined as MIF-shared in a CSS, but can only be configured to one CSS at a time. Within a CSS, they can be defined as MIF-shared, reconfigurable, or dedicated (SHR, REC, or DED).

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[6] Up to 360 ESCON channels are supported with RPQ 8P2507.

If you have devices such as a 2074 console controller, and you plan to use multiple CSSs that access the same 2074, then you need to configure an ESCON PCHID in each CSS to access the 2074 over an ESCON Director.

ESCON channels can be configured in one of three ways:

- Point-to-point: In this configuration, an ESCON channel is connected directly to the control unit.
- Switched point-to-point: In this configuration, an ESCON channel is connected to multiple control units over an ESCON director.
- Switched point-to-point over maximum two chained ESCON directors, where at least one connection at one ESCON director has to be dedicated: This configuration allows for connections over extended distances.

ESCON connectivity can also be achieved by installing a FICON to ESCON converter. This setup allows you to implement ESCON control units and devices into an existing FICON environment and to use the advantages of the FICON channel and the FICON features (Figure 2-43).

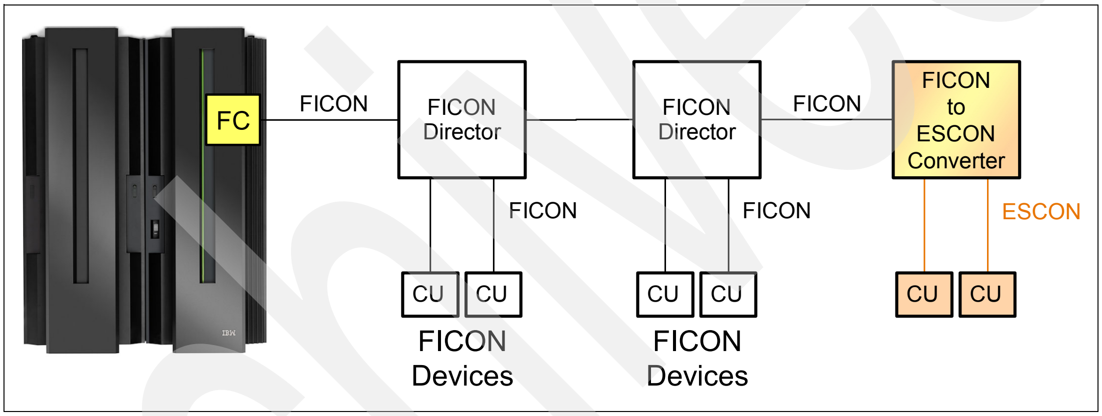


Figure 2-43 FICON to ESCON converter

Using a FICON to ESCON converter allows you to attach FICON devices on the same FICON channel.

2.3.3 FICON channels

FICON Express8 provides connectivity to storage devices by using Fiber Connection (FICON) or Fibre Channel Protocol (FCP). It supports autonegotiation of link data rate and is capable of 2 Gbps, 4 Gbps, and 8 Gbps link data rates. FICON Express8 and FICON Express4 support High Performance FICON for System z (zHPF), which is an extension to the FICON architecture, providing performance improvement for single-track and multi-track operations.

On previous servers, there was a 64 KB data transfer limit (that is, 16 x 4 KB) for a zHPF multi-track operation. On the z196 server, the limit on the amount of data that can be transferred in a single operation is raised. This new limit allows the channel to exploit the bandwidth of FICON Express8 and FICON Express4 channels when configured as CHPID type FC. The attached CU must support zHPF to exploit this enhancement.

A z196 server allows FICON channels to be defined in two ways:

- FICON native mode (FC)

  This type of channel allows for connectivity to control units that have native FICON interfaces. This can be done by point-to-point (direct connection), switched point-to-point (through a Fibre Channel Director), or cascaded FICON Directors (through two Fibre Channel Directors). FC channels can be defined as dedicated, MIF-shared, and spanned (Figure 2-44).

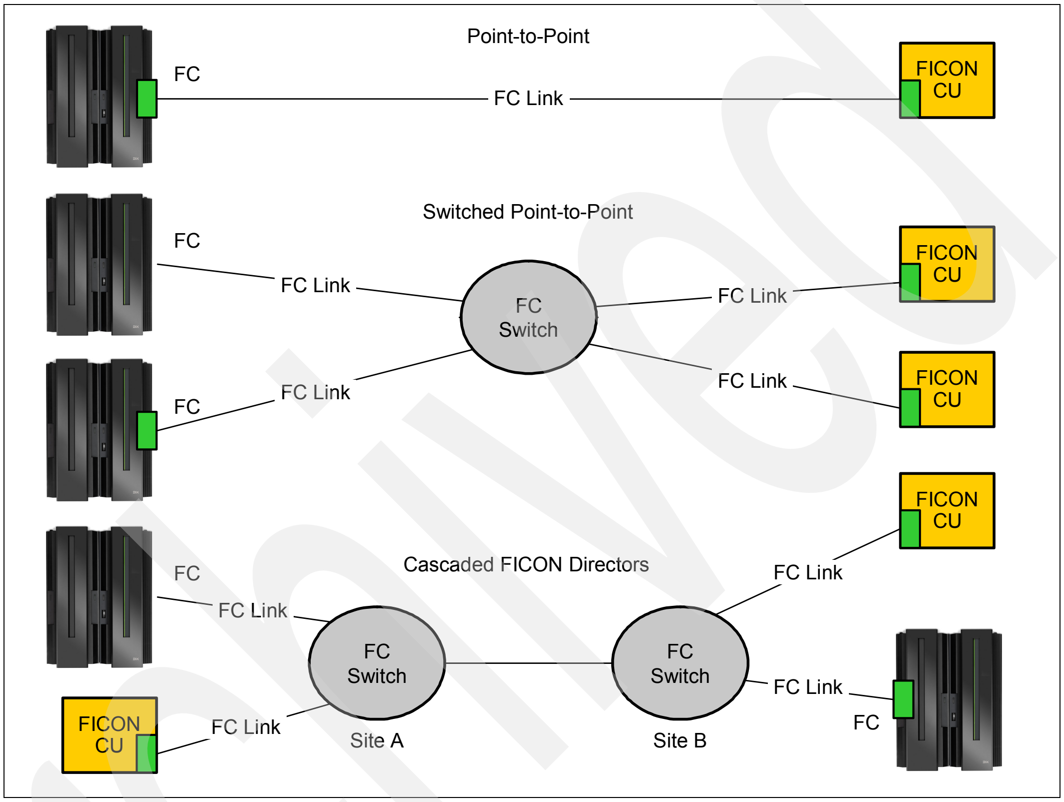


Figure 2-44 Supported FICON topologies

- Fibre Channel Protocol mode (FCP)

  This channel type allows for access to FCP devices over a Fibre Channel switch or multiple Fibre Channel switches to FCP devices, or over a Fibre Channel switch or multiple Fibre Channel switches to a Fibre Channel-to-SCSI bridge.

The FICON Express8 and the FICON Express4 provide support for Fibre Channel and SCSI interfaces in Linux environments. FCP channels can be defined as dedicated, MIF-shared, and spanned (Figure 2-45).

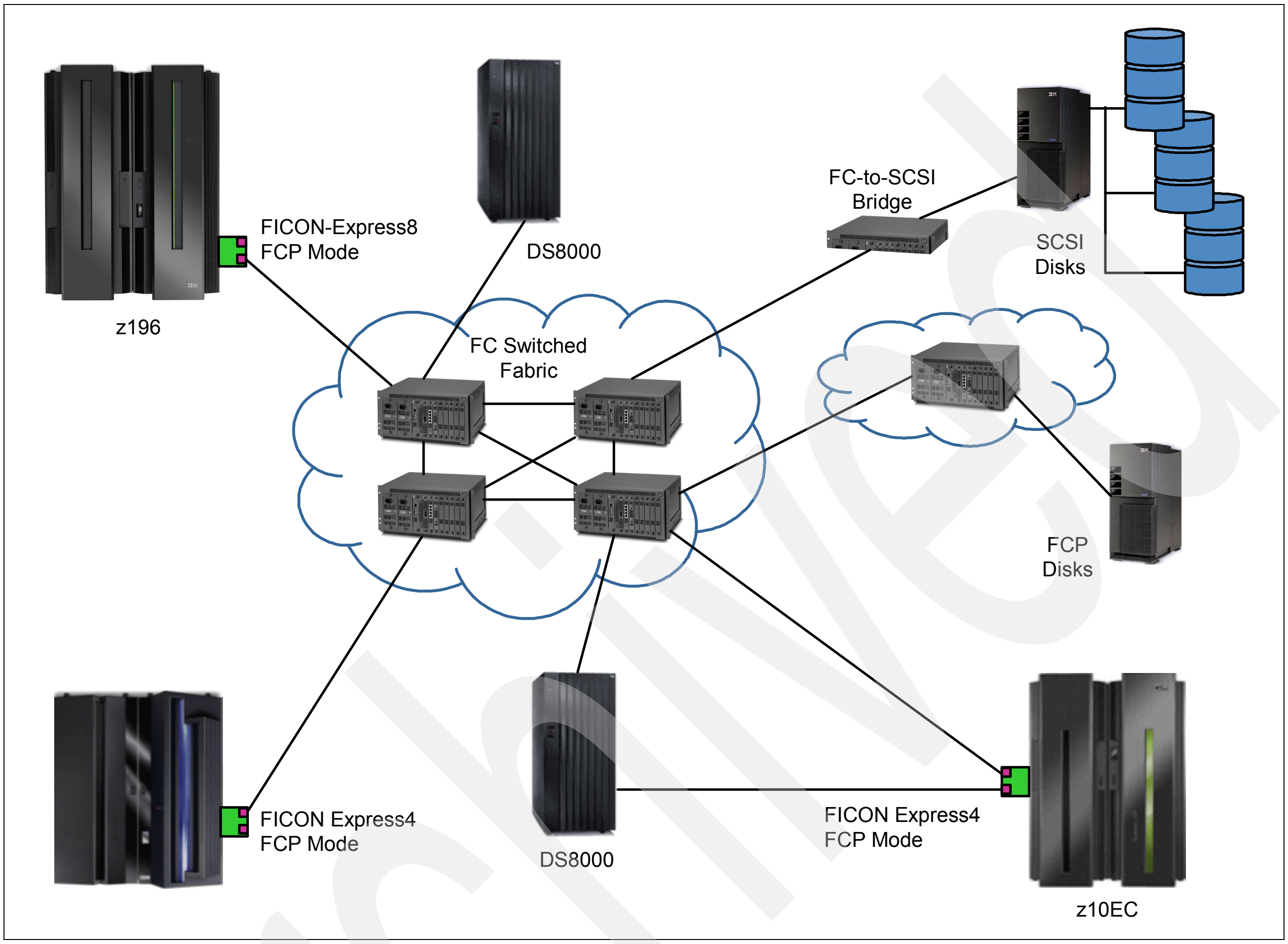


Figure 2-45 FCP connectivity topologies

Note: The FCV channel type is not supported on z196 servers.

2.3.4 Open System Adapter

The z196 supports the Open System Adapter (OSA) Express3 and some of the OSA-Express2 features. Depending on the specific feature, OSA-Express2 can be carried over from a previous server during an upgrade, while the OSA-Express3 features are ordered as new features.

The following OSA features can be ordered on a z196 server:

- OSA-Express3 10GbE
- OSA-Express3 GbE
- OSA-Express3 1000BASE-T

OSA features that can be carried forward on an upgrade to z196 are:

- OSA-Express2 GbE
- OSA-Express2 1000BASE-T

The following features are *not* supported on a z196 server:

- OSA-Express2 10 GbE: This feature can be replaced by OSA-Express3 10 GbE. The connector type changes from SC type for OSA-Express2 to LC type for OSA-Express3.
- Any type of OSA-Express feature: Consider replacing this OSA-Express feature with a OSA Epress3 feature.

A typical OSA network is shown in Figure 2-46, which shows all the current supported OSA connectivity across System z servers.

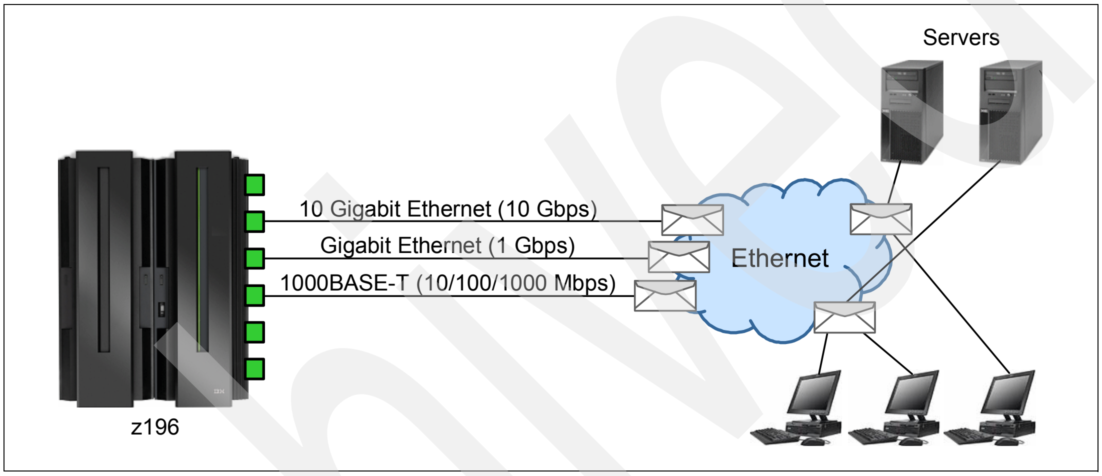


Figure 2-46 OSA supported connectivity

The OSA-Express2 1000BASE-T Ethernet feature and the OSA-Express3 1000BASE-T Ethernet feature can also be used for the OSA-Express Integrated Console Controller (OSA-ICC). The OSA-ICC provides a system console function when there is an IPL and operating systems support for multiple logical partitions. The OSA-ICC can be used as a replacement for the 3174 or other console controller or as an additional console controller to the 3174 or 2074. The OSA-ICC is a standard feature on the 1000BASE-T Ethernet feature. It can be used by coding the channel type as OSC in the HCD.

The OSA-Express2 Gigabit Ethernet, OSA-Express3 Gigabit Ethernet, and 1000BASE-T Ethernet features have the capability to provide direct (LPAR-to-LPAR) connectivity to the Communication Controller for Linux (CCL) on z10 EC and z196 servers with the introduction of the Open Systems Adapter for Network Control Program (OSN) CHPID type. When the channel is defined as OSN (OSA-NCP) it can be used to replace IBM 3745 control units running NCP. As with OSA-ICC, OSA-NCP is a standard feature. In order to use this feature for OSA-NCP, you must use a Linux logical partition running the appropriate application.

A new channel type, OSM, is introduced with the z196 serve, and it requires an OSA-Express3 1000BASE-T feature. Channel type OSM is used to build an Intra-Node Management Network (INMN). The INMN provides control and management functions on a zBX attached to a z196 server, to build a managed Ensemble, and provides a communication path for an HMC within an Ensemble. Refer to 11.2, “Ensembles and zBX connectivity” on page 504 for information about managed Ensembles. Two ports on two different OSA-Express3 1000BASE-T adapters are used for redundancy. Only Port 0 on a OSA-Express3 100Base-T card can be defined as channel type OSM. A copper CAT6

Ethernet cable is used to connect to the internal network in the z196 server. To build a managed Ensemble, an additional channel type OSX has to be defined on an OSA-Express3 10 GbE feature.

Figure 2-47 shows the port assignment of an OSA-Express3 1000BASE-T adapter card and the occupied ports if an OSM channel type is defined.

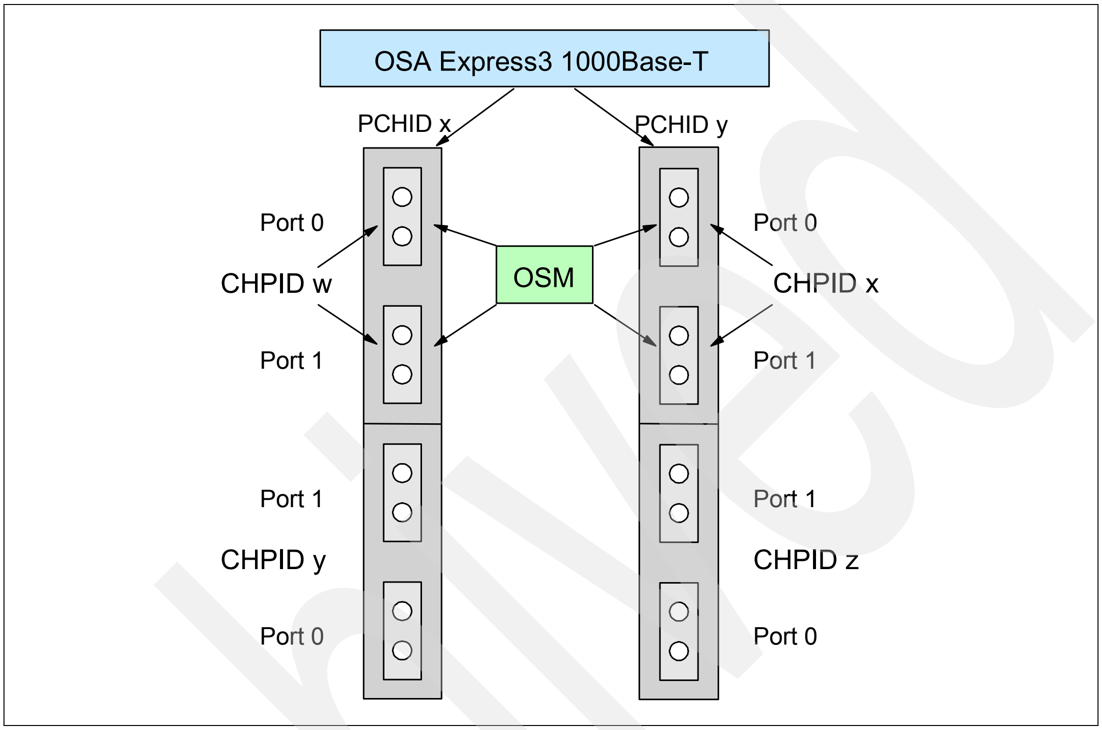


Figure 2-47 OSA-Express3 1000BASE-T port assignment

For redundancy, two OSM CHPIDs are defined on two different OSA-Express3 1000BASE-T adapters. For each OSM CHPID, both ports (0 and 1) for the CHPID are consumed, but only port 0 on each adapter and CHPID is used to connect to the network.

The OSA-Express3 10 GbE supports the new OSX channel, which is introduced with the z196 server. The OSX channel type is used to build an Intra-Ensemble Data Network (IEDN). The IEDN allows communication and data sharing between z/OS images, and provides a communication path to an attached zBX. For redundancy, two OSA-Express3 10 GbE feature are required. The OSX channel type connects to the Top Of Rack (TOR) switch in a zBX.

Figure 2-48 shows the port assignment of an OSA-Express3 10 GbE adapter card and the occupied ports if an OSX channel type is defined.

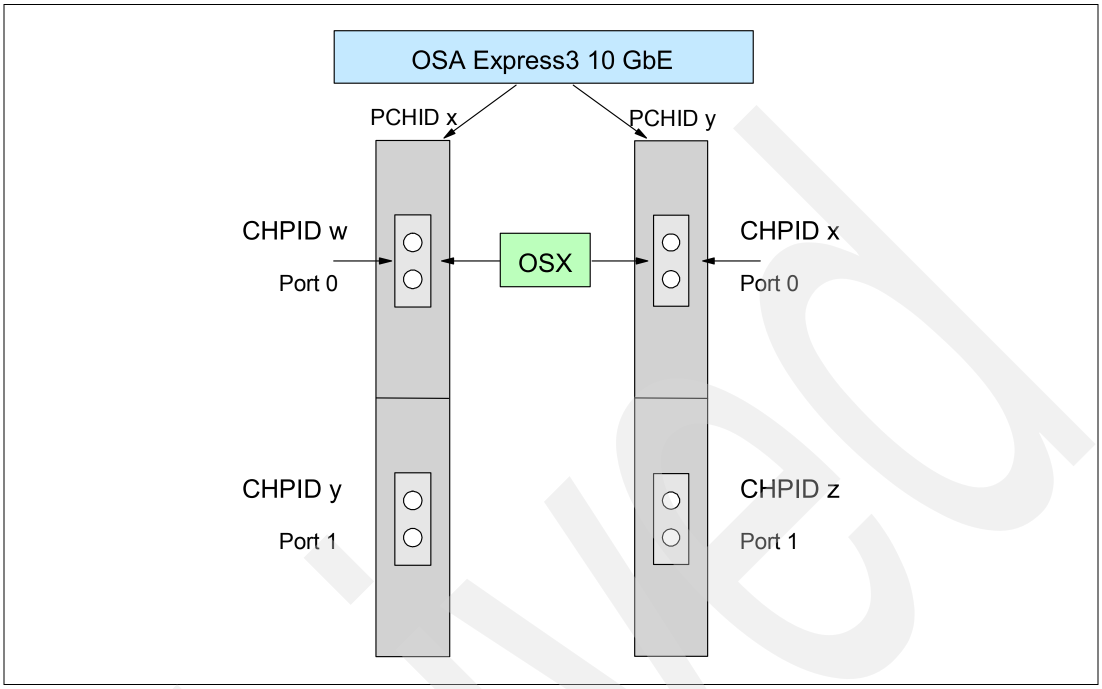


Figure 2-48 OSA-Express3 10 GbE port assignment

For redundancy's sake, two OSX CHPIDs are defined on two different OSA-Express3 10 GbE adapters. For each OSX CHPID, one port for the CHPID is occupied and used to connect to the zBX. The other CHPID/port of the OSA-Express3 10GbE adapter can be used to connect to an external network. Refer to 11.2, "Ensembles and zBX connectivity" on page 504 for more information about this topic.

2.3.5 HiperSockets

HiperSockets provide the fastest TCP/IP communications between z/OS, z/VM, VSE/VSA, and Linux logical partitions on a z196. HiperSockets provide internal "virtual" local area networks that act similar to TCP/IP networks inside a z196 server. This effect is achieved by using the Licensed Internal Code (LIC) and supporting device drivers on the operating systems. HiperSockets establishes a network with higher availability, security, simplicity, performance, and cost effectiveness than could be achieved using an external TCP/IP network.

The HiperSockets function, also known as Internal Queued Direct Input/Output (iQDIO), uses no physical cabling or external networking connections. Data access is performed at memory speeds, bypassing external network delays.

A HiperSocket is defined as a channel type IQD. It is assigned a CHPID value, but no PCHID. When defining an IQD channel, the maximum frame size in HCD must be set. The default is 16 KB, but you can use 24 KB, 40 KB, or 64 KB. A single logical partition can connect up to 32 HiperSockets.

HiperSockets can be defined as MIF-shared in a CSS and as spanned channels across multiple CSSs. A HiperSocket CHPID can be seen as an "internal LAN" to the server, and the level of sharing is determined by the logical partitions you want to grant access to that LAN.

The HiperSockets supported functions on a z196 include the following functions:

- HiperSockets Broadcast support on Internet Protocol version 4 (IPv4) for applications

  Applications using the broadcast function can propagate the broadcast frames to all TCP/IP applications that are using HiperSockets.
- VLAN support for HiperSockets in a Linux environment

  VLANs can reduce their latency by allowing networks to be organized by traffic patterns and not physical locations. This setup allows for traffic flow over HiperSockets and between HiperSockets and OSA-Express features.
- IPv6 support on HiperSockets
- Improved Layer 2 traffic diagnostics

2.3.6 Parallel Sysplex over InfiniBand (PSIFB) links

The z196 servers benefit from the high speed and low latency offered by InfiniBand technology. It provides improved reliability, scalability, and performance, which is important for both Parallel Sysplex® and I/O interconnectivity.

InfiniBand is a point-to-point interconnect architecture developed to satisfy contemporary requirements for higher bandwidth and ability to scale with increasing bandwidth demand. Each individual link is based on a two-fiber 2.5 Gbps bidirectional connection for an optical (fiber cable) implementation or a four wire 2.5 Gbps bidirectional connection for an electrical (copper cable) implementation, called a physical lane. Each lane supports multiple transport services for reliability and multiple prioritized virtual communication channels. Physical lanes are grouped together to support a single physical lane (1X), four physical lanes (4X), eight physical lanes (8X), or 12 physical lanes (12X).

InfiniBand currently defines several link speeds at the physical layer. It negotiates the use of:

- Single Data Rate (SDR), delivering 2.5 Gbps per physical lane
- Double Data Rate (DDR), delivering 5.0 Gbps per physical lane
- Quadruple Data Rate (QDR), delivering 10.0 Gbps per physical lane

Combining the link speeds with the interface widths gives the link or signalling rates shown in Table 2-8.

Table 2-8 Interface width and link ratings

Width	Single Data Rate	Double Data Rate	Quadruple Data Rate
1X	2.5 Gbps	5.0 Gbps	10 Gbps (1 GBps)
4X	10.0 Gbps (1 GBps)	20.0 Gbps (2 GBps)	40 Gbps (4 GBps)
8X	20.0 Gbps (2 GBps)	40.0 Gbps (4 GBps)	80 Gbps (8 GBps)
12X	30.0 Gbps (3 GBps)	60.0 Gbps (6 GBps)	120 Gbps (12 GBps)

I/O interconnectivity on z196

The connectivity to the I/O cages (I/O domains) in the z196 server is supported by InfiniBand technology, which provides a data rate of 6 Gbps.

For the z196 server, an HCA2-C fanout in the front of a book connects over an IFB copper cable to the IFB-MP card in the I/O cage. As shown in Figure 2-49, there is a passive connection in the IFB-MP to provide the redundancy for the I/O interface. This setup allows for concurrent repairs against the cabling, the HCA-2C fanout, or the book. The use of InfiniBand for the I/O interconnectivity is entirely internal to the z196 server and requires no further planning or actions.

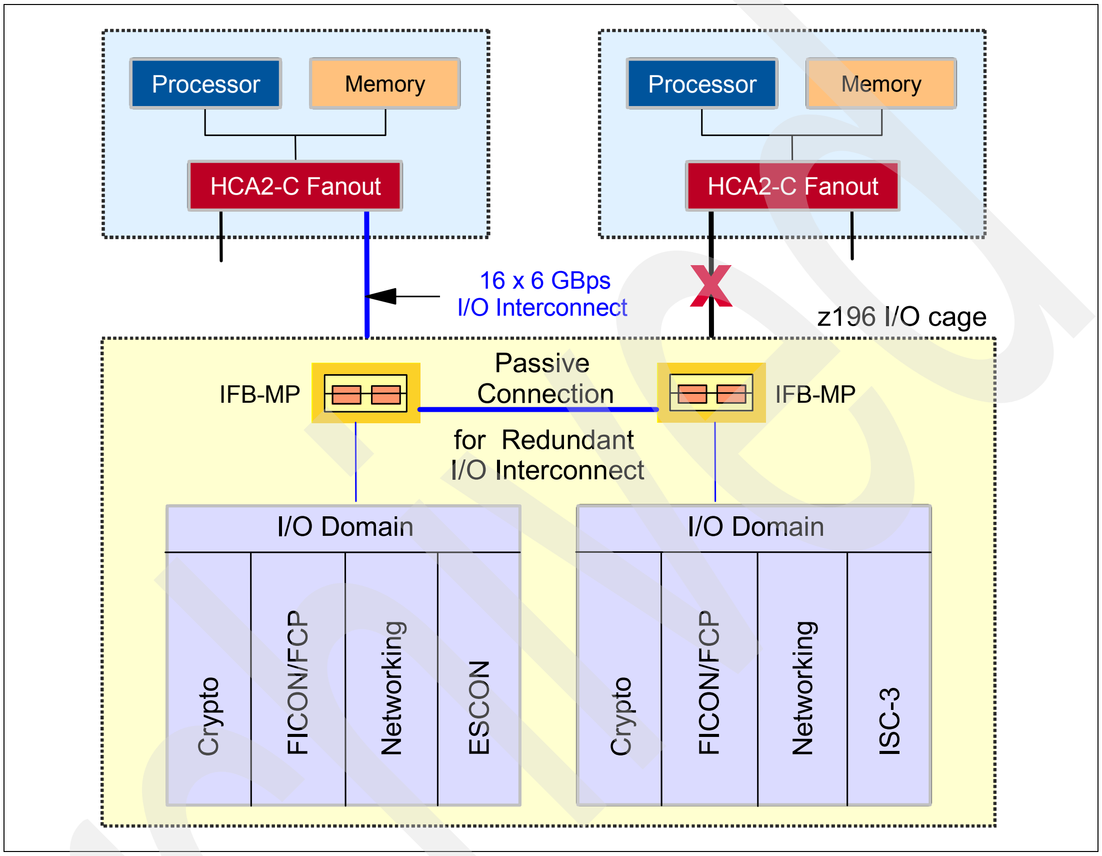


Figure 2-49 Data flow for a disconnected I/O interface link

InfiniBand coupling links

On the z196 server, 12x IB-DDR is the high-speed link used to connect either two z196 units, or a System z196 to a System z10, or a System z9, over a point-to-point coupling link. The HCA2-O fanout is installed in a fanout slot in the front of the book. The fanout has two optical MPO ports and the order increment for the HCA2-O fanout is always one complete fanout with both links enabled.

The connection is made by connecting the HCA2-O to the other systems' IFB fanouts (either an HCA1-O for a System z9 or an HCA2-O for a z10) over a 50 micron OM3 (2000 MHz-km) multimode fiber. In the cable are 12 lanes (two fibers per lane, one each for transmit and receive) which yields 24 fibers in total. The maximum supported length for these connections is 150 meters (Figure 2-50).

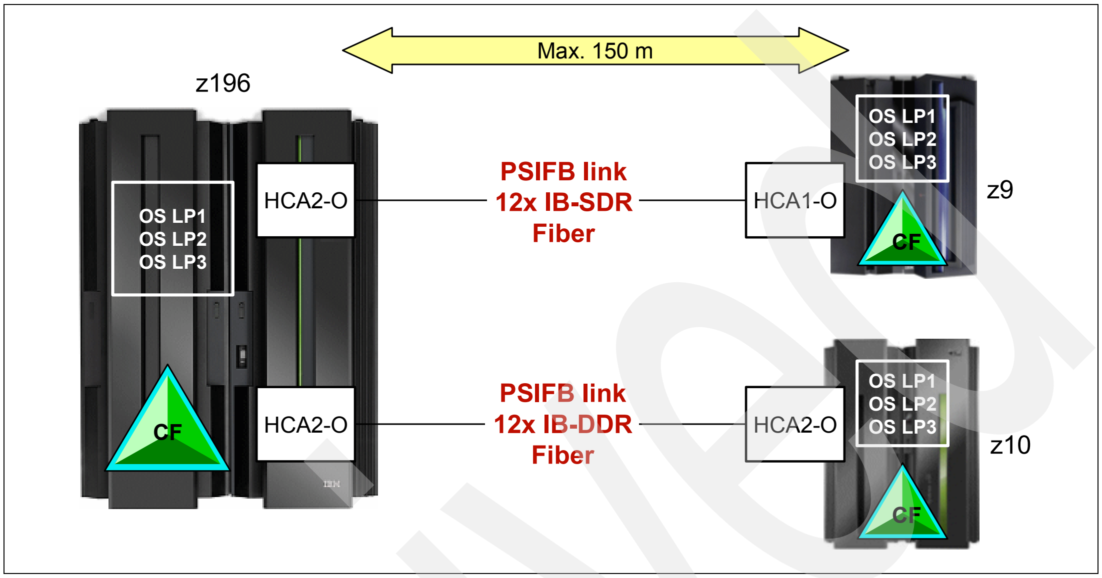


Figure 2-50 InfiniBand coupling link connectivity for z196 (HCA-O)

While the HCA2-O fanout supports a maximum distance of 150 m (492 feet), the HCA2-O LR supports a maximum unrepeated distance of 10 km (6.1 miles). The HCA2-O LR fanout provides a 1x IB-DDR or 1x IB-SDR link. The link speed for 1x IB-DDR is 5 Gbps, and for 1x IB-SDR, the link speed is 2.5 Gbps. The z196 HCA-O LR fanout is used to connect to another z196 server or to a z10 server (Figure 2-51).

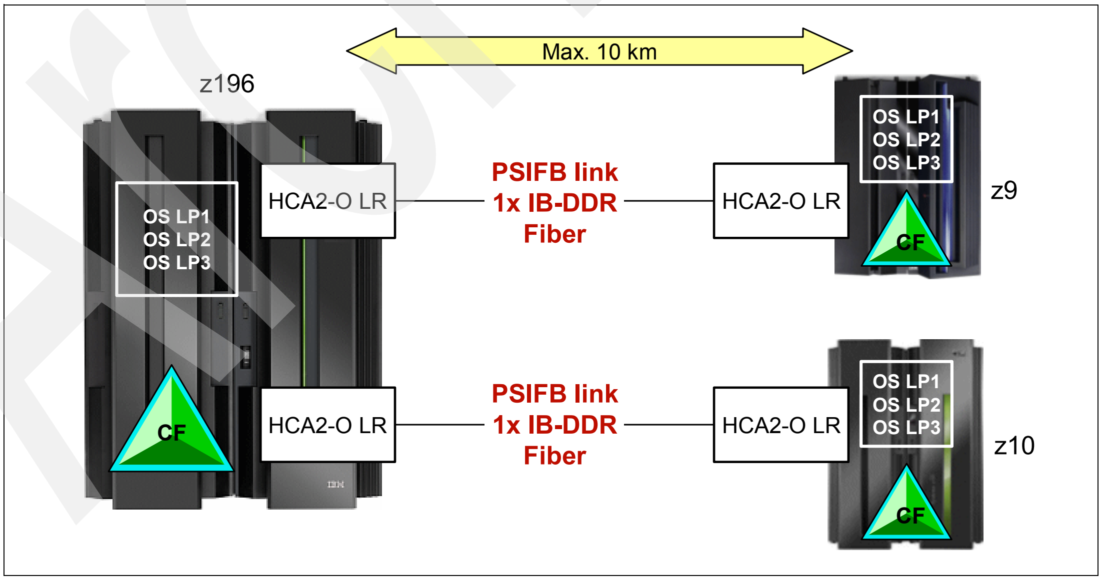


Figure 2-51 InfiniBand coupling link connectivity for z196 (HCA-O LR)

Note: Connectivity to a z9 server over HCA-O LR fanout is not supported.

All types of PSIFB coupling links support the Server Time Protocol (STP).

Adapter ID assignment

The Adapter ID (AID) is a number between 00 and 1F assigned to every PSIFB fanout at installation time. It is unique for the system. There is only one AID per fanout assigned so that both ports on the fanout share the same AID. In the IOCP, the AID must be used to connect the physical location of the fanout with the logical assigned CHPID. For assignment and handling, the AID is bound to the serial number of the fanout. If the fanout is moved, the AID moves with it, so it is not necessary to readjust the IOCDS. For new system builds or newly installed books, the AID can be determined by using the data in Table 2-9.

Table 2-9 Initial AID number assignment

Adapter location	**Book**			
	Fourth	**First**	**Third**	**Second**
D1	00	08	10	18
D2	01	09	11	19
D3	NA	NA	NA	NA
D4	NA	NA	NA	NA
D5	02	0A	12	1A
D6	03	0B	13	1B
D7	04	0C	14	1C
D8	05	0D	15	1D
D9	06	0E	16	1E
DA	07	0F	17	1F

Note: The fanout positions D3 and D4 are reserved for Functional Service Processor (FSP) cards and cannot be used for fanouts. Also, the positions D1 and D2 are not available in the books in slots 10 and 15 of a M49 model, and all books of a M66 and M80 model.

Depending on the z196 model, the plugging rules for fanouts vary, but the IBM configuration tool takes care of the allocation. The assignments of the AIDs are found in the PCHID Report for new servers or MES upgrades, and in HMC and SE windows after installation. Refer to Example 1-1 on page 12 for an example of a PCHID Report.

A maximum of 16 HCA2-O fanouts are supported on a z196 server, which provide a total of 32 ports. Nevertheless, the maximum value of 128 coupling link CHPIDs per system is still valid, including IC, active ISC-3, and PSIFB types. It is possible to define up to 16 CHPIDs per fanout, which can be freely distributed across both links, but we recommend no more than eight CIB CHPIDs per HCA. Note that the PSIFB CHPIDs can be shared or spanned across logical partitions on z196 servers. However, the number of coupling CHPIDs must not exceed the maximum of 128.

PSIFB links and STP

PSIFB links are also used to pass time synchronization signals using the Server Time Protocol. Therefore, the same coupling links can be used to exchange timekeeping information and Coupling Facility messages in a Parallel Sysplex.

STP provides a coordinated time source for systems connected over coupling links. It replaces the Sysplex Timer as a time source for interconnected systems. STP uses coupling links to transmit time signals between interconnected systems. PSIFB links are supported for STP timing signals between systems that support PSIFB, including timing-only links where required. Coexistence with other types of coupling links used for STP is also supported. For additional information, refer to the *Server Time Protocol Planning Guide,* SG247280.

Note: At least two physical coupling links should be used between any two servers exchanging STP messages to prevent a single point of failure.

Prerequisites

The implementation of PSIFB links requires a z196 server on at least one end of the connection. The hardware prerequisites for PSIFB are satisfied by the System z196 ordering process. Prerequisites for PSIFB links on System z10 are resolved by ordering the HCA2-O fanout feature (FC #0163). Prerequisites on System z9 are also resolved by ordering a HCA1-O fanout feature (FC #0167). Additional HSAs are allocated to support the HCA1-O fanout on System z9. After the feature is installed, a POR is required to enable the PSIFB links.

PSIFB links are supported by z/OS V1.7 and later releases. At the time of writing, all currently available and supported releases require additional PTFs. The information necessary to identify the required service is available in the Preventive Service Planning (PSP) buckets named 2094DEVICE, 2097DEVICE, and 2817DEVICE for System z9, z10, and z196, respectively. The PSP information should be thoroughly reviewed early in the planning process to allow time for ordering and installing any necessary software.

Cable requirements

The PSIFB link uses an industry standard optical fiber cable. The cable for 12x IB-DDR is a 12 fiber pair cable (total of 24 optical fibers) of 50 micron multimode optical fiber. You are responsible for providing the cable because it is not included with the HCA feature. The maximum cable length for PSIFB is 150 meters, which provides more flexibility for physical placement of servers.

The z196 environment uses an InfiniBand MPO 50 micron fiber cable for PSIFB connectivity. It is a 50 micron OM3 (2000 MHz-km) multimode fiber cable with MPO connectors. It has one pair of fibers per lane, which yields 24 fibers in total for a cable used in a 12x connection. Optical cables of different length are only used to make coupling links. The sender and receiver are clearly marked with either RX or TX and the connectors are keyed. Also, on all FRUs using IFB optical modules, the keys are facing upward and the Transmitter module (TX) is on the left side and the Receiver module (RX) is on the right side.

2.3.7 Coupling links

The z196 server supports two types of external coupling links: Parallel Sysplex over InfiniBand (PSIFB) coupling links and InterSystem Channel-3 (ISC-3) links:

- PSIFB
  - HCA2-O fanout
    - Maximum distance of 150 m (492 feet)

        - 50 micron OM3 (2000 MHz-km) multimode fiber cable
        - MPO connector
        - Maximum of 32 links per server
    - HCA2-O LR fanout
        - Maximum distance of 10 km (6.2 miles)
        - 9 micron single-mode (SM) fiber cable
        - LC duplex connector
        - Maximum of 32 links per server
- ISC-3
        - Maximum distance of 10 km (6.2 miles)
        - 9 micron single-mode (SM) fiber cable
        - LC duplex connector
        - Maximum of 48 links per server

> **Note:**
>
> - ICB-4 coupling links are not supported on z196 servers.
> - System z196 is the last server to offer ISC-3 coupling links.

All the supported coupling link types can coexist on a single server and between two servers. There are no restrictions on intermixing supported link types.

For z196 servers, the maximum number of coupling CHPIDs combined (PSIFB, active ISC-3 links, and IC) is 128. Individual limits include 48 ISC3 links plus 16 HCAs (32 links).

Coexistence

When implementing PSIFB or ISC-3 links, the requirements for z196 server coexistence must be considered. The z196 can *only* coexist with System z10 (EC or BC) and System z9 (EC or BC) servers in a parallel sysplex. Any earlier servers (such as z800, z900, z890, or z990) in the parallel sysplex environment must be removed or replaced by a supported server before the z196 can be added.

PSIFB coupling links and ISC-3 coupling links are available on z196, z10, and z9 servers. Table 2-10 lists the supported coupling link options for connecting a z196 server to another z196, z10, or z9 server.

Table 2-10 Coupling link options to connect z196 to a z196, z10, or z9 server

	z196		
Connect to	**PSIFB 12x IB DDR**	**PSIFB LR 1x IB SDR**	**ISC-3**
z196	Y	Y	Y
z10	Y	Y	Y
z9	Y	N	Y

> **Note:** ICB-4 coupling links are not supported on z196 servers.

Figure 2-52 shows the coupling link configuration options:

- z196 to z196
- z196 to z10 EC
- z196 to z10 BC
- z196 to z9 EC
- z196 to z9 BC

On a z196 server, up to 80 physical external coupling links can be ordered. A maximum of 128 CHPIDs can be configured across the physical links.

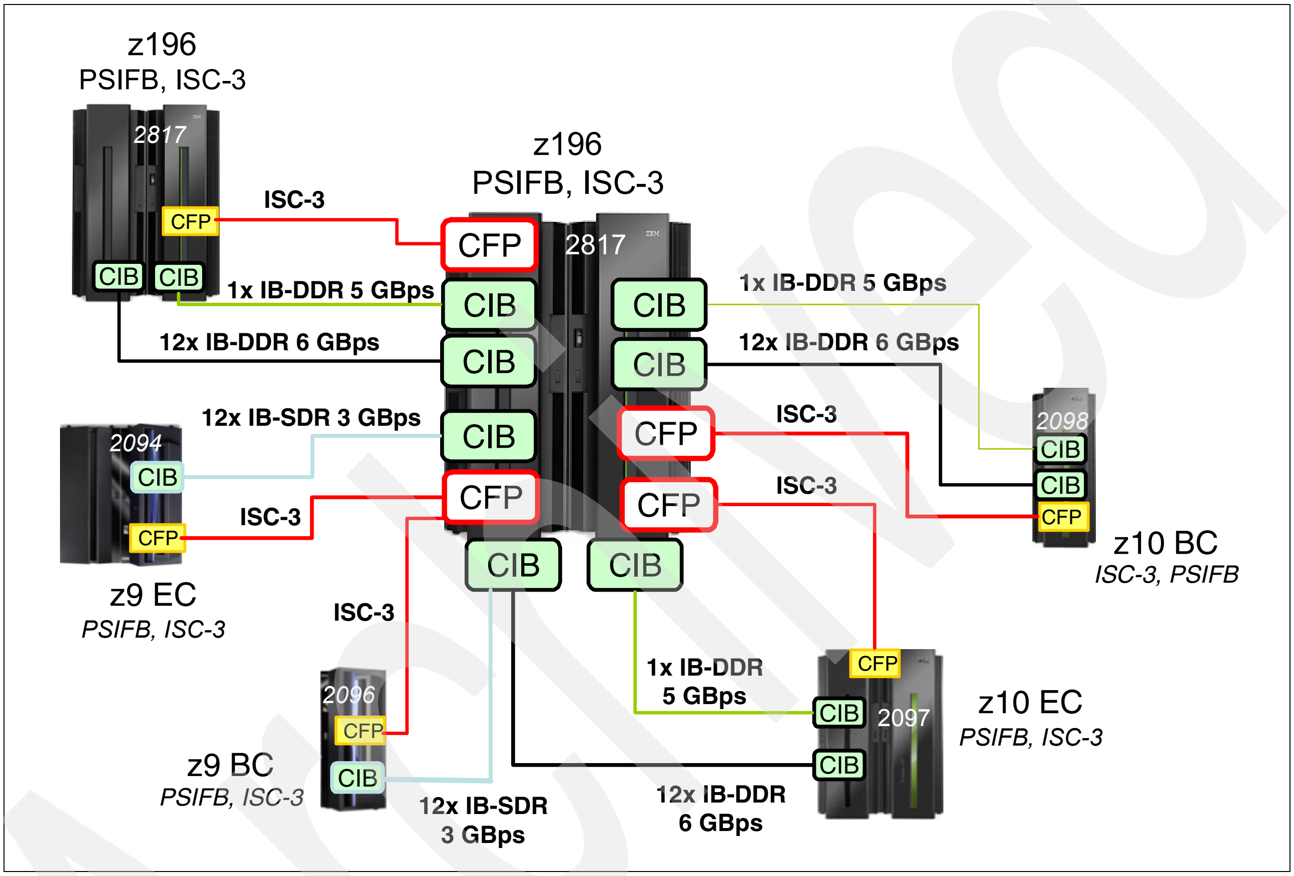


Figure 2-52 Coupling link configuration options and supported coexistence for z196

When configuring a z196 in a Parallel Sysplex configuration, you need to ensure that the other servers have the correct channel type and definition to connect to a z196.

The channel types that can be defined for coupling links are:

- ISC-3 in peer mode (CFP): Inter System Channel links are used for data sharing between the Coupling Facility and the operating systems connected to the Coupling Facility. They are connected point-to-point. ISC-3 coupling links must be defined in peer mode (CFP).
- PSIFB (CIB): This is a CHPID type to identify a coupling over IB (CIB) channel path. The CHPID can be DED, REC, SHR, or SPAN. The HCA2-O link supports point-to-point up to 150 m. The HCA2-O LR link supports point-to-point up to 10 km.
- Internal Coupling links in peer mode (ICP): Internal Coupling channels are linkless connections (controlled by Licensed Internal Code) that do not need any cabling. They

provide connectivity between a Coupling Facility and logical partitions running on the same CPC.

Some high-level configuration guidelines for CIB CHPIDs are as follows:

- No PCHID can be specified for a CIB channel path. An Adapter ID (AID) and PORT are used.
- A spanned CIB CHPID requires the same AID and PORT to be specified for all channel subsystems where it is defined. A maximum of 4 CHPIDs is recommended.
- Up to 16 CIB CHPIDs can be defined to the same AID. Even though 16 are allowed, we recommend no more than 8 per HCA. This is verified at the HCA level, meaning all 16 could be defined on one port.
- A combination of CIB, CBP, CFP, and ICP CHPIDs are allowed on the same control unit (CF image), up to the maximum of eight paths per CU.
- All CIB CHPIDs on a single control unit must have the same connecting system (CSYSTEM).
- A CIB CHPID can only be connected to another CIB CHPID.

Note: A configuration connecting two CIB CHPIDs within the same system using the same AID and port is not supported. Prior versions of IOCP/HCD would allow this type of configuration, The current version of IOCP/HCD prevents such a definition.

- All CIB CHPIDs must be connected within HCD/HCM before a production IODF can be built.
- A processor that has a connected CIB channel path must have an established local system name (LSYSTEM). This is handled by HCD.

A new Coupling Facility Control Code (CFCC) level 17 is introduced by the z196 server. CFCC level 17 allows allocation of up to 2047 structures, which doubles the number of structures allowed by previous servers.

CFCC level 17 can coexist with previous CFCC levels on z10 and z9 servers. The minimum CFCC level for z10 and z9 servers are:

- z10 CFCC level 16 Service level 2.22 (MCL N24403.04)
- z9 CFCC level 15 Service level 2.11 (MCL G40953.014)

To calculate structure sizes, the Coupling Facility Structure Sizer tool (CFSizer) should be used. The CFSizer returns structure sizes based on CFCC level. The CFsizer tool is available at the following address:

`http://www.ibm.com/systems/z/cfsizer`

Support for multiple CHPIDs per port

PSIFB coupling technology provides the ability to define multiple CHPIDs on a single PSIFB port. Each PSIFB fanout has two ports, and 16 CHPIDs can be defined across those two ports in any combination. There are multiple reasons for using this new support, such as:

- PSIFB links can be shared by multiple sysplexes. On previous systems supporting only ICB-4 and ISC-3 coupling links, sharing these coupling links between different sysplexes was not supported. If a single System z9 with two z/OS logical partitions, each a member of a different parallel sysplex, is connected to another System z9 with two CF logical partitions, one for each sysplex, at least two coupling links are required. Without PSIFB, the two sysplexes cannot share a coupling link. With PSIFB, multiple CHPIDs can be assigned to a single physical link, allowing each sysplex to own separate logical coupling links across a single physical PSIFB link. Depending on the exact configuration, this configuration might provide a significant reduction in the number of coupling links required.

For ISC-3 coupling links, each coupling link CHPID requires a physical link (Figure 2-53).

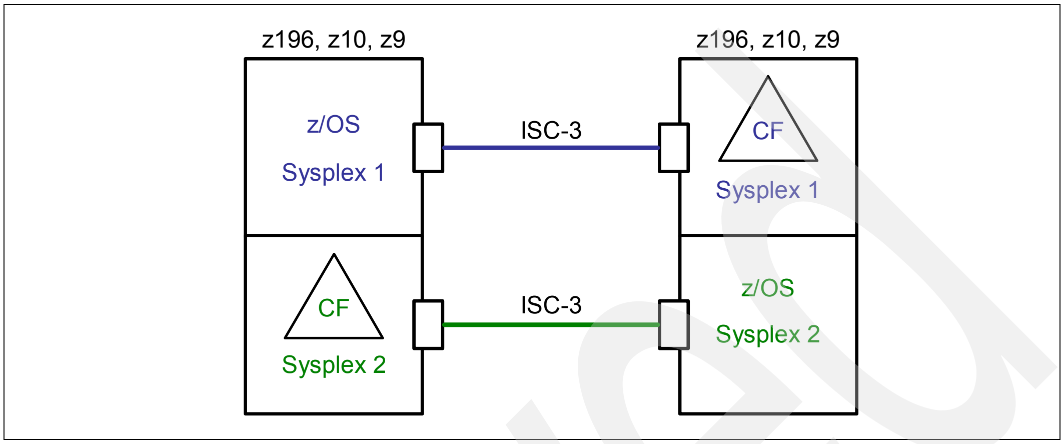


Figure 2-53 Coupling links using ICB-4 or ISC-3

For PSIFB links, multiple CHPIDs can share a physical link (up to 16 per adapter) (Figure 2-54).

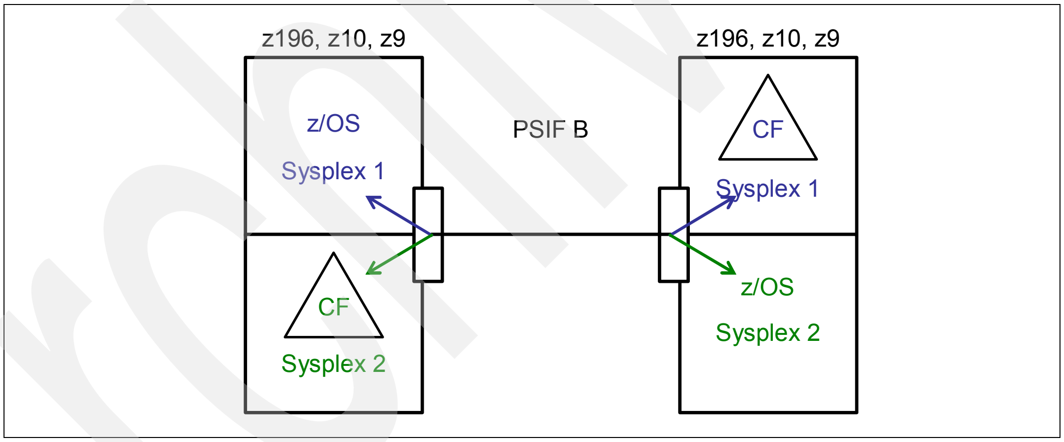


Figure 2-54 Coupling links using PSIFB

- Defining more coupling link CHPIDs provides additional subchannels for CF communication. Each peer-mode coupling link CHPID defines seven subchannels supporting seven concurrent I/O operations to the coupling facility. If the volume and duration of CF accesses is high enough to cause subchannel busy conditions, then defining additional CHPIDs may improve CF communication performance. This action might also provide significant relief when multiple z/OS images on a single machine are sharing a coupling link CHPID over a Multiple Image Facility (MIF). For heavily used systems, this is often a source of subchannel busy conditions.

Note: Defining multiple CHPIDs on a single physical PSIFB link does not satisfy the condition of having multiple coupling links between coupled systems. Multiple physical links, on different HCAs, should be configured to avoid single points of failure.

Adapter ID and port assignment

Unlike channels installed in an I/O cage, which are identified by a PCHID number related to their physical location, PSIFB fanouts and ports are identified by an AID. The AID is used to define CHPIDs for PSIFB links just as PCHIDs are used to define CHPIDs for other types of coupling links. The assignment of AIDs is covered in “Adapter ID assignment” on page 84.

The AID assigned to an adapter can be found in the *PCHID report* provided for a new server or for MES upgrades on existing servers. This is the same report that provides the PCHID information for other types of coupling links. Example 2-1 shows part of a PCHID report for a z196 model M32. In this example, two adapters are installed, one in the first book (location 06) and the other in the second book (location 15). The adapters are installed in location D6 in each case. The assigned AID to the adapter in the first book is 0B and the AID assigned to the adapter in the second book is 1B.

Example 2-1 Sample PCHID REPORT showing AID assignments

```
CHPIDSTART
  19756694                      PCHID REPORT                       Jun 22,2010
  Machine: 2817-M32 SNxxxxxxx
  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Source           Cage  Slot  F/C    PCHID/Ports or AID              Comment
  06/D6            A25B  D606  0163   AID=0B

  15/D6            A25B  D615  0163   AID=1B
```

Note: When a PSIFB HCA fanout card is moved from one slot location on a processor book to another location, the AID moves as well (the AID is *retained*).

LSYSTEM, CSYSTEM, and CPATH

A local system name (LSYSTEM in the IOCP) is required on every server that uses PSIFB links. The LSYSTEM unique keyword is on the ID statement. The local system name is used by the CPC to identify itself when establishing a coupling facility connection using CIB channel paths. We recommend using the same CPC name specified for the processor on the Hardware Management Console. This action helps avoid naming conflicts.

CSYSTEM is on the CHPID statement. This is the name (the name given the attached system by the just mentioned LSYSTEM value in the IOCP) of the system with which this CHPID is going to connect.

The CPATH is also defined on the CHPID statement. The value of this keyword, similar to ICP, identifies the CSS and CHPID on the connecting system (CSYSTEM) to which this channel path is to communicate. The CPATH keyword is valid only for ICP and CIB channel paths and is required for all ICP and CIB definitions. An ICP or CIB channel path must connect to another channel path of the same type and can connect to only one path. A channel path cannot connect to itself. The CPATH keyword has extra syntax rules when the connected channel paths belong to the same CPC (that is, they are internal connections). Channel paths cannot connect to each other if they both have candidate lists with the same, single logical partition. Note that this prevents the definition of ICP and CIB channels in a configuration with only one logical partition defined.

PSIFB link

A PSIFB link connects a port on a host channel adapter (HCA) over a physical cable to the equivalent one on a different server. The z196 supports up to 128 coupling link CHPIDs. The maximum number of coupling links allowed for each type is summarized in Table 2-11.

Table 2-11 Maximum number of coupling links supported

Coupling link type	Order increment	z196 maximum[a]
IC	N/A	32
ISC-3	1 link	48
PSIFB	2 ports (1 HCA)	32 (16 HCAs)

a. The maximum combined coupling link types and defined CHPIDs is 128.

The maximum number of coupling links in a particular server is affected by many factors, including the number of I/O cages and books installed.

There is no combined limit on physical coupling links, but the maximum number of coupling CHPIDs defined is 128. Defining IC links, and defining multiple CHPIDs over the installed PSIFB ports, may cause the limit on the number of CHPIDs to be reached well before the maximum number of physical links. Even though these maximums have increased for z196, they still must be considered when planning to use the flexibility allowed by the PSIFB links.

CIB CHPIDs can be shared or spanned across logical partitions and channel subsystems on z196, z10, and z9 servers.

2.3.8 Configuration rules

Table 2-12 summarizes the maximum number of CHPID types supported on a z196 server.

Table 2-12 z196 maximum number of supported CHPIDs

Maximum channel paths (CHPID type)	z196
Channel path total	1024
CNC, CTC,CVC, and CBY	240/360[a]
FC and FCP	288/336[b]
OSC, OSD, OSE, OSN, OSM[c], and OSX	48
CFP, ICP, and CIB combined	128
CFP	48
ICP	32
CIB	128
IQD	32

a. Up to 360 ESCON channels are supported with RPQ 8P2507.
b. Up to 336 FICON channels are supported with RPQ 8P2506.
c. Only 2 OSM CHPIDs are required to configure an Ensemble.

The following configuration rules are implemented and enforced using the Hardware Configuration Definition (HCD) and Input Output Configuration Program (IOCP). All control units and I/O devices that attach to the server must be defined to the channel subsystem. When defining the I/O configuration for the server CSS over HCD/IOCP, you need to specify:

- For logical partitions, the logical partition name, CSS ID, and MIF ID
- Channel paths and their assignment to CSSs and logical partitions
- ESCON or FICON Director, where appropriate
- Control units attached to the channel paths
- I/O devices assigned to the control units

Table 2-13 shows the z196 server attributes.

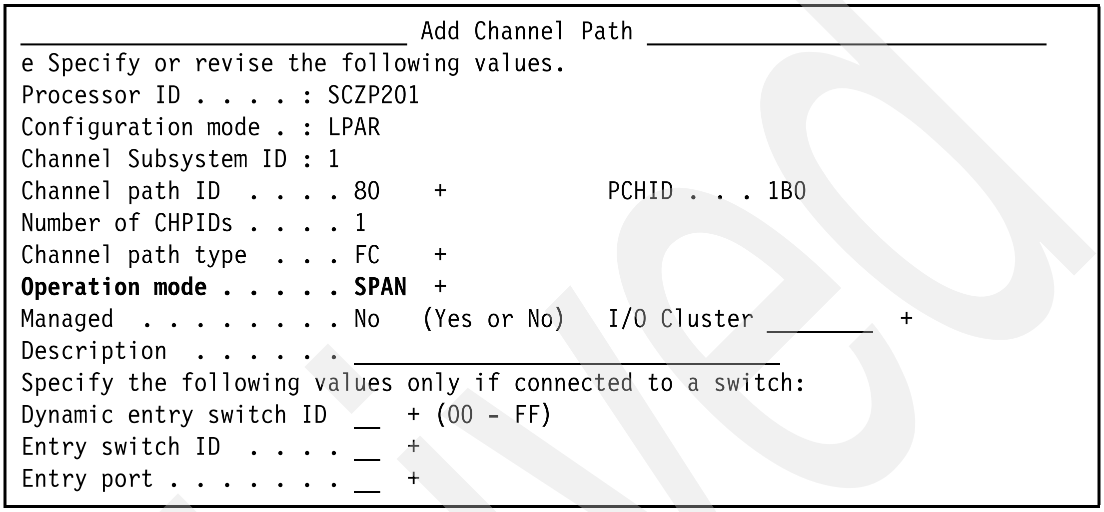
Table 2-13 z196 server attributes

Attributes		**z196**
Maximum configurable Physical Control Units (PCUs)	Per CVC and CBY	48
	Per OSD, OSM, and OSX	16
	Per OSE, OSC, and OSN	1
	Per CFP, ICP, and CIB	1
	PCUs or link addresses per CNC and CTC	120
	PCUs or link addresses per FC	256
	Per FCP	1
	Per IQD	64
Maximum configurable devices	Per CFP, ICP, and CIB	256
	Per CNC	1024
	Per CTC	512
	Per OSE	255[a]
	Per OSC	254[b]
	Per OSD, OSM, and OSX channel path with priority queuing disabled	1920
	Per OSD and OSX channel path with priority queuing enabled	480
	Per OSN (UNIT=OSN devices or subchannels)	480
	Per OSN (UNIT=3745 devices or subchannels)	180
	Per FCP	480
	Per FC	16k
	For all IQD channel paths	12k

a. 240 valid subchannels can be used.
b. 120 valid subchannels can be used.

When assigning channels, you must consider if you want to have certain types of channels defined as spanned, which means that some channels can access multiple CSSs. This action uses the MIF concept of sharing channels across logical partitions to sharing channels across logical partitions and CSSs.

A channel is considered spanned when its CHPID number in all CSSs is the same, and it is assigned to the same PCHID or AID. A spanned channel is defined with OPERATION MODE=SPAN in the HCD (Figure 2-55).



```
______________________________ Add Channel Path _______________________________
e Specify or revise the following values.
Processor ID . . . . : SCZP201
Configuration mode . : LPAR
Channel Subsystem ID : 1
Channel path ID  . . . . 80    +           PCHID . . . 1B0
Number of CHPIDs . . . . 1
Channel path type  . . . FC    +
Operation mode . . . . . SPAN  +
Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
Description  . . . . . . ________________________________
Specify the following values only if connected to a switch:
Dynamic entry switch ID  __  + (00 - FF)
Entry switch ID  . . . . __  +
Entry port . . . . . . . __  +
```

Figure 2-55   Define spanned channels

3

I/O Autoconfiguration on IBM zEnterprise 196 processors

In this chapter, we describe how to use the new I/O Autoconfiguration function that is available for IBM zEnterprise 196 processors and IBM z/OS V1.12. I/O Autoconfiguration is also known as z/OS Discovery and AutoConfiguration (zDAC). With the I/O Autoconfiguration function, HCD/HCM lets you discover undefined FICON storage devices (DASD and tape) connected to the processor using a switch.

According to user-defined policies or to HCD/HCM provided defaults, HCD/HCM can automatically define the control units and devices of discovered controllers. Users can either accept the proposed definitions without changes, or they can update the proposed definitions before committing them to the specified target work IODF.

HCD/HCM provides:

- A dialog to define autoconfiguration policies
- A dialog to perform the discovery and definition process

This function is only available on z196 processors.

We discuss the following topics:

- Description of I/O Autoconfiguration
- Prerequisites and operational considerations for using I/O Autoconfiguration
- Overview of the autoconfiguration process
- Defining autoconfiguration policies
- Specifying profile options relating to the zDAC process
- Defining logical partition groups for autoconfiguration
- Defining OS configuration groups for autoconfiguration
- How to set keywords for autoconfiguration policies
- Performing the automatic I/O discovery process
- Applying updates to the autoconfiguration proposals
- Before and after captures of our example
- I/O Autoconfiguration using HCM
- Defining autoconfiguration policies
- Defining logical partition groups for autoconfiguration

- Defining OS configuration groups for autoconfiguration
- Setting keywords for autoconfiguration policies
- Performing the automatic I/O discovery process
- Applying updates to the autoconfiguration proposals

3.1 Description of I/O Autoconfiguration

You can use the HCD I/O Autoconfiguration function to perform automatic configuration tasks to define switched FICON connected DASD and tape control units and devices that are currently not yet defined in either the active or currently accessed IODF. HCD can invoke the I/O subsystem to discover I/O hardware in the current configuration that is accessible to the system. Proposed definitions are automatically written into a specified target work IODF that is created as a copy of the active or accessed IODF.

During I/O Autoconfiguration processing, HCD presents the discovered controllers, control units, and devices to the user and offers proposals about how to configure them. The user can accept or change these definition proposals. Upon the user's confirmation, the configuration definitions are then written into the specified target IODF.

HCD provides a series of panels to perform the automatic I/O configuration. These discovery panels are scoped by policies and the parameters for these policies are accessed with HCD Option 0 or HCM. You must have a HCD profile data set (HCDPROF) allocated to your HCD session or HCM session in order for these policy parameters to take effect and be retained for future discoveries.

I/O Autoconfiguration is available starting with IBM System z196 processors. It requires the same access authorization as used for dynamic reconfiguration.

3.2 Prerequisites and operational considerations for using I/O Autoconfiguration

Consider the following information when exploiting the I/O Autoconfiguration functionality of HCD:

- The I/O Autoconfiguration process minimally requires that the LPAR (LP) groups used for autoconfiguration are running on IBM System z196 processors with z/OS V1.2.
- The target work IODF should be created from the active IODF. This restriction is not enforced, but recommended to facilitate consistent discovery of devices. If devices need to be added to do discovery, failures might occur due to inconsistent IODFs. Hardware definitions of this active IODF will remain consistent.
- All active IODFs for the systems in a sysplex should be the same. This restriction is not enforced. Consistent active IODFs allows IOS to avoid running some phases of discovery on every system. Tokens should be in sync and prior activates should have been completed.
- Without indicating *force full mode discovery*, there is a limit on the number of successive failures. Unless force full mode discovery is requested, processing assumes that CUADD values will start at 00 and continue through nn, with no missing CUADDs. Discovery for a controller ends after several successive failures occur and force full mode discovery is not indicated.

- For DASD, all newly discovered devices are assumed to be 3390 type devices (either 3390B or 3390A types).
- If port restrictions (zoning or PDCM) exist within a switch (that is, they limit the ability of a CHPID to connect to a destination port for a control unit interface), I/O Autoconfiguration may configure paths that cannot be used. If a port is discovered on a controller, it is assumed that it has access to all configured logical control units on that controller.
- All CHPIDs, switches, and ports should be configured online and be accessible when discovery is attempted.
- At least one system per CPC must have the ability to perform dynamic I/O configuration changes and must be part of the current sysplex. It must be able to make I/O configuration changes on behalf of the LP group systems on the CPC. This system needs not necessarily be in the target LP group.
- A logical control unit containing only secondary devices in an active PPRC relationship may not be able to be discovered. The I/O used to determine the devices configured on a logical control unit cannot be performed to secondary devices.
- I/O Autoconfiguration is a configuration tool that configures for availability. You can use Dynamic CHPID Management (DCM) for performance management. CHPID/path selection is performed to minimize or even eliminate single points of failure to newly discovered logical control units. DCM manages for performance by adding CHPIDs and managing paths to the logical control units as needed.
- Within a target LPAR Group, I/O Autoconfiguration only allows the proposal for controllers that are consistently defined (or absent) for the target LP group systems in the target IODF. If a controller is partially defined in the LP group (some systems have logical control units and devices configured that others do not have), I/O Autoconfiguration does not attempt to propose definitions for the systems within the LP group that do not have the definitions. You should define the discovery scope using LP groups with systems requiring the definition.
- If candidate access lists currently exclude an LPAR from accessing a control unit already defined on a CSS, I/O Autoconfiguration cannot discover and add that control unit. Therefore, all systems in the participating LP groups should have a homogeneous view of the devices and control units. If this is not the case. you can update device candidate lists in HCD to add devices and control units to the desired LPARs.
- If switches are connected such that it would be possible to have three or more switches in a path to a control unit, it is possible that this path would be chosen if no viable alternative exists.
- Discovery attempts should be performed during times where changes are minimal. Dynamic I/O configuration changes using HCD/HCM or using the ACTIVATE MVS™ command should not be done during the discovery process. ACTIVATE processing and CONFIGURE CHP commands will likely affect discovery processing.

3.2.1 Overview of the autoconfiguration process

In this section, we provide an overview of the I/O Autoconfiguration process.

The Fabric discovery process

The I/O Autoconfiguration function is invoked from the HCD Primary Task Selection panel. This action causes HCD to invoke IOS to perform the Fabric discovery process. You can define the scope of discovery by searching all controllers, new controllers only, or search for the controller containing a specific control unit.

Note: The scope of the discovery is limited to the active sysplex.

The controller discovery

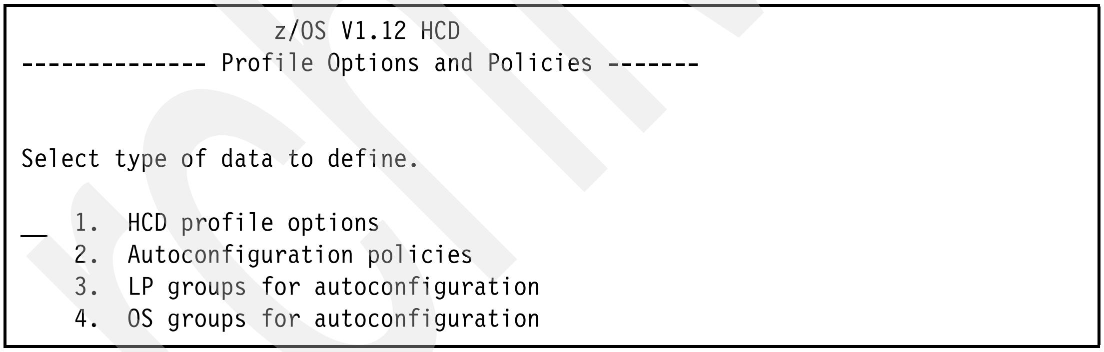
From the discovered controllers, HCD retrieves and proposes control unit and device types and numbers, channel path assignments, partition access, and OS device parameters. You can choose whether HCD should perform the definition without user interaction, or whether the panel should show the proposed definitions so that you can confirm or change these values.

I/O Autoconfiguration makes temporary changes to the I/O configuration by adding devices that are used exclusively for discovery on the targeted systems to search for attached devices.

3.2.2 Defining autoconfiguration policies

Before you let HCD discover and define control units and I/O devices, you must specify your desired autoconfiguration policies. This task contains the following subtasks, which can be accessed from the HCD Primary Task Menu, Option 0. Refer to Figure 3-1

- Option 0.1: Setting your HCD profile options
- Option 0.2: Setting keywords for autoconfiguration policies
- Option 0.3: Defining logical partition groups for autoconfiguration
- Option 0.4: Defining OS groups for autoconfiguration



```
                   z/OS V1.12 HCD
-------------- Profile Options and Policies -------


Select type of data to define.

__  1.  HCD profile options
    2.  Autoconfiguration policies
    3.  LP groups for autoconfiguration
    4.  OS groups for autoconfiguration
```

Figure 3-1 Primary Options and Policies

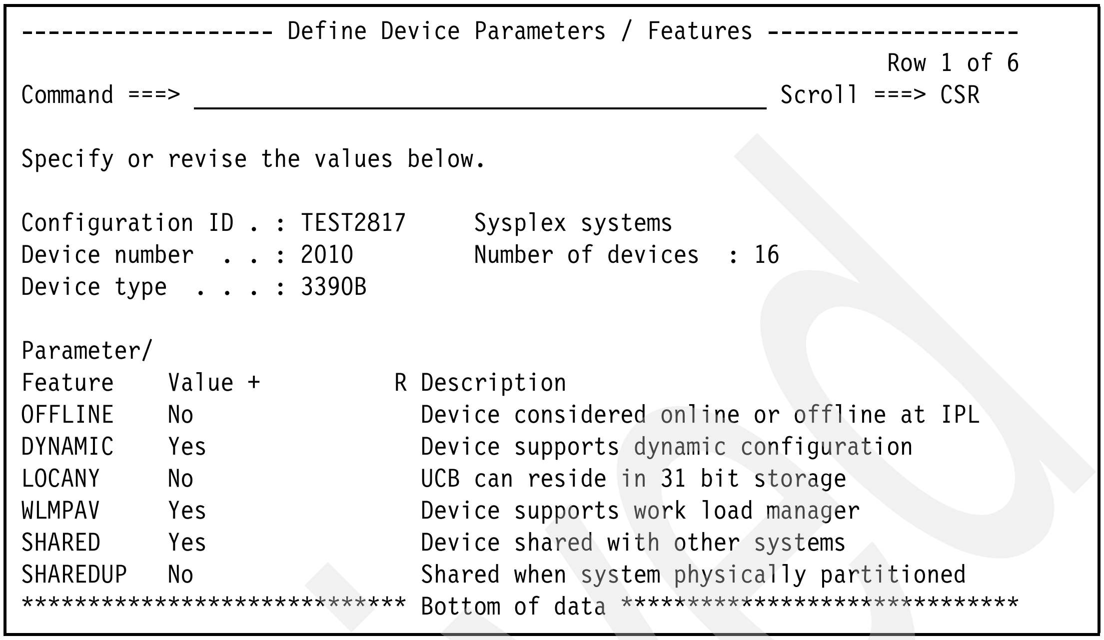
Note: If you want to restrict your discovery to a particular logical partition or group of logical partitions, define a Logical Partition Group first.

Similarly with OS configurations, define an OS Group first.

3.2.3 Specifying profile options relating to the zDAC process

When I/O Autoconfiguration discovers and adds “new” device numbers to an OS config, HCD uses the default OS config parameter values as per the device’s unit information module (UIM). These parameter default values can be overridden and set to your own preferences by selecting HCD Option 1. HCD profile options from the Profiles and Policies menu.

Figure 3-2 shows the parameter default values for device type 3390B.

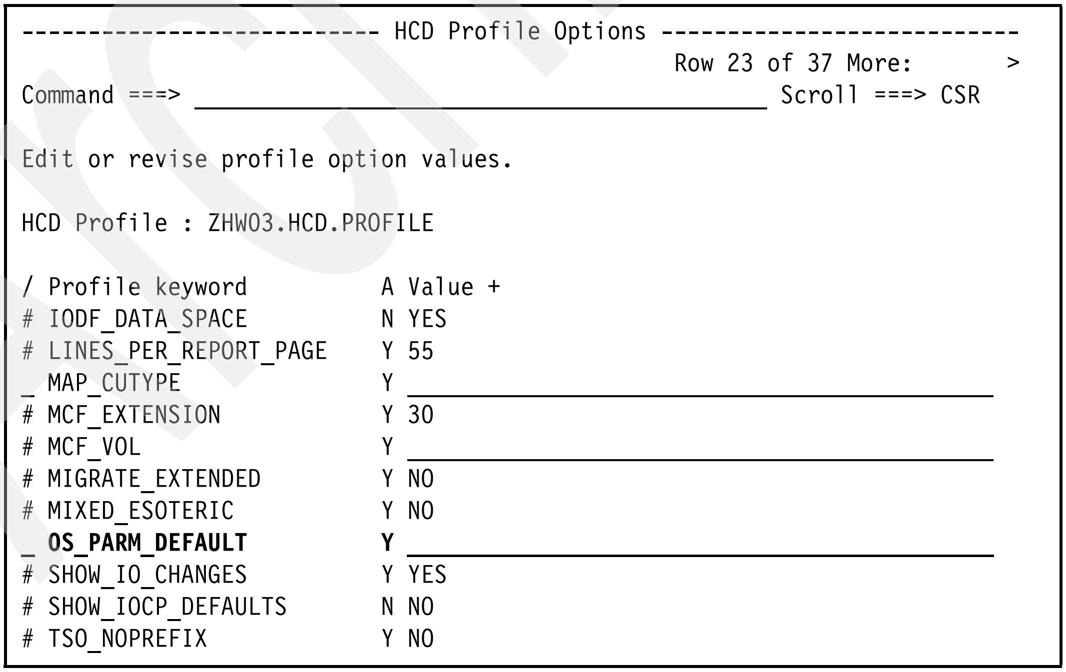


```
------------------- Define Device Parameters / Features -------------------
                                                                  Row 1 of 6
Command ===> ___________________________________________ Scroll ===> CSR

Specify or revise the values below.

Configuration ID . : TEST2817     Sysplex systems
Device number  . . : 2010         Number of devices  : 16
Device type  . . . : 3390B

Parameter/
Feature    Value +         R Description
OFFLINE    No                Device considered online or offline at IPL
DYNAMIC    Yes               Device supports dynamic configuration
LOCANY     No                UCB can reside in 31 bit storage
WLMPAV     Yes               Device supports work load manager
SHARED     Yes               Device shared with other systems
SHAREDUP   No                Shared when system physically partitioned
***************************** Bottom of data ******************************
```

Figure 3-2 Default UIM values for device type 3390B

You might prefer to define your 3390B devices with `LOCANY=Yes` or `WLMPAV=No`, for example. To set these definitions, perform the following steps:

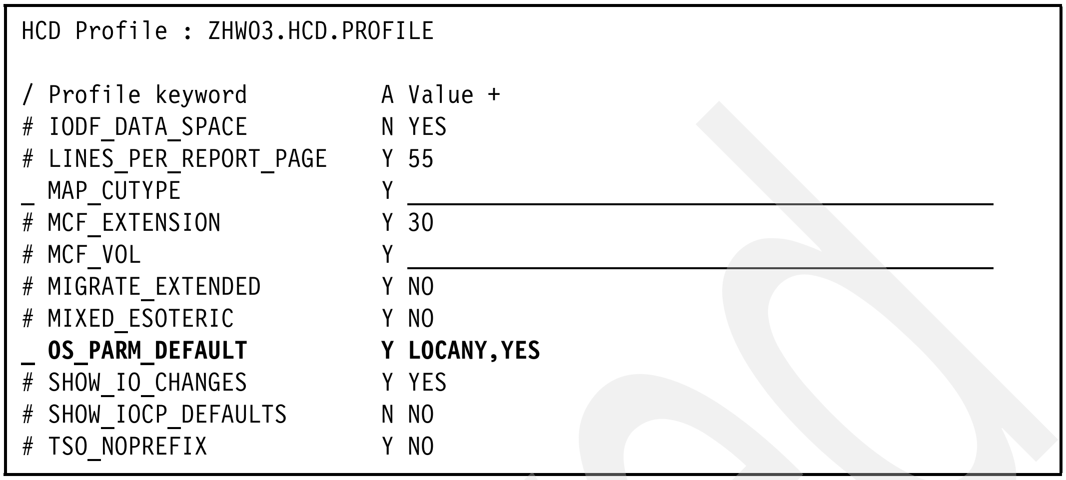
1. Select HCD Option 0.1. HCD Profile Options.
2. Page down until you find the profile option that says `OS_PARM_DEFAULT` (Figure 3-3).



```
--------------------------- HCD Profile Options ---------------------------
                                                 Row 23 of 37 More:       >
Command ===> ___________________________________________ Scroll ===> CSR

Edit or revise profile option values.

HCD Profile : ZHW03.HCD.PROFILE

/ Profile keyword          A Value +
# IODF_DATA_SPACE          N YES
# LINES_PER_REPORT_PAGE    Y 55
_ MAP_CUTYPE               Y ____________________________________________
# MCF_EXTENSION            Y 30
# MCF_VOL                  Y ____________________________________________
# MIGRATE_EXTENDED         Y NO
# MIXED_ESOTERIC           Y NO
_ OS_PARM_DEFAULT          Y ____________________________________________
# SHOW_IO_CHANGES          Y YES
# SHOW_IOCP_DEFAULTS       N NO
# TSO_NOPREFIX             Y NO
```

Figure 3-3 HCD - Profile Options - OS_PARM_DEFAULT - not set

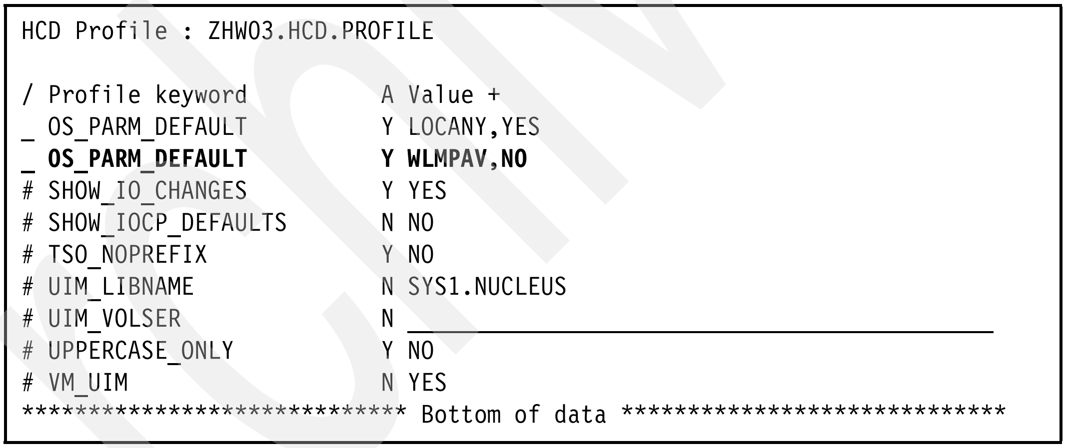
3. To enter an overriding value, enter the OS parm you want to override (Figure 3-4) and press Enter.



```
HCD Profile : ZHW03.HCD.PROFILE

/ Profile keyword          A Value +
# IODF_DATA_SPACE          N YES
# LINES_PER_REPORT_PAGE    Y 55
_ MAP_CUTYPE               Y ____________________________________________
# MCF_EXTENSION            Y 30
# MCF_VOL                  Y ____________________________________________
# MIGRATE_EXTENDED         Y NO
# MIXED_ESOTERIC           Y NO
_ OS_PARM_DEFAULT          Y LOCANY,YES
# SHOW_IO_CHANGES          Y YES
# SHOW_IOCP_DEFAULTS       N NO
# TSO_NOPREFIX             Y NO
```

Figure 3-4 HCD - Profile Options - OS_PARM_DEFAULT - set

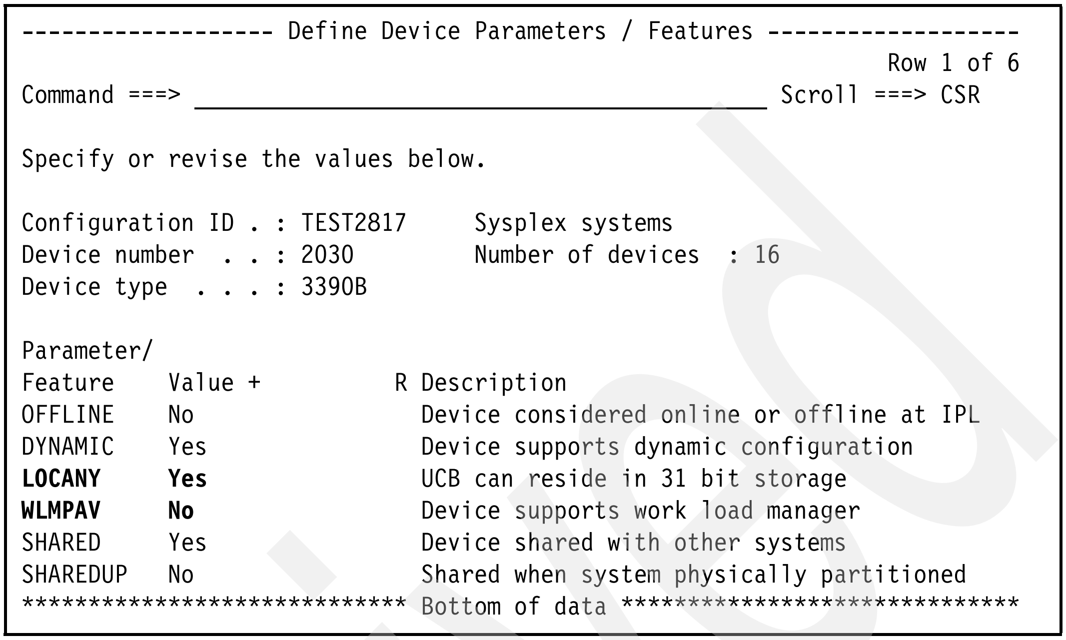
4. If you want to add additional `OS_PARM_DEFAULT` changes, type `a` next to the existing `OS_PARM_DEFAULT` keyword entry and press Enter. An additional entry is added. Here we have entered `WLMPAV,NO` (Figure 3-5).



```
HCD Profile : ZHW03.HCD.PROFILE

/ Profile keyword          A Value +
_ OS_PARM_DEFAULT          Y LOCANY,YES
_ OS_PARM_DEFAULT          Y WLMPAV,NO
# SHOW_IO_CHANGES          Y YES
# SHOW_IOCP_DEFAULTS       N NO
# TSO_NOPREFIX             Y NO
# UIM_LIBNAME              N SYS1.NUCLEUS
# UIM_VOLSER               N ____________________________________________
# UPPERCASE_ONLY           Y NO
# VM_UIM                   N YES
***************************** Bottom of data *****************************
```

Figure 3-5 HCD - Profile Options - Additional OS_PARM_DEFAULT - set

5. If we now define some new 3390B devices, the OS parameter defaults are overridden with what we have specified in the HCD Profile Options (Figure 3-6).



```
------------------- Define Device Parameters / Features -------------------
                                                                 Row 1 of 6
Command ===> ____________________________________________ Scroll ===> CSR

Specify or revise the values below.

Configuration ID . : TEST2817     Sysplex systems
Device number  . . : 2030         Number of devices  : 16
Device type  . . . : 3390B

Parameter/
Feature    Value +          R Description
OFFLINE    No                 Device considered online or offline at IPL
DYNAMIC    Yes                Device supports dynamic configuration
LOCANY     Yes                UCB can reside in 31 bit storage
WLMPAV     No                 Device supports work load manager
SHARED     Yes                Device shared with other systems
SHAREDUP   No                 Shared when system physically partitioned
***************************** Bottom of data ******************************
```

Figure 3-6 HCD - Default UIM values for device type 3390B - overridden

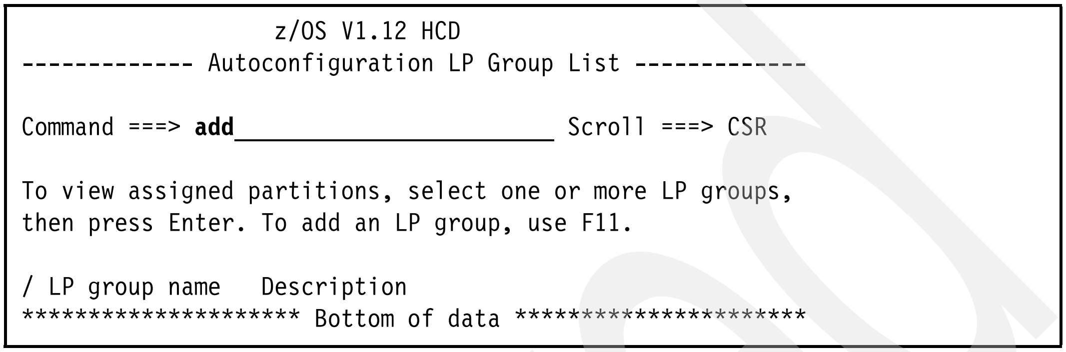
> **Note:** Default values *cannot* be set differently for different device types. Additionally, the assignment of devices to esoteric names cannot currently be controlled with an I/O Autoconfiguration (zDAC) dialog.

3.2.4 Defining logical partition groups for autoconfiguration

A logical partition group (LP group) is a collection of logical partitions of the same sysplex that is used by I/O Autoconfiguration to determine to which partitions the discovered devices should be assigned.

To define LP groups for autoconfiguration, perform the following steps:

1. Select Option 3. LP groups for autoconfiguration from the Profile Options and Policies menu (Figure 3-7). This action invokes the Autoconfiguration LP Group List, which displays a list of LP groups. In our example we currently have no lists defined.
2. Enter `add` in the command line and press Enter (or press PF11) (Figure 3-7).

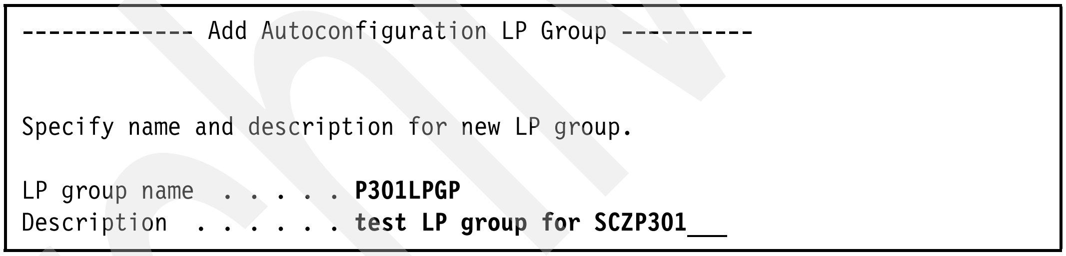


```
                   z/OS V1.12 HCD
------------- Autoconfiguration LP Group List -------------

Command ===> add________________________ Scroll ===> CSR

To view assigned partitions, select one or more LP groups,
then press Enter. To add an LP group, use F11.

/ LP group name   Description
******************** Bottom of data *********************
```

Figure 3-7 Adding a new LP group for autoconfiguration

Use the Autoconfiguration LP Group List to define or delete LP groups, to assign logical partitions to a group, or unassign partitions from a group.

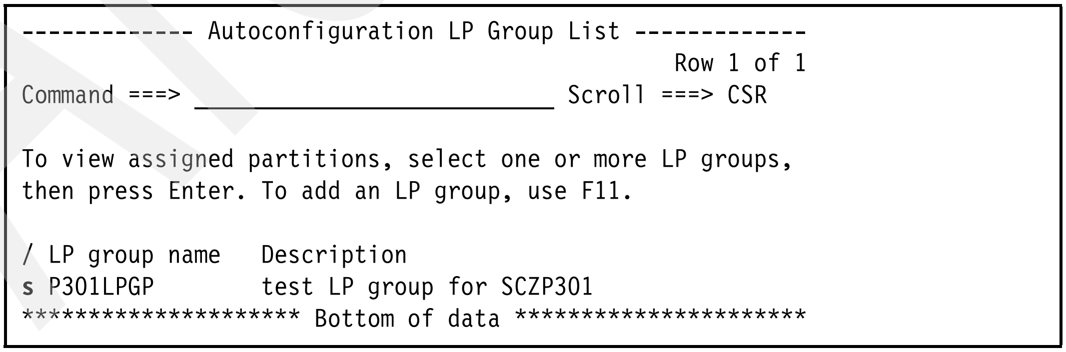
3. Enter your desired group name and description and press Enter (Figure 3-8).



```
------------- Add Autoconfiguration LP Group ----------


Specify name and description for new LP group.

LP group name  . . . . . P301LPGP
Description  . . . . . . test LP group for SCZP301___
```

Figure 3-8 Add Autoconfiguration LP Group panel

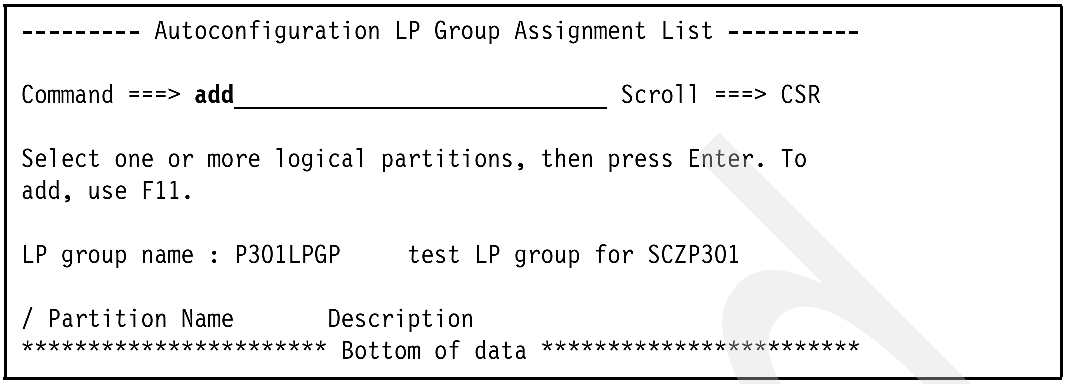
4. Enter `s` next to the LP group name to add processor(s) and partition(s) and press Enter (Figure 3-9).



```
------------- Autoconfiguration LP Group List -------------
                                               Row 1 of 1
Command ===> ___________________________ Scroll ===> CSR

To view assigned partitions, select one or more LP groups,
then press Enter. To add an LP group, use F11.

/ LP group name   Description
s P301LPGP        test LP group for SCZP301
******************** Bottom of data *********************
```

Figure 3-9 Select an autoconfiguration LP group to add partitions

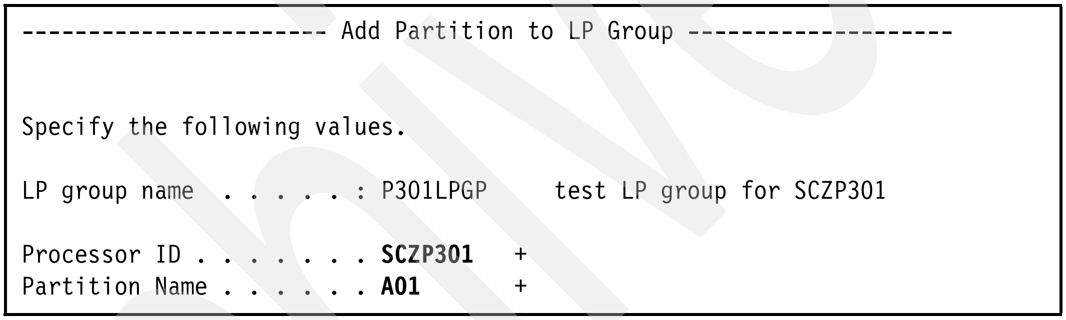
5. Enter `add` in the command line and press Enter or press PF11 (Figure 3-10).



```
--------- Autoconfiguration LP Group Assignment List ----------

Command ===> add____________________________ Scroll ===> CSR

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

LP group name : P301LPGP     test LP group for SCZP301

/ Partition Name       Description
********************** Bottom of data ************************
```

Figure 3-10 Add processors and partitions to an autoconfiguration LP group

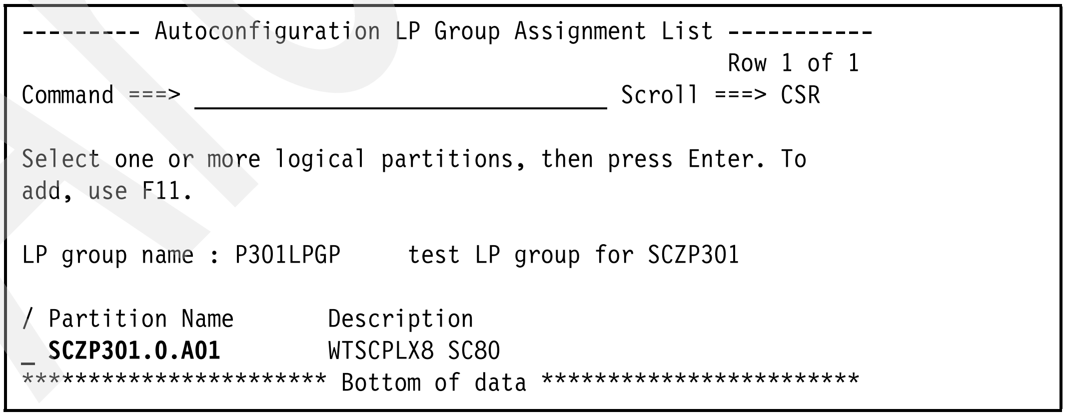
6. Enter the desired Processor ID and Partition Name and press Enter or press PF4 in the data fields for a list of Processor IDs and Partitions that are defined in the IODF (Figure 3-11).



```
----------------------- Add Partition to LP Group --------------------


Specify the following values.

LP group name  . . . . . : P301LPGP     test LP group for SCZP301

Processor ID . . . . . . . SCZP301   +
Partition Name . . . . . . A01       +
```

Figure 3-11 Specifying a Processor ID and Partition Name for an LP group

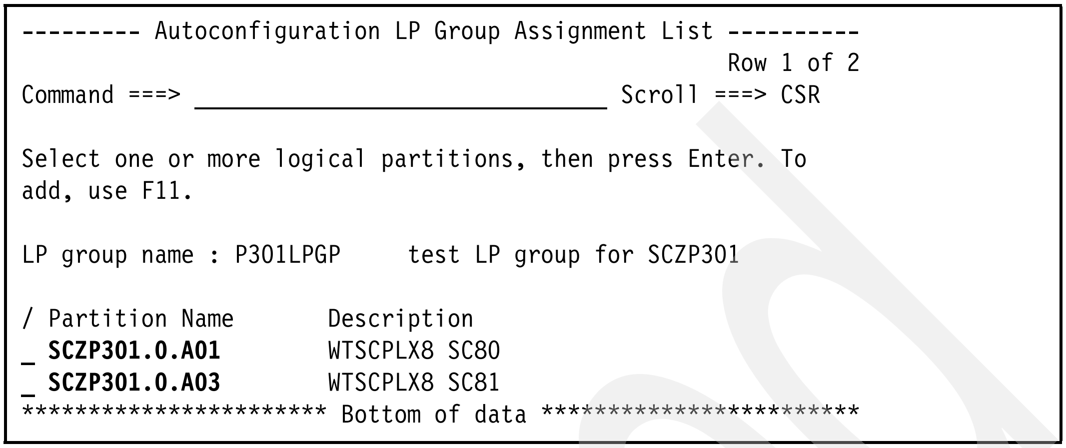
7. Note that processor SCZP301 and LPAR A01 of CSS.0 have been added to the LP Group (Figure 3-12).



```
--------- Autoconfiguration LP Group Assignment List -----------
                                                      Row 1 of 1
Command ===> _______________________________ Scroll ===> CSR

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

LP group name : P301LPGP     test LP group for SCZP301

/ Partition Name       Description
_ SCZP301.0.A01        WTSCPLX8 SC80
********************** Bottom of data ************************
```

Figure 3-12 Processor and partition added to an LP group

8. Additional processors and partitions for this sysplex may be added by entering `add` in the command line or by entering `a` next to the existing entry (Figure 3-13).



```
--------- Autoconfiguration LP Group Assignment List ----------
                                                     Row 1 of 2
Command ===> _______________________________ Scroll ===> CSR

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

LP group name : P301LPGP     test LP group for SCZP301

/ Partition Name       Description
_ SCZP301.0.A01        WTSCPLX8 SC80
_ SCZP301.0.A03        WTSCPLX8 SC81
*********************** Bottom of data ************************
```

Figure 3-13 Adding additional processors and partitions to an LP group

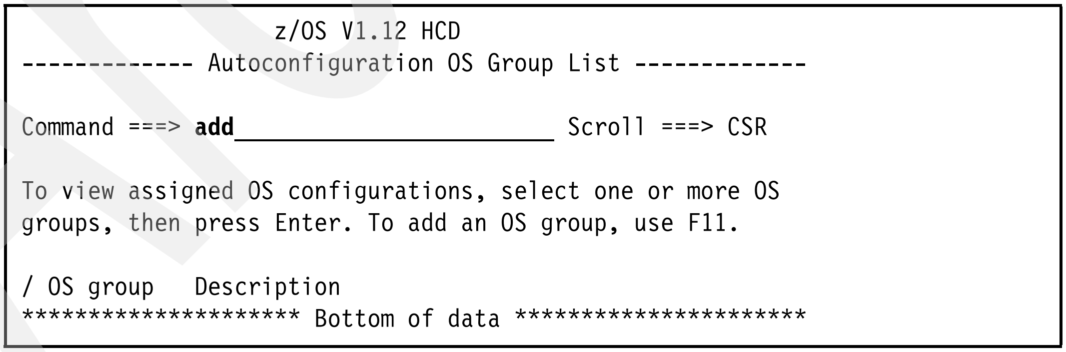
You may now return to the Profile Options and Policies menu.

3.2.5 Defining OS configuration groups for autoconfiguration

An OS group is a collection of OS configurations that is used by I/O Autoconfiguration to determine to which operating systems of type MVS the auto-defined devices should be assigned.

To define OS configuration groups for autoconfiguration, perform the following steps:

1. Select Option 4. OS groups for autoconfiguration from the Profile Options and Policies menu (Figure 3-14). This action invokes the Autoconfiguration OS Group List, which displays a list of operating system groups (OS groups). In our example, we currently have no lists defined.
2. Enter `add` in the command line and press Enter or press PF11.

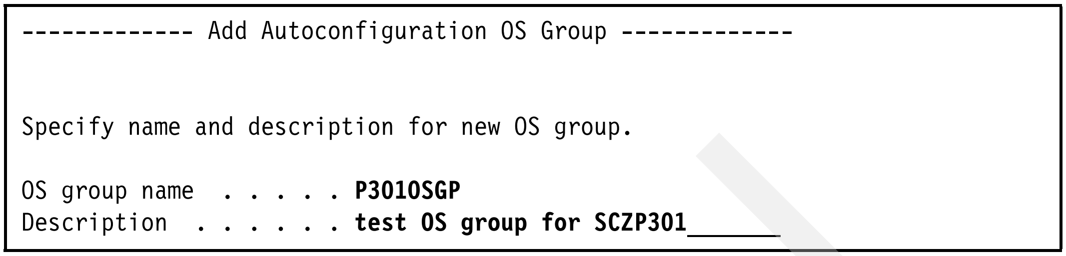


```
                   z/OS V1.12 HCD
------------- Autoconfiguration OS Group List -------------

Command ===> add________________________ Scroll ===> CSR

To view assigned OS configurations, select one or more OS
groups, then press Enter. To add an OS group, use F11.

/ OS group   Description
******************** Bottom of data *********************
```

Figure 3-14 Adding new OS group for autoconfiguration

Use the Autoconfiguration OS Group List to view, add, or delete OS groups or to assign autoconfigured devices to operating systems.

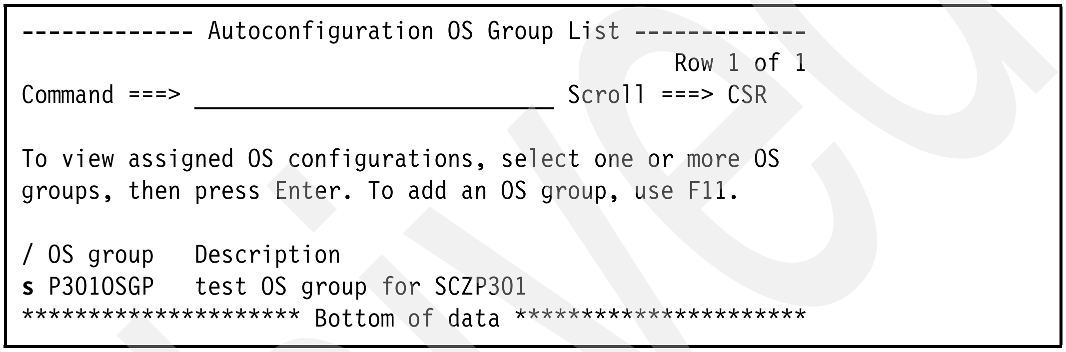
3. Enter your desired group name and description and press Enter (Figure 3-15).



```
------------- Add Autoconfiguration OS Group -------------


Specify name and description for new OS group.

OS group name  . . . . . P301OSGP
Description  . . . . . . test OS group for SCZP301_______
```

Figure 3-15 Add autoconfiguration OS group

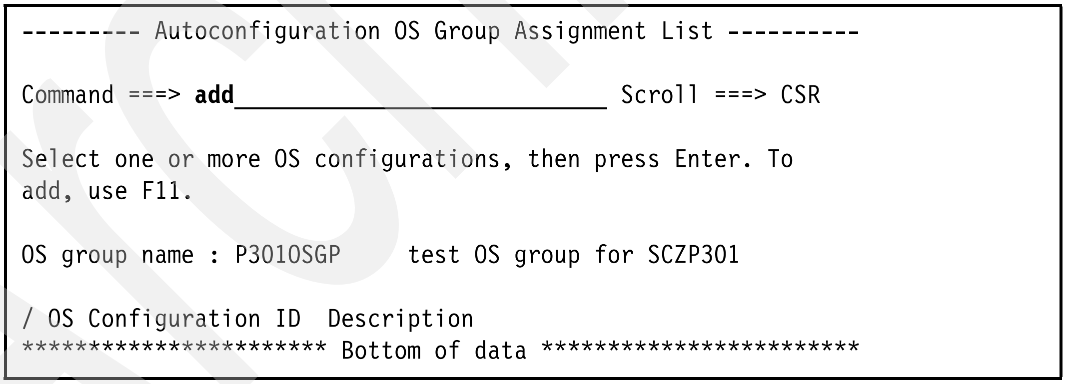
4. Enter s next to the OS group name to add one or more OS configurations (Figure 3-16).



```
------------- Autoconfiguration OS Group List -------------
                                                Row 1 of 1
Command ===> ___________________________ Scroll ===> CSR

To view assigned OS configurations, select one or more OS
groups, then press Enter. To add an OS group, use F11.

/ OS group   Description
s P301OSGP   test OS group for SCZP301
******************** Bottom of data *********************
```

Figure 3-16 Select an autoconfiguration OS group to add OS configurations

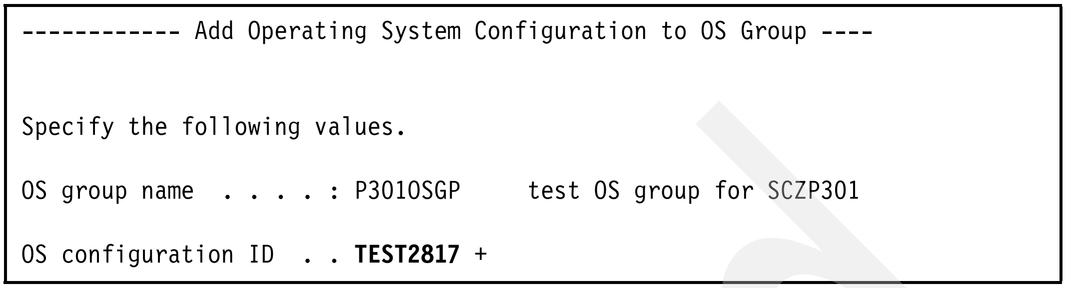
5. Enter add in the command line and press Enter (Figure 3-17).



```
--------- Autoconfiguration OS Group Assignment List ----------

Command ===> add____________________________ Scroll ===> CSR

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

OS group name : P301OSGP     test OS group for SCZP301

/ OS Configuration ID  Description
********************** Bottom of data ***********************
```

Figure 3-17 Add OS configurations to an autoconfiguration OS group

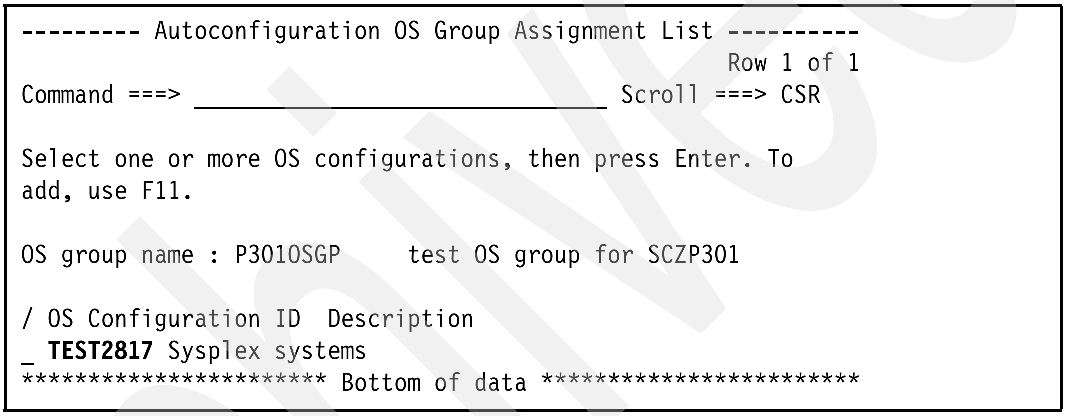
6. Enter the desired OS config ID or press PF4 in the OS configuration ID data field to be prompted for the OS configurations that are defined in the IODF (Figure 3-18).



```
----------- Add Operating System Configuration to OS Group ----


Specify the following values.

OS group name  . . . . : P301OSGP     test OS group for SCZP301

OS configuration ID  . . TEST2817 +
```

Figure 3-18 Specifying OS configuration ID for OS groups

7. Note that the OS configuration ID TEST2817 has been added to the OS group (Figure 3-19).



```
--------- Autoconfiguration OS Group Assignment List ----------
                                                      Row 1 of 1
Command ===> _______________________________ Scroll ===> CSR

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

OS group name : P301OSGP     test OS group for SCZP301

/ OS Configuration ID  Description
_ TEST2817 Sysplex systems
*********************** Bottom of data ************************
```

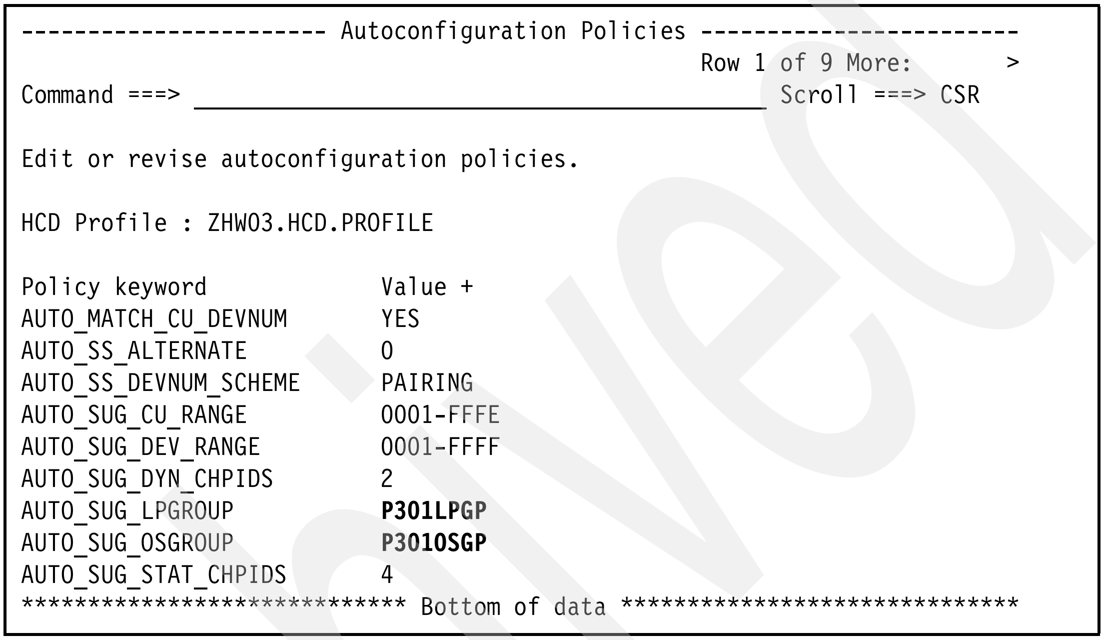
Figure 3-19 OS configuration ID added to OS group

8. Additional OS configuration IDs for this sysplex may be added by entering `add` on the command line or typing `a` next to the existing entry.

You may now return to the Profile Options and Policies menu.

3.2.6 How to set keywords for autoconfiguration policies

To set the autoconfiguration policies by using keywords, select Option 2. Autoconfiguration policies from the Profile Options and Policies menu (Figure 3-20). This action invokes the Autoconfiguration Policies panel, which displays the current value settings for autoconfiguration policy keywords as they are either explicitly set in the HCD profile data set or as they are defaulted by HCD. Use this panel to revise or change the displayed keyword values.



```
---------------------- Autoconfiguration Policies ------------------------
                                                   Row 1 of 9 More:       >
Command ===> ___________________________________________ Scroll ===> CSR

Edit or revise autoconfiguration policies.

HCD Profile : ZHWO3.HCD.PROFILE

Policy keyword            Value +
AUTO_MATCH_CU_DEVNUM      YES
AUTO_SS_ALTERNATE         0
AUTO_SS_DEVNUM_SCHEME     PAIRING
AUTO_SUG_CU_RANGE         0001-FFFE
AUTO_SUG_DEV_RANGE        0001-FFFF
AUTO_SUG_DYN_CHPIDS       2
AUTO_SUG_LPGROUP          P301LPGP
AUTO_SUG_OSGROUP          P301OSGP
AUTO_SUG_STAT_CHPIDS      4
**************************** Bottom of data ******************************
```

Figure 3-20 Autoconfiguration policies

You must set the following policy keywords:

- AUTO_MATCH_CU_DEVNUM: This policy specifies whether, for autoconfiguration definitions, a control unit number should match the starting base device number.

  If you specify YES (which is the default), the first base device is set to the same number as the control unit. If NO is specified, the device number of the first base device and the control unit number do not necessarily need to match.

- AUTO_SS_ALTERNATE: This policy specifies the ID of the subchannel set in which newly discovered Parallel Access Volume (PAV) alias devices are defined during an auto-definition process, provided that free device numbers are available in this subchannel set, and processors that have access to the device range, support alternate subchannels.

  The default subchannel set ID is 1.

- AUTO_SS_DEVNUM_SCHEME: This policy defines the schema for assigning device numbers to PAV alias devices in an alternate subchannel set. Supported schemes are:
  - CONSECUTIVE: The alias device numbers in an alternate subchannel set are consecutive to the base device numbers.
  - DENSE: The device numbers in an alternate subchannel set are densely assigned, that is, the next free device numbers in the assigned device number range will be used.
  - PAIRING: Base and alias device numbers are assigned alternatively starting with, for example, device numbers xx00 and xx80 versus xx80 and xx00.

  PAIRING is the default.

- AUTO_SUG_CU_RANGE: This policy specifies the range of control unit numbers from which numbers for auto-defined control units will be taken. If no value is specified, range 0001-FFFE is taken as default. Specify the range according to the following syntax:

  nnnn-mmmm

  Where:

  - nnnn is the lower range boundary.
  - mmmm is the upper range boundary.
- AUTO_SUG_DEV_RANGE: This policy specifies the range of device numbers from which device numbers for auto-defined devices will be taken. If no value is specified, range 0001-FFFF is taken as default.

  Note: I/O Autoconfiguration avoids using device and control unit numbers in the 0000-00FF range in Subchannel set 0. If you have no alternative number ranges available, you must configure the CUs or devices manually in this range.

- AUTO_SUG_DYN_CHPIDS: This policy specifies the number of dynamically managed channel paths allowed on a control unit definition, if it is auto-defined. A maximum number of seven dynamic channel paths is allowed. The default is six.
- AUTO_SUG_LPGROUP: This policy specifies the name of a group of logical partitions to which discovered devices will be assigned. If no name is set, devices will be assigned to all eligible partitions of the active sysplex. The reserved group name ALL signals this during autoconfiguration processing.
- AUTO_SUG_OSGROUP: This policy specifies the name of a group of OS configurations to which discovered devices will be assigned. If no name is set, devices will be assigned to all OS configurations which correspond to the active LP group.
- AUTO_SUG_STAT_CHPIDS: This policy specifies the number of static channel paths to be assigned to a control unit definition, if it is auto-defined. At least one and not more than eight static channel paths can be defined.

  The default is 2.

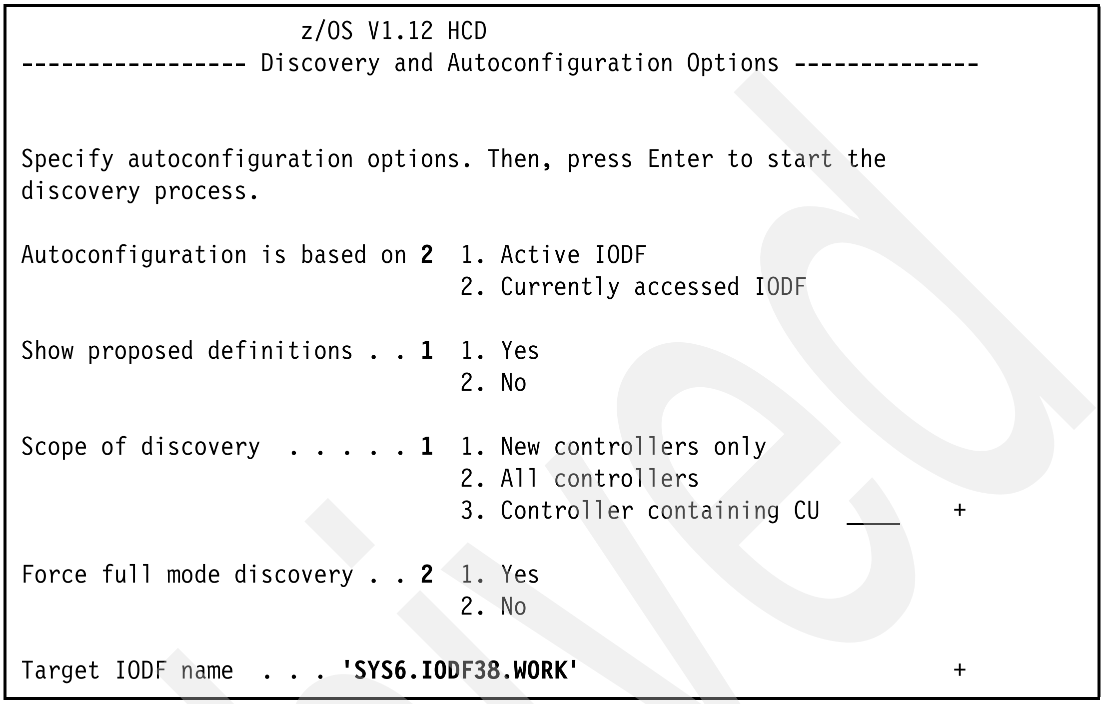
3.2.7 Performing the automatic I/O discovery process

After having specified all the policies, invoke the I/O Autoconfiguration process for HCD to discover and automatically define control units and I/O devices into a specified target IODF.

You invoke the I/O Autoconfiguration process from the HCD by performing the following steps:

1. Select Option 1. Define, modify, or view configuration data from the Primary Task Selection menu.
2. Select Option 6. Discovered new and changed control units and I/O devices.

These steps invoke the Discovery and Autoconfiguration Options panel (Figure 3-21), which lets you select processing options for discovery and autoconfiguration. Input to all fields is required and initial defaults are supplied.



```
                      z/OS V1.12 HCD
------------------ Discovery and Autoconfiguration Options --------------


Specify autoconfiguration options. Then, press Enter to start the
discovery process.

Autoconfiguration is based on 2  1. Active IODF
                                 2. Currently accessed IODF

Show proposed definitions . . 1  1. Yes
                                 2. No

Scope of discovery  . . . . . 1  1. New controllers only
                                 2. All controllers
                                 3. Controller containing CU  ____    +

Force full mode discovery . . 2  1. Yes
                                 2. No

Target IODF name  . . . 'SYS6.IODF38.WORK'                            +
```

Figure 3-21 Discovery and Autoconfiguration Options panel

You must set the following autoconfiguration options:

- Autoconfiguration is based on

  Choose whether the active production IODF or the currently accessed IODF should be taken as the base for new configuration definitions resulting from the discovery process.

  What this means is that HCD checks the discovered devices accessible to the system against this selected IODF, whether they are already defined or not. If they are found to be new or changed, the resulting configuration proposals are also adopted to fit into this IODF.

  HCD copies this IODF to the selected target IODF, which receives all changes done to the configuration during autoconfiguration processing.

  > **Note:** Any IODF that you select as the base for I/O autoconfiguration must be enabled for full dynamic activation. If you select a work IODF that is not enabled, it should be based on a production IODF.

- Show proposed definitions

  You can decide whether the panel should display proposed definitions for possible configuration changes. Select Yes if you want to work in an attended operation mode. In this mode, HCD invokes a subsequent series of panels in which you can revise and change the proposed settings.

  Select No if you want to run the unattended fast-path of I/O Autoconfiguration. In this case, HCD does not offer a possibility to revise the proposals or to update or add definitions. Instead, the HCD definitions are completely saved in the target IODF immediately.

- Scope of discovery

  In this selection, you decide which controllers are discovered:

  – New controllers only: HCD discovers and returns only new controllers that are not yet known in the chosen target IODF.

  – All controllers: HCD discovers and returns all new controllers and all changed controllers (a full discovery).

  – Controller containing CU ____: HCD performs a discovery limited on that controller containing the control unit with the specified number. The referenced control unit must be a DASD or tape CU and must be defined in the target IODF.

- Force full mode discovery

  Decide when discovery processing should stop. If set to No, which is the default, processing stops after several consecutive unused CUADD values that do not exist on the target controller. With this option set to Yes, for each discovered controller, all unused logical control unit addresses (CUADD values) and unit addresses are checked for changes.

- Target IODF name

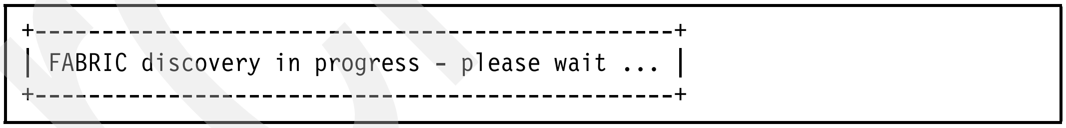
  Type the name of a work IODF that should receive the configuration definitions for all discovered new or changed controllers, according to your selected scope of discovery.

  This input is required. The specified IODF can either be an existing work IODF, or it will be created by HCD. In any case, the IODF specified in the “Autoconfiguration is based on” field is copied to the specified target IODF.

  The target IODF must not be enabled for multi-user access.

> **Note:** As soon as you accepted any proposals into your target IODF, it becomes the new currently accessed IODF.

3. Press Enter and observe the status message at the bottom of the panel (Figure 3-22).

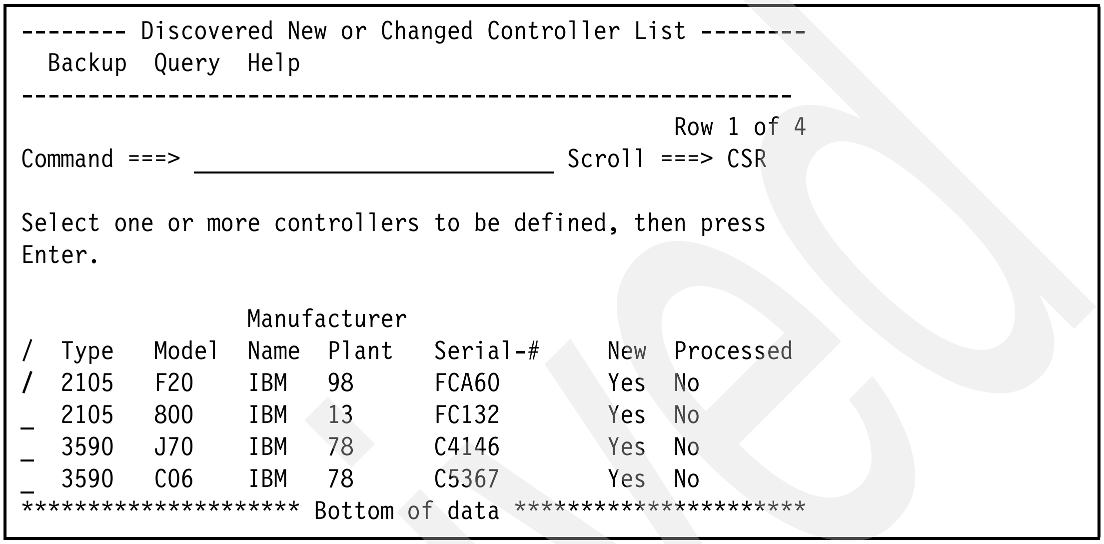


```
+----------------------------------------------+
| FABRIC discovery in progress - please wait ... |
+----------------------------------------------+
```

Figure 3-22 Fabric Discovery in progress

3.2.8 Applying updates to the autoconfiguration proposals

After a successful discovery, HCD displays the result in the Discovered New or Changed Controller List (Figure 3-23). Only discovered controllers are returned, which are reachable from all target systems that have partitions defined in the LP group referenced by the AUTO_SUG_LPGROUP policy keyword.



```
-------- Discovered New or Changed Controller List --------
  Backup  Query  Help
----------------------------------------------------------
                                                 Row 1 of 4
Command ===> ___________________________ Scroll ===> CSR

Select one or more controllers to be defined, then press
Enter.

                 Manufacturer
/  Type   Model  Name  Plant   Serial-#     New  Processed
/  2105   F20    IBM   98      FCA60        Yes  No
_  2105   800    IBM   13      FC132        Yes  No
_  3590   J70    IBM   78      C4146        Yes  No
_  3590   C06    IBM   78      C5367        Yes  No
******************** Bottom of data **********************
```

Figure 3-23 Discovered New or Changed Controller List

This panel lists all discovered controllers that are either not yet defined in the IODF, or whose definition in the IODF is different from discovered controller characteristics.

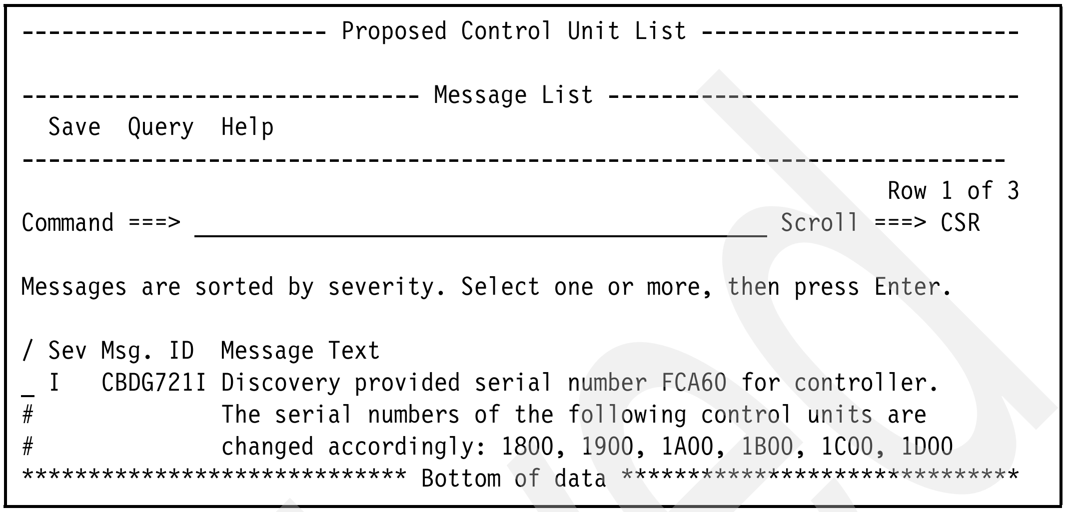
To apply updates to the autoconfiguration proposals, perform the following steps:

1. Enter action code / next to one or multiple controllers that you want to be defined or changed in the target IODF. HCD subsequently processes each selected controller in the way described in the remainder of this chapter.
2. Press Enter and note the status message at the bottom of the panel (Figure 3-24).

```
+---------------------------------------------------+
| CONTROLLER discovery in progress - please wait ... |
+---------------------------------------------------+
```

Figure 3-24 Controller discovery in progress

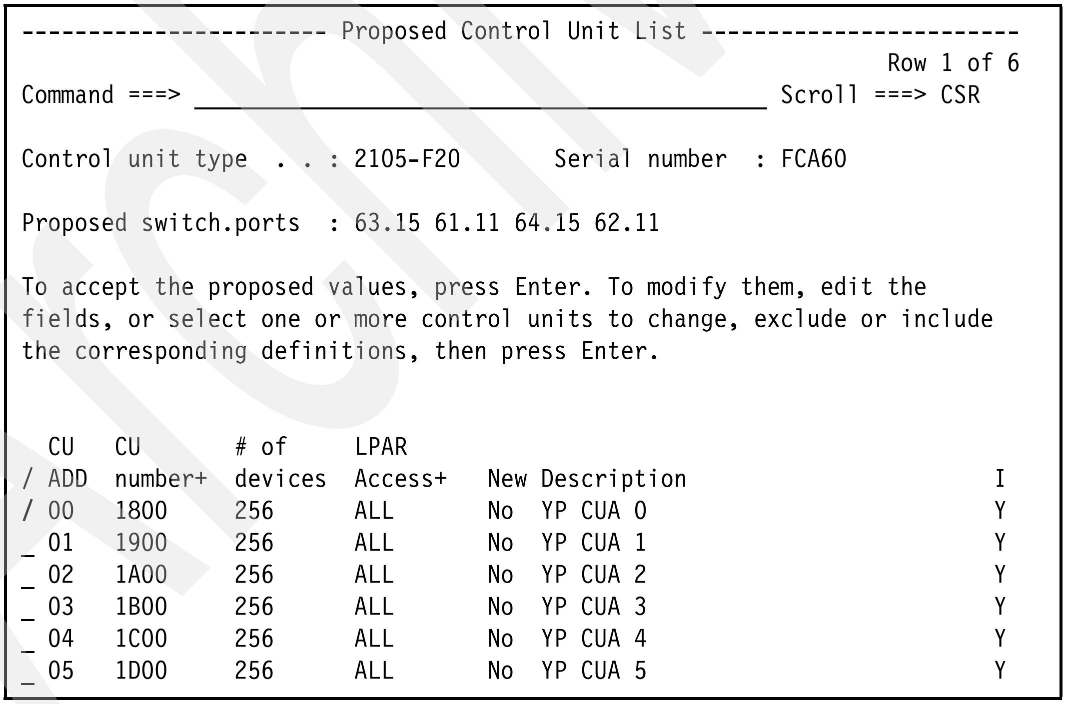
3. In our example, HCD issued msg CBDG721I, indicating that the serial number field for the following control units has been updated in the IODF with the serial number that was discovered (Figure 3-25). Press PF3 to continue.



```
----------------------- Proposed Control Unit List ------------------------

------------------------------ Message List -------------------------------
  Save  Query  Help
--------------------------------------------------------------------------
                                                                Row 1 of 3
Command ===> ____________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ I   CBDG721I Discovery provided serial number FCA60 for controller.
#              The serial numbers of the following control units are
#              changed accordingly: 1800, 1900, 1A00, 1B00, 1C00, 1D00
***************************** Bottom of data ******************************
```

Figure 3-25   CBDG721I message for serial number changes

4. As a result of the discovery process, the Proposed Control Unit List offers definition proposals for the control units found in the currently processed controller (Figure 3-26).



```
----------------------- Proposed Control Unit List ------------------------
                                                                Row 1 of 6
Command ===> ____________________________________________ Scroll ===> CSR

Control unit type  . . : 2105-F20       Serial number  : FCA60

Proposed switch.ports  : 63.15 61.11 64.15 62.11

To accept the proposed values, press Enter. To modify them, edit the
fields, or select one or more control units to change, exclude or include
the corresponding definitions, then press Enter.


  CU   CU       # of     LPAR
/ ADD  number+  devices  Access+   New Description                       I
/ 00   1800     256      ALL       No  YP CUA 0                          Y
_ 01   1900     256      ALL       No  YP CUA 1                          Y
_ 02   1A00     256      ALL       No  YP CUA 2                          Y
_ 03   1B00     256      ALL       No  YP CUA 3                          Y
_ 04   1C00     256      ALL       No  YP CUA 4                          Y
_ 05   1D00     256      ALL       No  YP CUA 5                          Y
```

Figure 3-26   Proposed Control Unit List

Here we can accept the proposed control unit definitions, or we can perform the following modifications:

– For control units showing Yes in column New (which indicates whether the control unit is not yet defined in the IODF), you can overwrite the values in column CU number.

- Also, you can overwrite the LPAR Access and Description fields by entering values in the panel.
- With action code `/`, you get an overview of available actions on the selected control units (i, e, or c):
  - With action code `i`, you can include the corresponding control unit definition in the IODF.
  - With action code `e`, you can exclude the control unit from being defined in the IODF.

    Your selection is reflected in column **I.** Y denotes included and N denotes excluded control units.
  - Action code `c` leads you to the Select Processor / CU panel. On this panel, HCD displays a list of all defined processors. You can define how the control unit is to be attached to one or more processors.

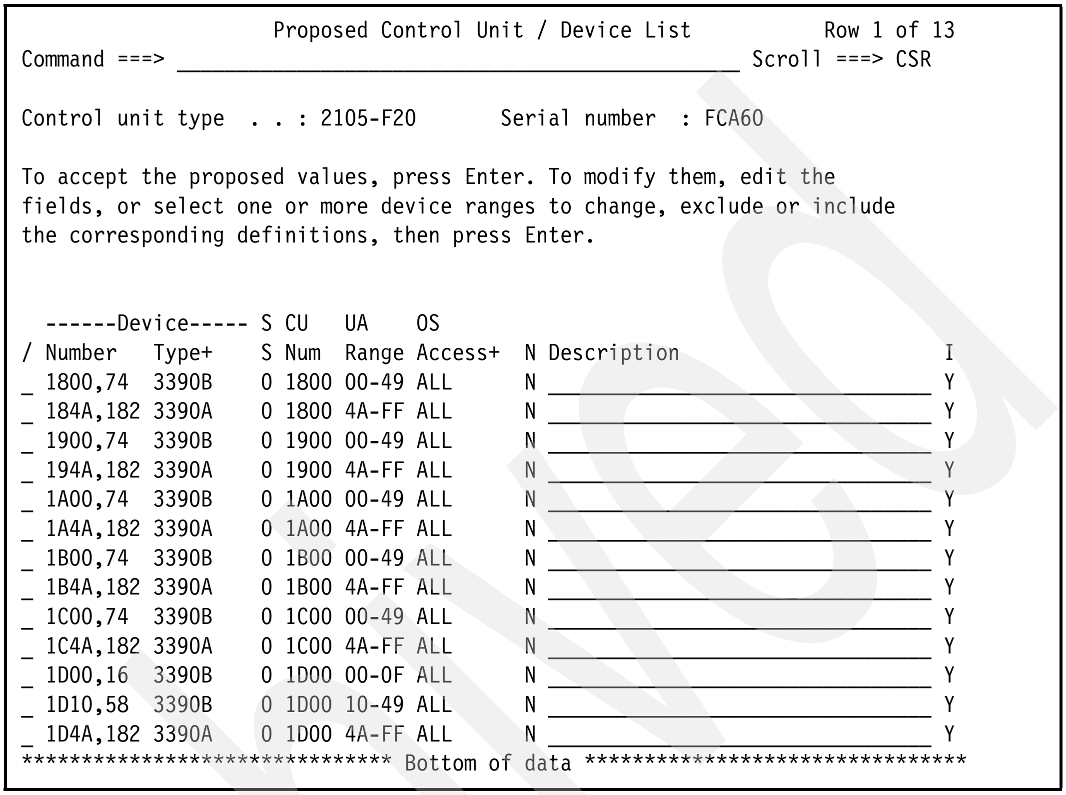
Rules for discovered control units:

- For each discovered control unit that is already defined with the same CUADD value, the existing control unit definition is checked for the same serial number. If the serial numbers match, or the IODF definition does not contain a serial number, the control unit number of the existing control unit is used. If the serial numbers do not match, a warning message is given, and the discovered control unit is proposed with a new number.
- For each discovered control unit that is not yet defined in the IODF, a new serial number is proposed.
- When a new control unit number is proposed, its value is taken from the preferred range specified by the AUTO_SUG_CU_RANGE policy. If there is no free control unit number in the IODF within that range, a warning message indicates that the policy could not be followed, and a free control unit number outside of the range is proposed.
- Proposed existing control units are updated with the discovered serial number. If the type of a discovered control unit differs from its definition in the IODF, the definition is updated.

Rules for discovered devices:

- For each discovered device that is already defined with the same unit address on an existing control unit, the existing device number is proposed. For non-existing devices on the control unit, the existing device numbering scheme is applied if possible.
- For new devices on new or existing control units where the existing device number scheme could not be applied, the device numbers are determined based on the AUTO_SUG_DEV_RANGE and AUTO_MATCH_CU_DEVNUM policies. For PAV alias devices, the numbers are additionally determined based on the AUTO_SS_ALTERNATE and AUTO_SS_DEVNUM_SCHEME policies. If a policy could not be applied because no free numbers are available for the active LP group and OS groups, a warning message is given and free device numbers outside the policies may be used.

5. We can now apply the desired modifications and press Enter after we are finished, or we can accept the proposed definitions without changes and press Enter. In both cases, HCD now displays the Proposed Control Unit / Device List (Figure 3-27).



```
                     Proposed Control Unit / Device List          Row 1 of 13
Command ===> _______________________________________________ Scroll ===> CSR

Control unit type  . . : 2105-F20       Serial number  : FCA60

To accept the proposed values, press Enter. To modify them, edit the
fields, or select one or more device ranges to change, exclude or include
the corresponding definitions, then press Enter.


  ------Device----- S CU   UA    OS
/ Number   Type+    S Num  Range Access+  N Description                      I
_ 1800,74  3390B    0 1800 00-49 ALL      N ________________________________ Y
_ 184A,182 3390A    0 1800 4A-FF ALL      N ________________________________ Y
_ 1900,74  3390B    0 1900 00-49 ALL      N ________________________________ Y
_ 194A,182 3390A    0 1900 4A-FF ALL      N ________________________________ Y
_ 1A00,74  3390B    0 1A00 00-49 ALL      N ________________________________ Y
_ 1A4A,182 3390A    0 1A00 4A-FF ALL      N ________________________________ Y
_ 1B00,74  3390B    0 1B00 00-49 ALL      N ________________________________ Y
_ 1B4A,182 3390A    0 1B00 4A-FF ALL      N ________________________________ Y
_ 1C00,74  3390B    0 1C00 00-49 ALL      N ________________________________ Y
_ 1C4A,182 3390A    0 1C00 4A-FF ALL      N ________________________________ Y
_ 1D00,16  3390B    0 1D00 00-0F ALL      N ________________________________ Y
_ 1D10,58  3390B    0 1D00 10-49 ALL      N ________________________________ Y
_ 1D4A,182 3390A    0 1D00 4A-FF ALL      N ________________________________ Y
******************************* Bottom of data ********************************
```

Figure 3-27 Proposed Control Unit / Device List

This list proposes definition details for existing or new devices accessible by the currently processed discovered control units (in our example, 1800 - 1D00). In the header of this panel, you can see the control unit type and serial number of the discovered controller.

We can accept the proposed device definitions without changes by pressing Enter.

Also, we can narrow the proposed device definitions by overwriting one or more of the device ranges, but only those with a Y in column N (abbreviation for New), which indicates that the device range is not yet defined in the IODF.

Furthermore, for one or more of the listed device ranges with Y in column N, you can change the OS Access and the Description fields by overwriting the values in the panel. Again, a changed OS group must be a subset of the initial OS group.

For further available actions on devices, select one or more devices using action code `/`:

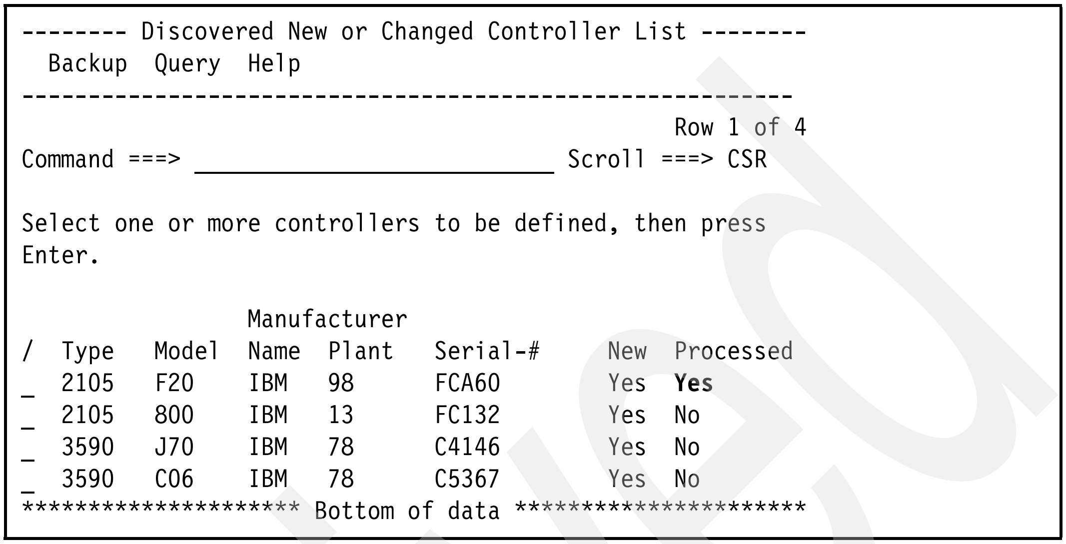
– By selecting action code `i`, we can include, or with action code `e`, we can exclude, the corresponding devices from autoconfiguration.

– Using action code `c` leads you to the Device / Processor Definition panel. On this panel, HCD displays a list of all defined processors that have one or more channel paths to the control unit to which the device being added or changed is attached. Here you can select the processor/CSS(s) for which you want to change the device-to-processor definition.

In both cases, either with modifications applied or with accepting the unchanged propositions, pressing Enter returns you to the Discovered New or Changed Controller List.

6. In our example, we accepted the discovered devices and pressed Enter.

   For each successfully processed controller, its Processed field is now turned to Yes (Figure 3-28).



```
-------- Discovered New or Changed Controller List --------
  Backup  Query  Help
----------------------------------------------------------
                                                 Row 1 of 4
Command ===> ___________________________ Scroll ===> CSR

Select one or more controllers to be defined, then press
Enter.

                 Manufacturer
/  Type   Model  Name  Plant   Serial-#     New  Processed
_  2105   F20    IBM   98      FCA60        Yes  Yes
_  2105   800    IBM   13      FC132        Yes  No
_  3590   J70    IBM   78      C4146        Yes  No
_  3590   C06    IBM   78      C5367        Yes  No
********************* Bottom of data **********************
```

Figure 3-28 Discovered controller processed

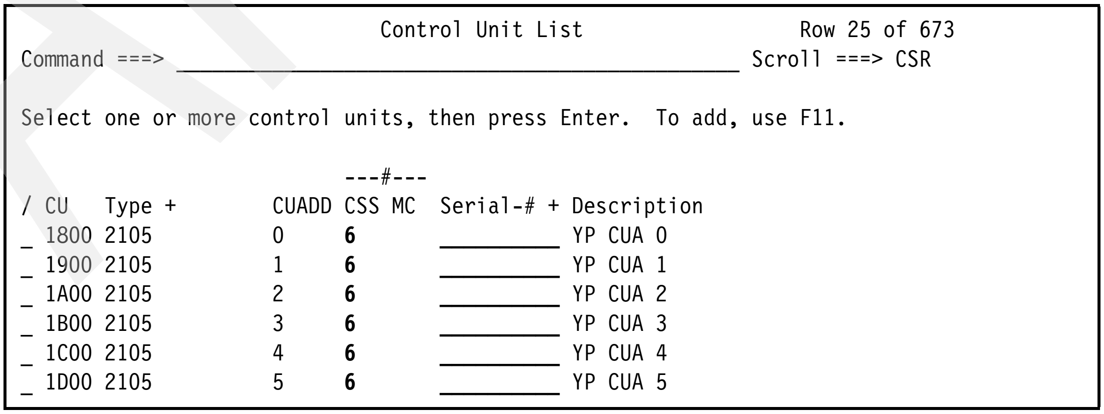
We can select the next controller to be autoconfigured, or we can exit the panel.

3.2.9 Before and after captures of our example

Here are panels of the control unit list (Figure 3-29) and definition (Figure 3-30 on page 116) we used in our example before the I/O Autoconfiguration process. We show the Control Unit definitions that are currently connected to processors other than the processor in our LP Group.

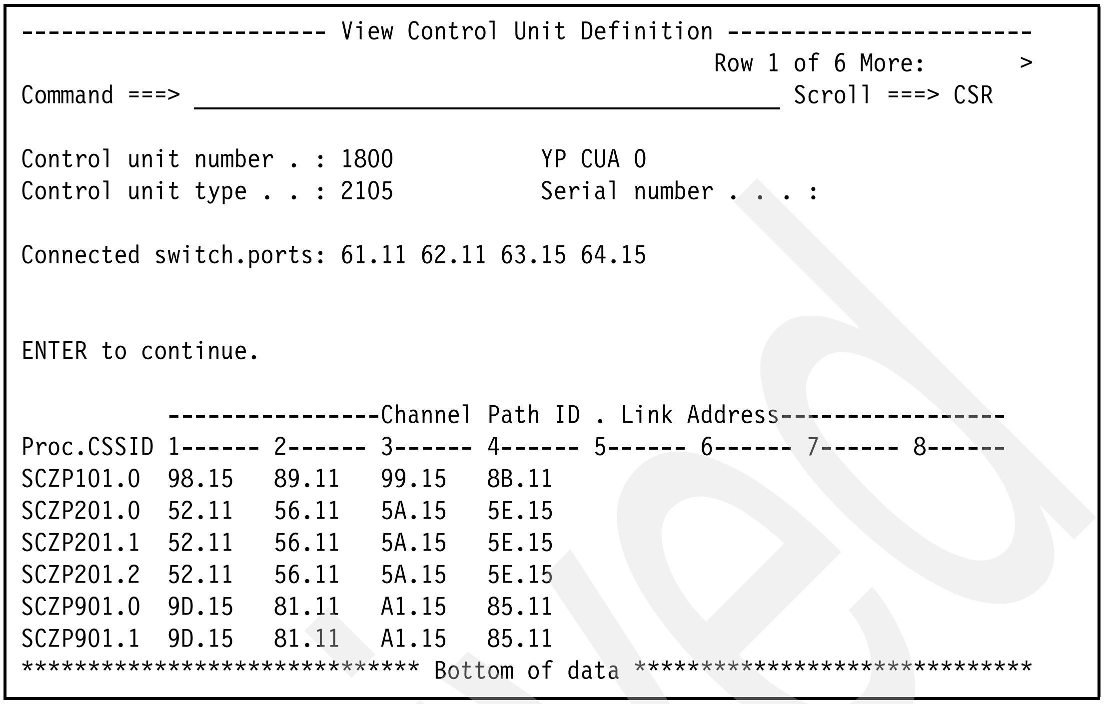
Note the following items:

- The CSS column indicates 6.
- The MC column is blank.
- The Serial # is blank.



```
                           Control Unit List               Row 25 of 673
Command ===> __________________________________________ Scroll ===> CSR

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

                          ---#---
/ CU   Type +       CUADD CSS MC  Serial-# + Description
_ 1800 2105         0     6       _________ YP CUA 0
_ 1900 2105         1     6       _________ YP CUA 1
_ 1A00 2105         2     6       _________ YP CUA 2
_ 1B00 2105         3     6       _________ YP CUA 3
_ 1C00 2105         4     6       _________ YP CUA 4
_ 1D00 2105         5     6       _________ YP CUA 5
```

Figure 3-29 Control Unit example prior to I/O Autoconfiguration



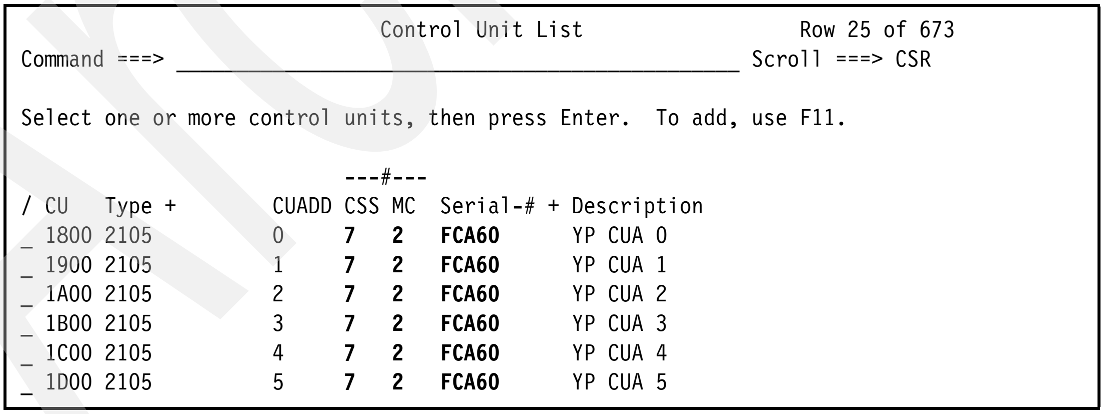
```
----------------------- View Control Unit Definition -----------------------
                                                    Row 1 of 6 More:       >
Command ===> ____________________________________________ Scroll ===> CSR

Control unit number . : 1800          YP CUA 0
Control unit type . . : 2105          Serial number . . . :

Connected switch.ports: 61.11 62.11 63.15 64.15


ENTER to continue.

           ----------------Channel Path ID . Link Address-----------------
Proc.CSSID 1------ 2------ 3------ 4------ 5------ 6------ 7------ 8------
SCZP101.0  98.15   89.11   99.15   8B.11
SCZP201.0  52.11   56.11   5A.15   5E.15
SCZP201.1  52.11   56.11   5A.15   5E.15
SCZP201.2  52.11   56.11   5A.15   5E.15
SCZP901.0  9D.15   81.11   A1.15   85.11
SCZP901.1  9D.15   81.11   A1.15   85.11
****************************** Bottom of data ******************************
```

Figure 3-30 Control Unit definition example prior to I/O Autoconfiguration

Here is the panel of the control unit list (Figure 3-31) we used in our example after the I/O Autoconfiguration process showing the CU definitions.

Note the following changes:

- The CSS column now indicates 7.
- The MC column now indicates 2.
- The Serial # now indicates the Serial Number of the controller.

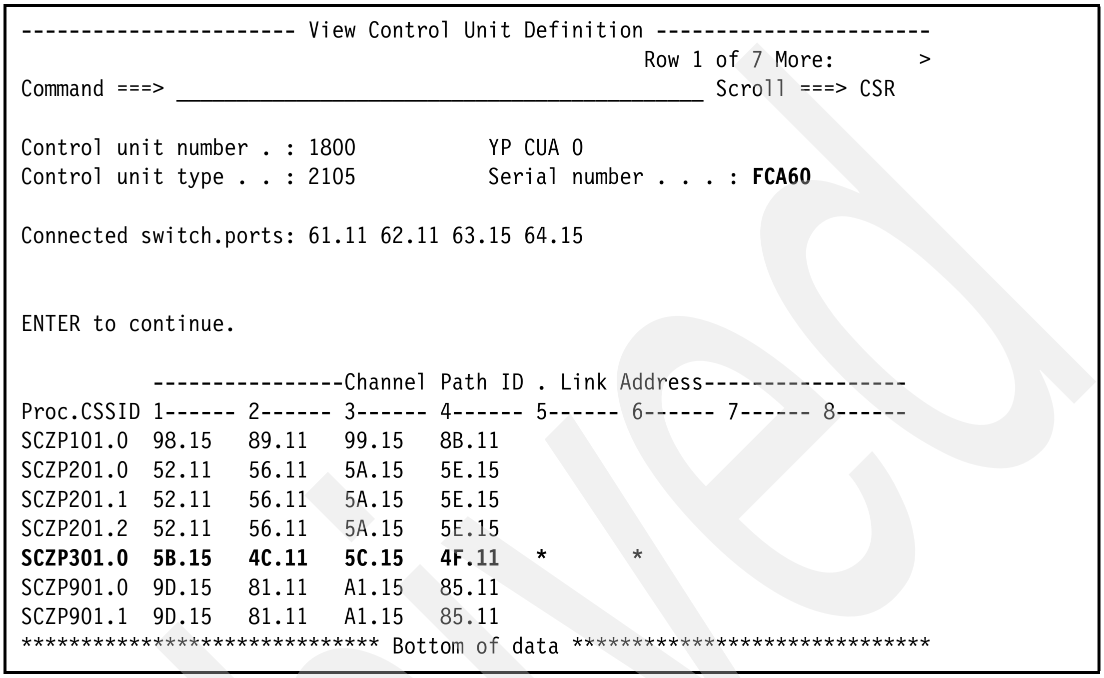


```
                              Control Unit List                  Row 25 of 673
Command ===> _______________________________________________ Scroll ===> CSR

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

                           ---#---
/ CU   Type +        CUADD CSS MC  Serial-# + Description
_ 1800 2105          0     7   2   FCA60      YP CUA 0
_ 1900 2105          1     7   2   FCA60      YP CUA 1
_ 1A00 2105          2     7   2   FCA60      YP CUA 2
_ 1B00 2105          3     7   2   FCA60      YP CUA 3
_ 1C00 2105          4     7   2   FCA60      YP CUA 4
_ 1D00 2105          5     7   2   FCA60      YP CUA 5
```

Figure 3-31 Control Unit example after I/O Autoconfiguration

In the View Control Unit Definition panel (Figure 3-32), note the following changes:

- The Serial # now indicates the Serial Number of the controller.
- Processor SCZP301 is now connected with for static CHPIDs and two dynamic CHPIDs.



```
----------------------- View Control Unit Definition -----------------------
                                                    Row 1 of 7 More:       >
Command ===> ____________________________________________ Scroll ===> CSR

Control unit number . : 1800           YP CUA 0
Control unit type . . : 2105           Serial number . . . : FCA60

Connected switch.ports: 61.11 62.11 63.15 64.15


ENTER to continue.

           ----------------Channel Path ID . Link Address-----------------
Proc.CSSID 1------ 2------ 3------ 4------ 5------ 6------ 7------ 8------
SCZP101.0  98.15   89.11   99.15   8B.11
SCZP201.0  52.11   56.11   5A.15   5E.15
SCZP201.1  52.11   56.11   5A.15   5E.15
SCZP201.2  52.11   56.11   5A.15   5E.15
SCZP301.0  5B.15   4C.11   5C.15   4F.11   *       *
SCZP901.0  9D.15   81.11   A1.15   85.11
SCZP901.1  9D.15   81.11   A1.15   85.11
****************************** Bottom of data ******************************
```

Figure 3-32   Control Unit definition example after I/O Autoconfiguration

3.2.10 I/O Autoconfiguration using HCM

In this section, we discuss performing I/O Autoconfiguration using HCM. We presume that you have a working knowledge of HCM.

Our first action is to open a work IODF through HCM.

3.2.11 Defining autoconfiguration policies

To define the autoconfiguration policies, perform the following steps:

1. Select **Utilities** → **Autoconfiguration** (Figure 3-33).

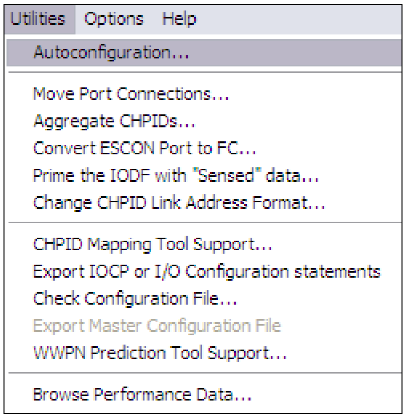
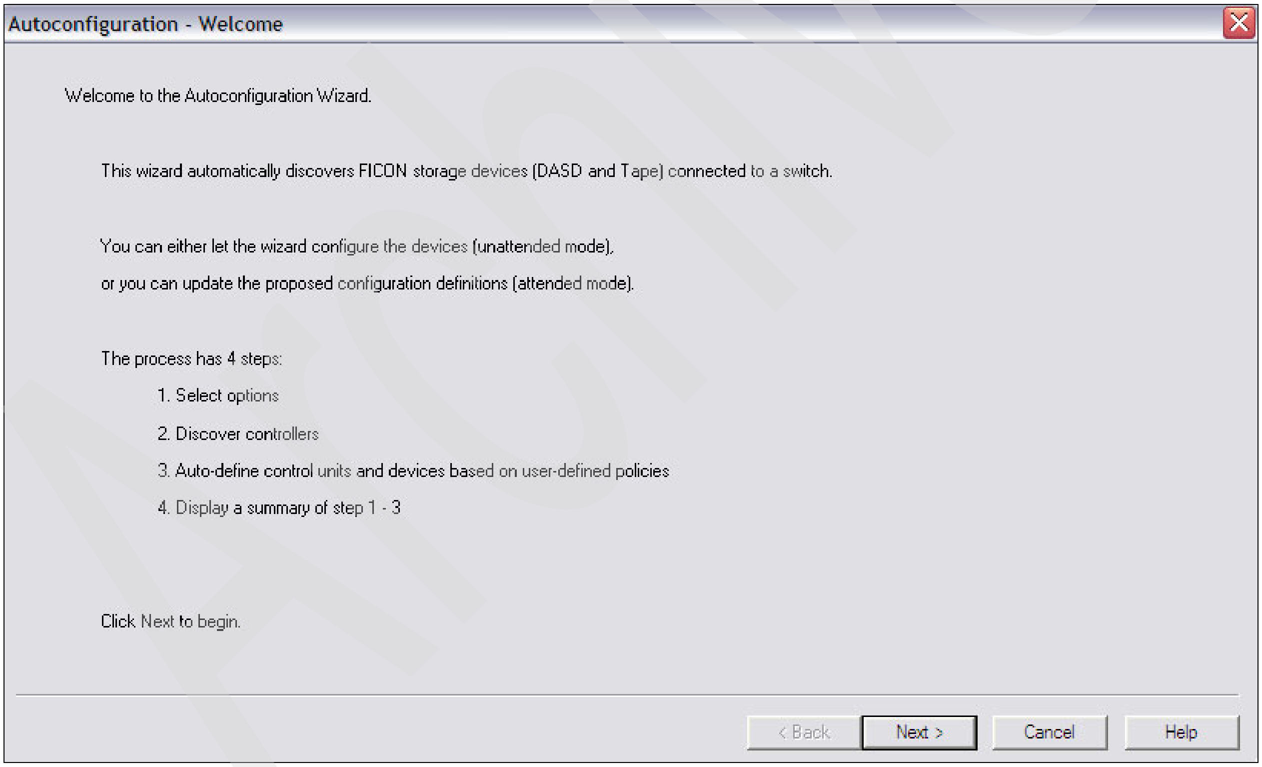


Figure 3-33 Utilities Autoconfiguration

This action opens the first window of the Autoconfiguration wizard (Figure 3-34).



Welcome to the Autoconfiguration Wizard.

This wizard automatically discovers FICON storage devices (DASD and Tape) connected to a switch.

You can either let the wizard configure the devices (unattended mode),

or you can update the proposed configuration definitions (attended mode).

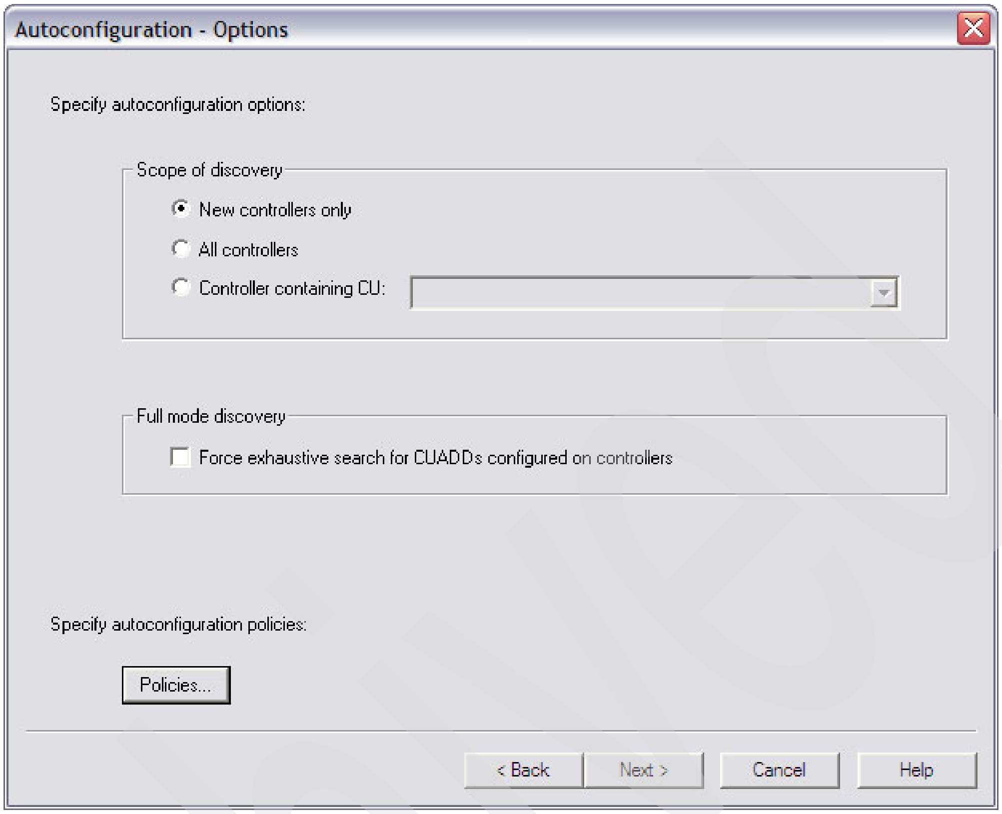
The process has 4 steps:

1. Select options
2. Discover controllers
3. Auto-define control units and devices based on user-defined policies
4. Display a summary of step 1 - 3

Click Next to begin.

Figure 3-34 Autoconfiguration wizard

Click **Next** to continue (Figure 3-35).



Specify autoconfiguration options:

Scope of discovery

● New controllers only

○ All controllers

○ Controller containing CU:

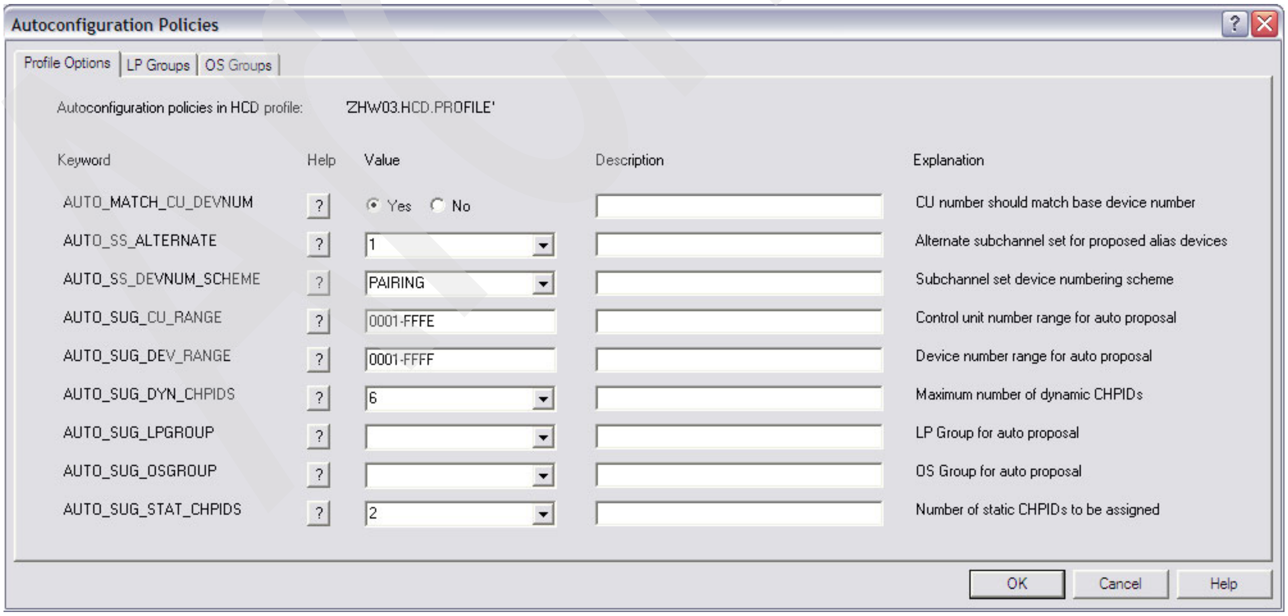
Full mode discovery

☐ Force exhaustive search for CUADDs configured on controllers

Specify autoconfiguration policies:

Figure 3-35 Autoconfiguration options

2. As described in the HCD examples, we initially set up the LP groups and OS groups. Click **Policies** (Figure 3-36).



Autoconfiguration policies in HCD profile: 'ZHW03.HCD.PROFILE'

Keyword	Help	Value	Description	Explanation
AUTO_MATCH_CU_DEVNUM	?	● Yes ○ No		CU number should match base device number
AUTO_SS_ALTERNATE	?	1		Alternate subchannel set for proposed alias devices
AUTO_SS_DEVNUM_SCHEME	?	PAIRING		Subchannel set device numbering scheme
AUTO_SUG_CU_RANGE	?	0001-FFFE		Control unit number range for auto proposal
AUTO_SUG_DEV_RANGE	?	0001-FFFF		Device number range for auto proposal
AUTO_SUG_DYN_CHPIDS	?	6		Maximum number of dynamic CHPIDs
AUTO_SUG_LPGROUP	?			LP Group for auto proposal
AUTO_SUG_OSGROUP	?			OS Group for auto proposal
AUTO_SUG_STAT_CHPIDS	?	2		Number of static CHPIDs to be assigned

Figure 3-36 Autoconfiguration policies defaults

Here we see some of the default settings in some of the fields for Profile Options:

- If this is the first time you are setting your Profile Options and Policies, the defaults are displayed.
- If you have previously made updates to your Profile Options and Policies, then they will be stored in and retrieved from your userid.HCD.PROFILE data set. In our example, we are using the ZHW03.HCD.PROFILE data set.

3.2.12 Defining logical partition groups for autoconfiguration

To define logical partition group for autoconfiguration, perform the following steps:

1. Click the **LP Groups** tab (Figure 3-37).

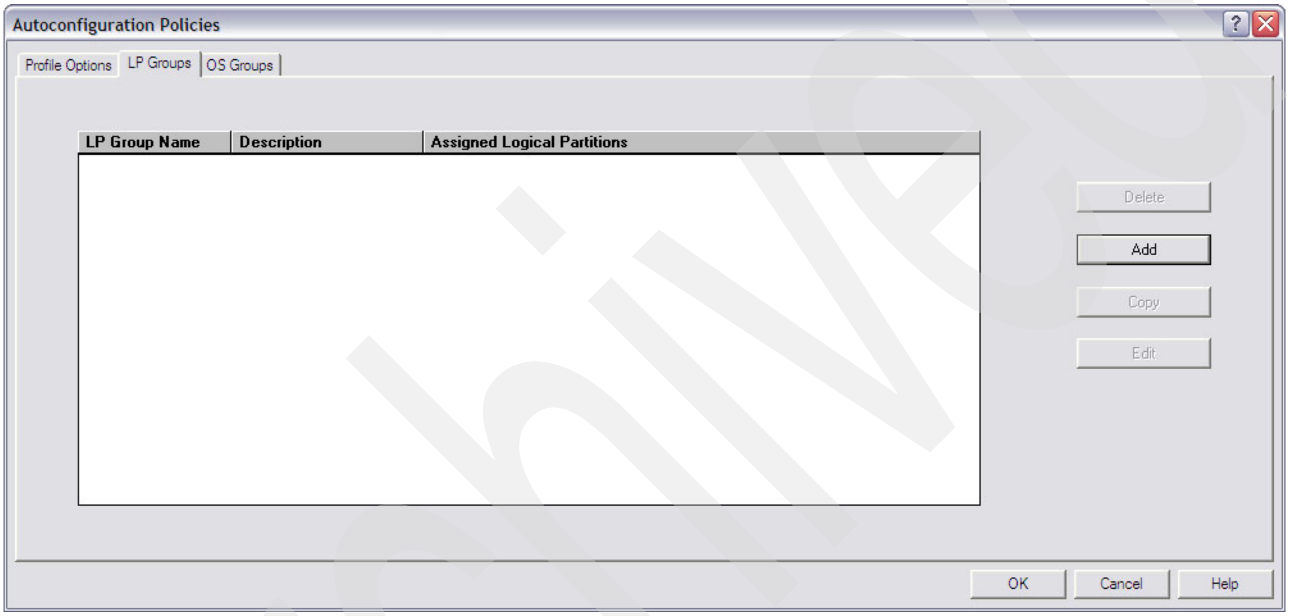
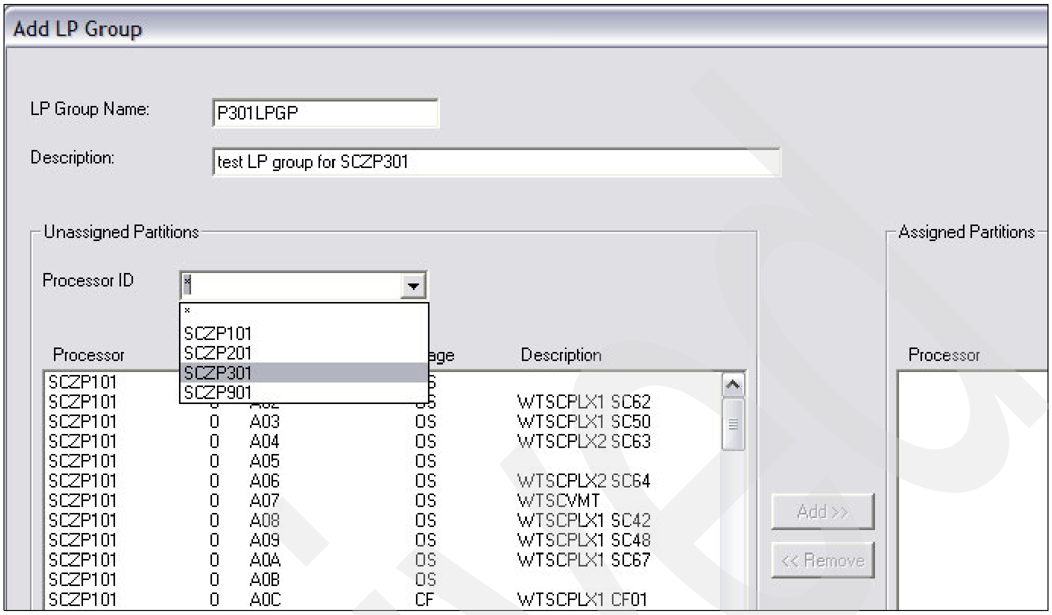


Figure 3-37 LP Groups: None defined

This window shows us that there are currently no LP groups defined in this IODF.

2. Click **Add**. In our example, we entered an LP Group Name and Description and selected the Processor ID drop-down menu to show a list of all defined processors in this IODF (Figure 3-38).



LP Group Name: P301LPGP

Description: test LP group for SCZP301

Processor ID: *

- *
- SCZP101
- SCZP201
- SCZP301
- SCZP901

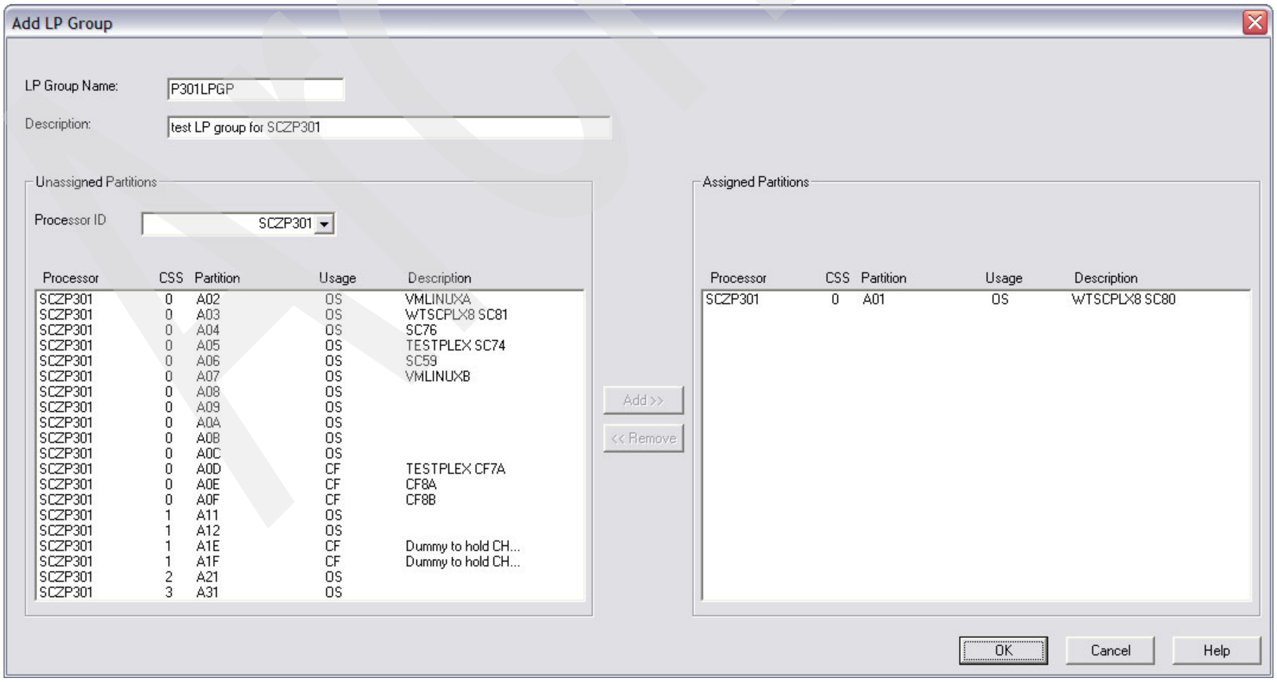
Processor			age	Description
SCZP101				
SCZP101				WTSCPLX1 SC62
SCZP101	0	A03	OS	WTSCPLX1 SC50
SCZP101	0	A04	OS	WTSCPLX2 SC63
SCZP101	0	A05	OS	
SCZP101	0	A06	OS	WTSCPLX2 SC64
SCZP101	0	A07	OS	WTSCVMT
SCZP101	0	A08	OS	WTSCPLX1 SC42
SCZP101	0	A09	OS	WTSCPLX1 SC48
SCZP101	0	A0A	OS	WTSCPLX1 SC67
SCZP101	0	A0B	OS	
SCZP101	0	A0C	CF	WTSCPLX1 CF01

Assigned Partitions: Processor

Figure 3-38 LP Groups: Processor list

This option is set to '*' by default to show all defined processors and partitions in the box in the lower left corner. By selecting a processor in the Processor ID window, this list can be filtered. Alternatively, we could just scroll down the list of processors and partitions.

3. Highlight the processor and partition that you want to add to the LP Group and click **Add**. In our example, we select processor SCZP301 and partition A01 (Figure 3-39).



LP Group Name: P301LPGP

Description: test LP group for SCZP301

Unassigned Partitions

Processor ID: SCZP301

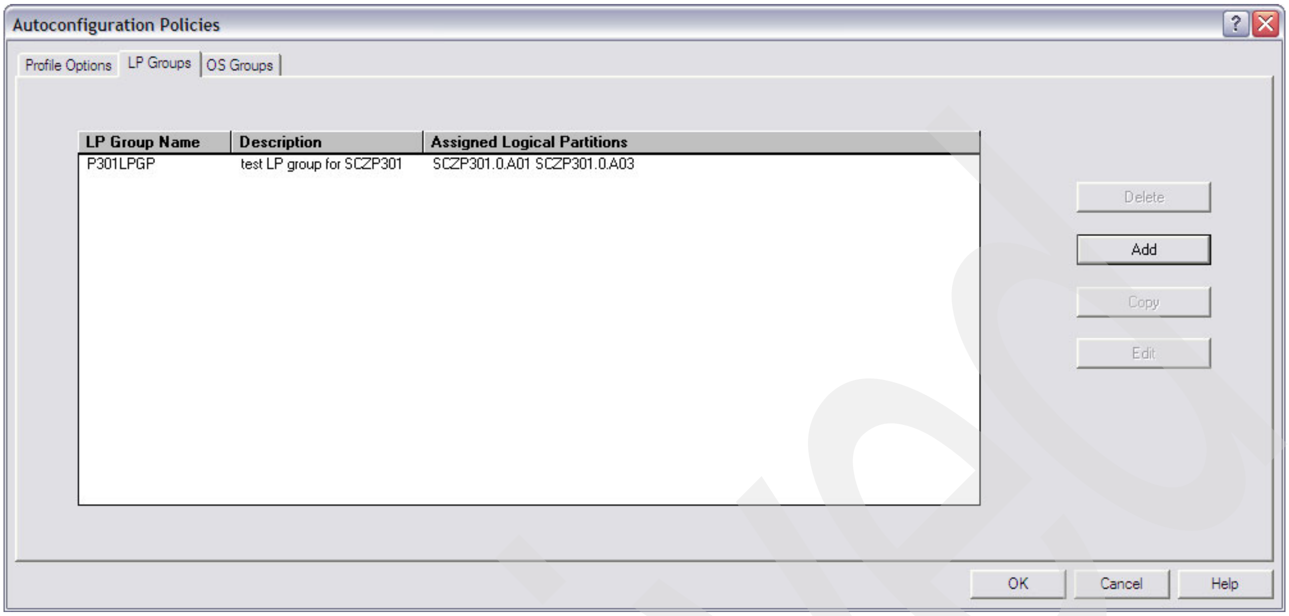
Processor	CSS	Partition	Usage	Description
SCZP301	0	A02	OS	VMLINUXA
SCZP301	0	A03	OS	WTSCPLX8 SC81
SCZP301	0	A04	OS	SC76
SCZP301	0	A05	OS	TESTPLEX SC74
SCZP301	0	A06	OS	SC59
SCZP301	0	A07	OS	VMLINUXB
SCZP301	0	A08	OS	
SCZP301	0	A09	OS	
SCZP301	0	A0A	OS	
SCZP301	0	A0B	OS	
SCZP301	0	A0C	OS	
SCZP301	0	A0D	CF	TESTPLEX CF7A
SCZP301	0	A0E	CF	CF8A
SCZP301	0	A0F	CF	CF8B
SCZP301	1	A11	OS	
SCZP301	1	A12	OS	
SCZP301	1	A1E	CF	Dummy to hold CH...
SCZP301	1	A1F	CF	Dummy to hold CH...
SCZP301	2	A21	OS	
SCZP301	3	A31	OS	

Assigned Partitions

Processor	CSS	Partition	Usage	Description
SCZP301	0	A01	OS	WTSCPLX8 SC80

Figure 3-39 LP Groups: Select processor and partition

4. Click **OK** or add more processors and partitions to the LP Group. In our example, we also add processor SCZP301 and partition A03 and then click **OK** (Figure 3-40).



LP Group Name	Description	Assigned Logical Partitions
P301LPGP	test LP group for SCZP301	SCZP301.0.A01 SCZP301.0.A03

Figure 3-40 LP Groups: Processor and partitions added

3.2.13 Defining OS configuration groups for autoconfiguration

To define OS configuration groups for autoconfiguration, perform the following steps:

1. Click the **OS Groups** tab (Figure 3-41).

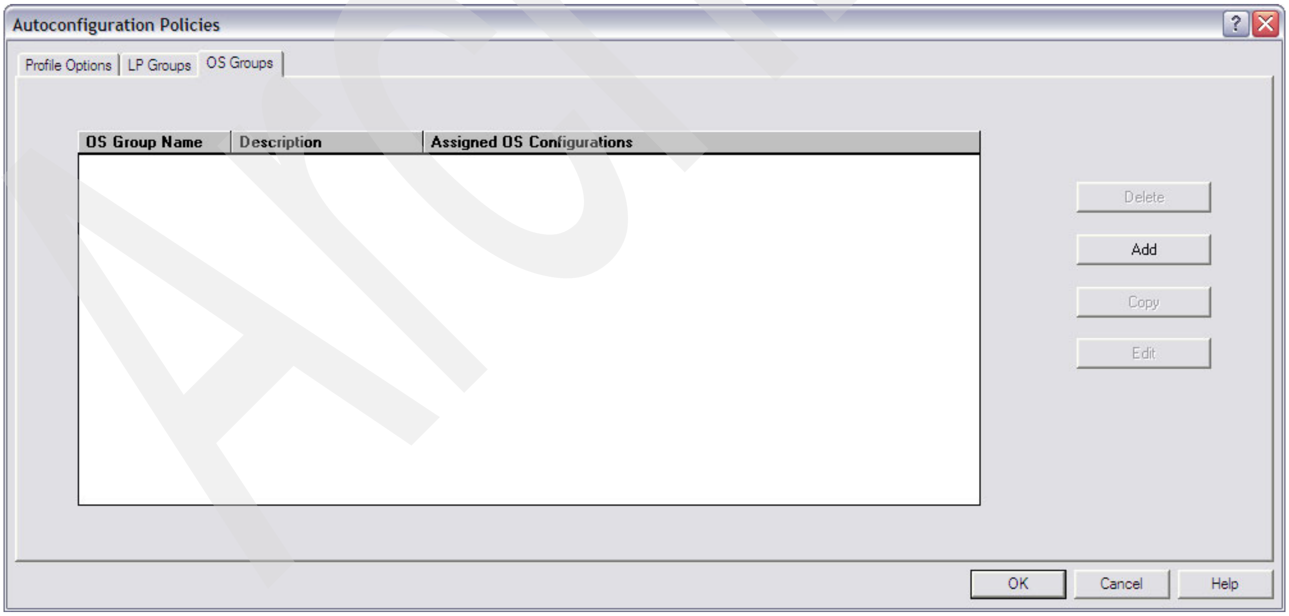
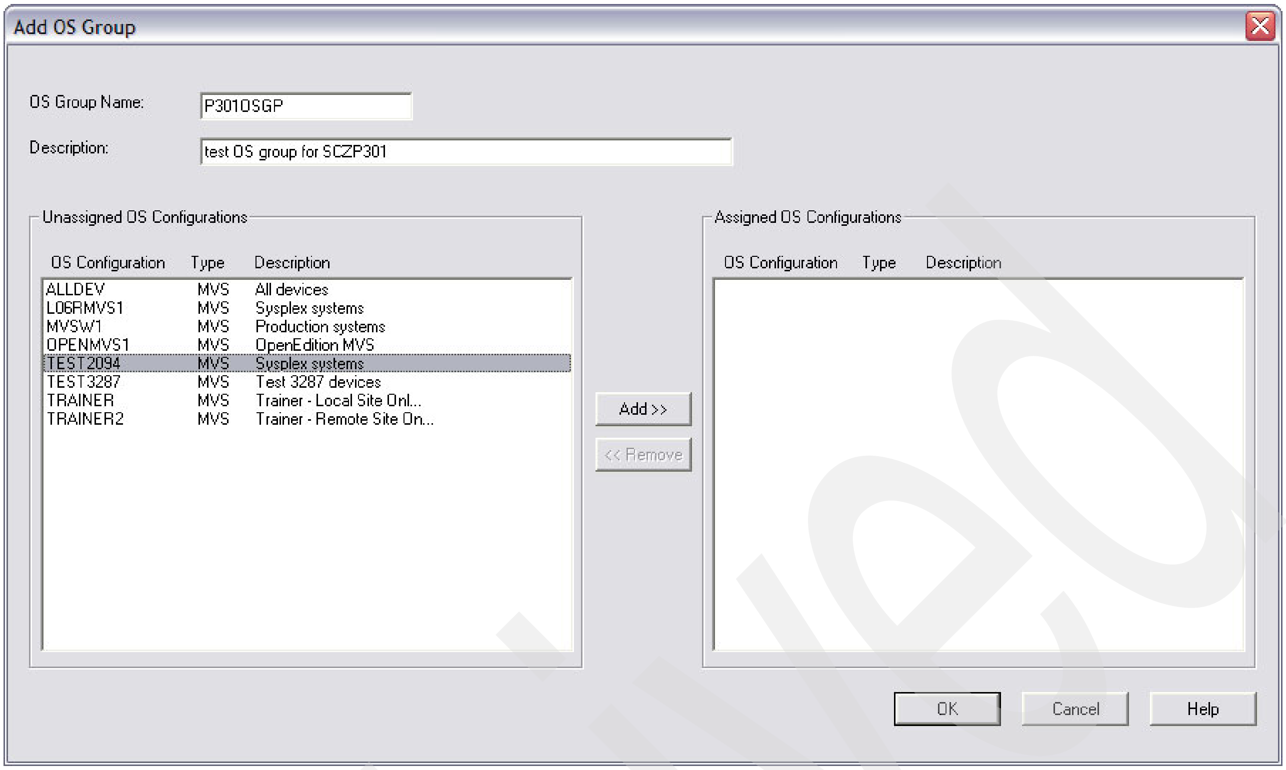


Figure 3-41 OS Groups: None defined

We see that there are currently no OS Groups defined in this IODF.

2. Click **Add.** In our example, we entered an OS Group Name and Description and highlighted the OS configuration we want to add to our OS Group (Figure 3-42).



OS Group Name: P301OSGP

Description: test OS group for SCZP301

Unassigned OS Configurations

OS Configuration	Type	Description
ALLDEV	MVS	All devices
L06RMVS1	MVS	Sysplex systems
MVSW1	MVS	Production systems
OPENMVS1	MVS	OpenEdition MVS
TEST2094	MVS	Sysplex systems
TEST3287	MVS	Test 3287 devices
TRAINER	MVS	Trainer - Local Site Onl...
TRAINER2	MVS	Trainer - Remote Site On...

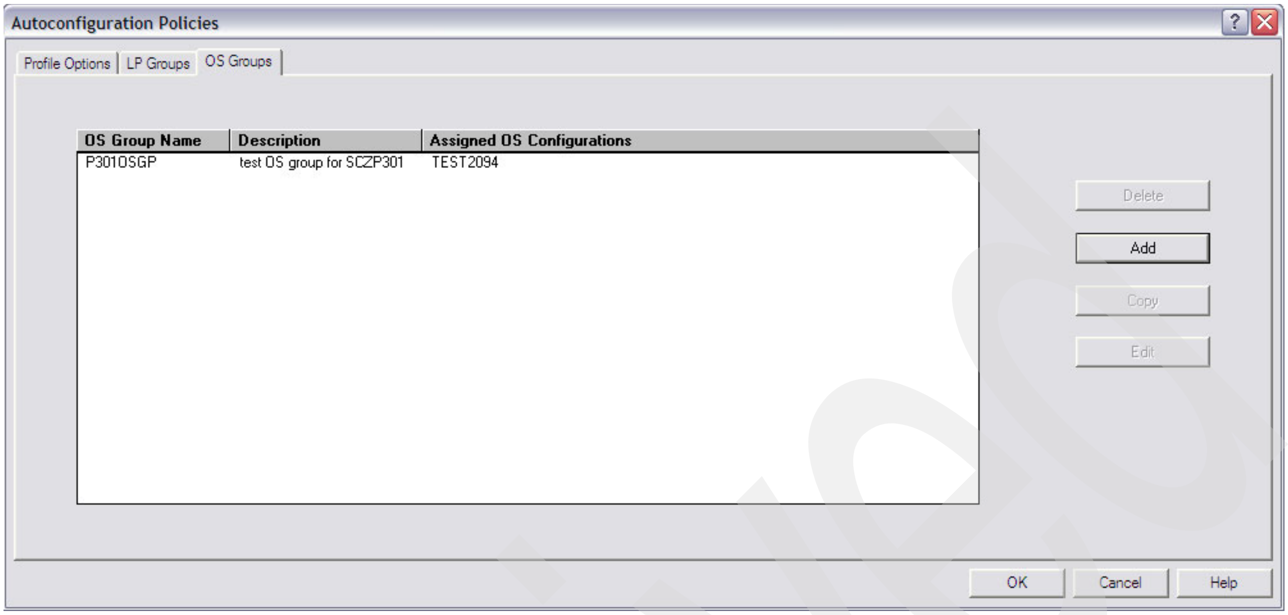
Assigned OS Configurations

OS Configuration	Type	Description

Figure 3-42 OS Groups: OS configuration list

3. Click **Add** to add the unassigned OS configuration to the assigned OS configuration list and to our OS Group.

4. Click **OK** or add more OS configurations. In our example, we only added the TEST2094 OS configuration and clicked **OK** (Figure 3-43).


Autoconfiguration Policies

Profile Options | LP Groups | OS Groups

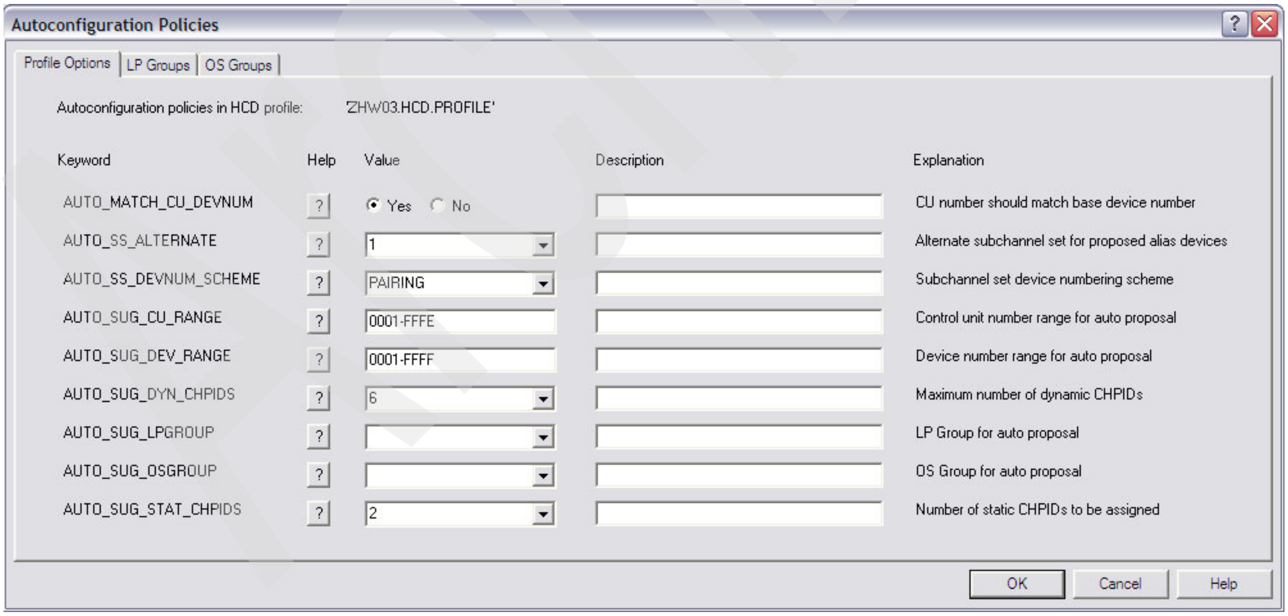
OS Group Name	Description	Assigned OS Configurations
P301OSGP	test OS group for SCZP301	TEST2094

Figure 3-43 OS Groups: OS configuration added

3.2.14 Setting keywords for autoconfiguration policies

To set keywords for autoconfiguration policies, perform the following steps:

1. Click the **Profile Options** tab (Figure 3-44).


Autoconfiguration Policies

Profile Options | LP Groups | OS Groups

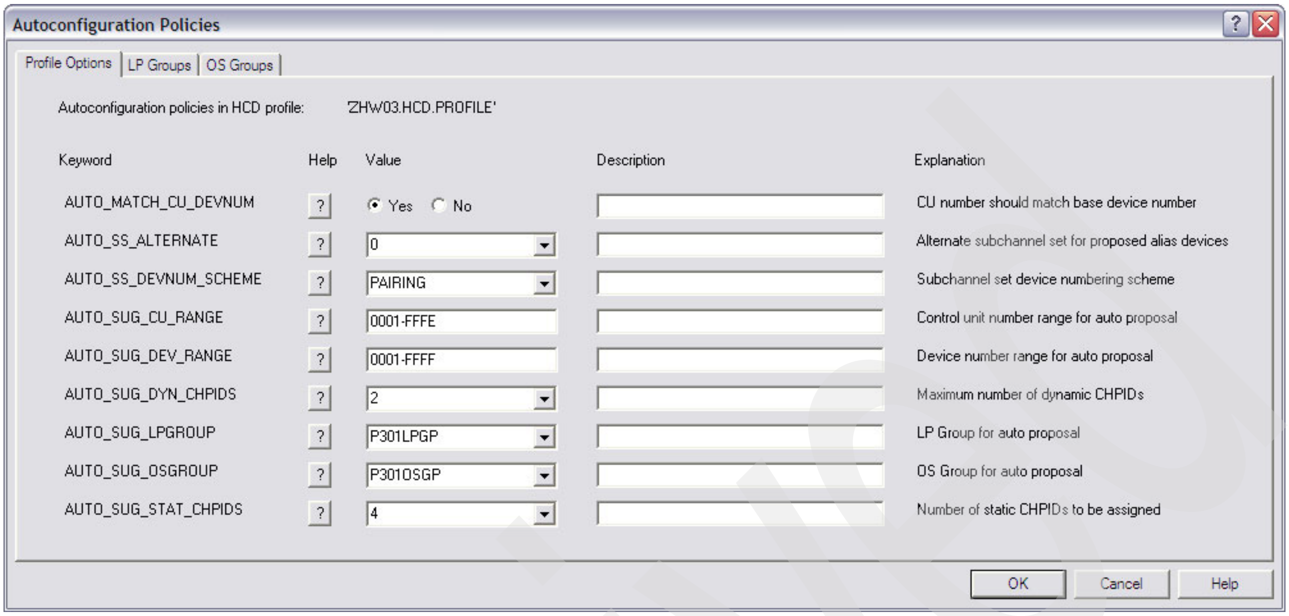
Autoconfiguration policies in HCD profile: 'ZHW03.HCD.PROFILE'

Keyword	Help	Value	Description	Explanation
AUTO_MATCH_CU_DEVNUM	?	● Yes ○ No		CU number should match base device number
AUTO_SS_ALTERNATE	?	1		Alternate subchannel set for proposed alias devices
AUTO_SS_DEVNUM_SCHEME	?	PAIRING		Subchannel set device numbering scheme
AUTO_SUG_CU_RANGE	?	0001-FFFE		Control unit number range for auto proposal
AUTO_SUG_DEV_RANGE	?	0001-FFFF		Device number range for auto proposal
AUTO_SUG_DYN_CHPIDS	?	6		Maximum number of dynamic CHPIDs
AUTO_SUG_LPGROUP	?			LP Group for auto proposal
AUTO_SUG_OSGROUP	?			OS Group for auto proposal
AUTO_SUG_STAT_CHPIDS	?	2		Number of static CHPIDs to be assigned

Figure 3-44 Autoconfiguration policies defaults

2. For our example we set the following keywords (Figure 3-45 on page 125):
   - AUTO_SS_ALTERNATE: Set to 0 (SS0).
   - AUTO_SUG_DYN_CHPIDS: Set to 2 (dynamic CHPIDs).

- AUTO_SUG_LPGROUP: Set to P301LPGP (LP Group).
- AUTO_SUG_OSGROUP: Set to P301OSGP (OS Group).
- AUTO_SUG_STAT_CHPIDS: Set to 4 (static CHPIDs).



Autoconfiguration policies in HCD profile: 'ZHW03.HCD.PROFILE'

Keyword	Help	Value	Description	Explanation
AUTO_MATCH_CU_DEVNUM	?	● Yes ○ No		CU number should match base device number
AUTO_SS_ALTERNATE	?	0		Alternate subchannel set for proposed alias devices
AUTO_SS_DEVNUM_SCHEME	?	PAIRING		Subchannel set device numbering scheme
AUTO_SUG_CU_RANGE	?	0001-FFFE		Control unit number range for auto proposal
AUTO_SUG_DEV_RANGE	?	0001-FFFF		Device number range for auto proposal
AUTO_SUG_DYN_CHPIDS	?	2		Maximum number of dynamic CHPIDs
AUTO_SUG_LPGROUP	?	P301LPGP		LP Group for auto proposal
AUTO_SUG_OSGROUP	?	P301OSGP		OS Group for auto proposal
AUTO_SUG_STAT_CHPIDS	?	4		Number of static CHPIDs to be assigned

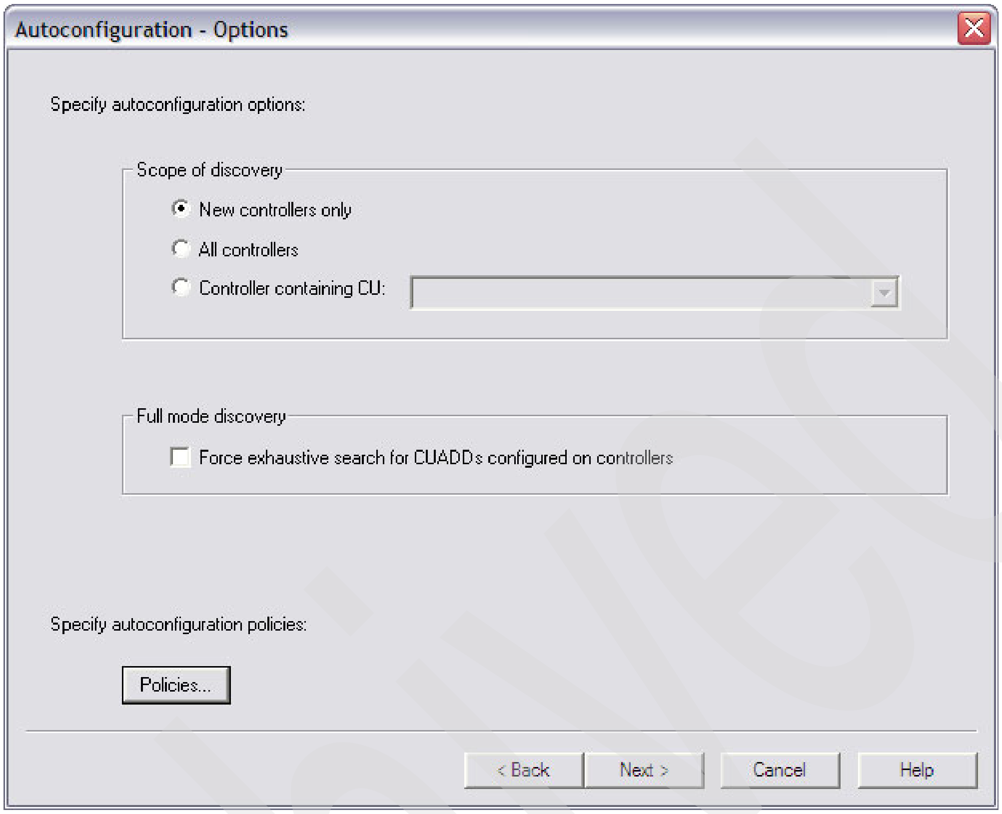
Figure 3-45 Autoconfiguration policies set

3. These values may also be found in the drop-down menus next to each data box. Click **OK**.

3.2.15 Performing the automatic I/O discovery process

Now that the profile options and policies have been set, we are ready to commence the automatic I/O discovery process. We search for 'New controllers only' in this example.

In the Autoconfiguration - Options window, click **Next** (Figure 3-46).



Autoconfiguration - Options

Specify autoconfiguration options:

Scope of discovery

● New controllers only

○ All controllers

○ Controller containing CU:

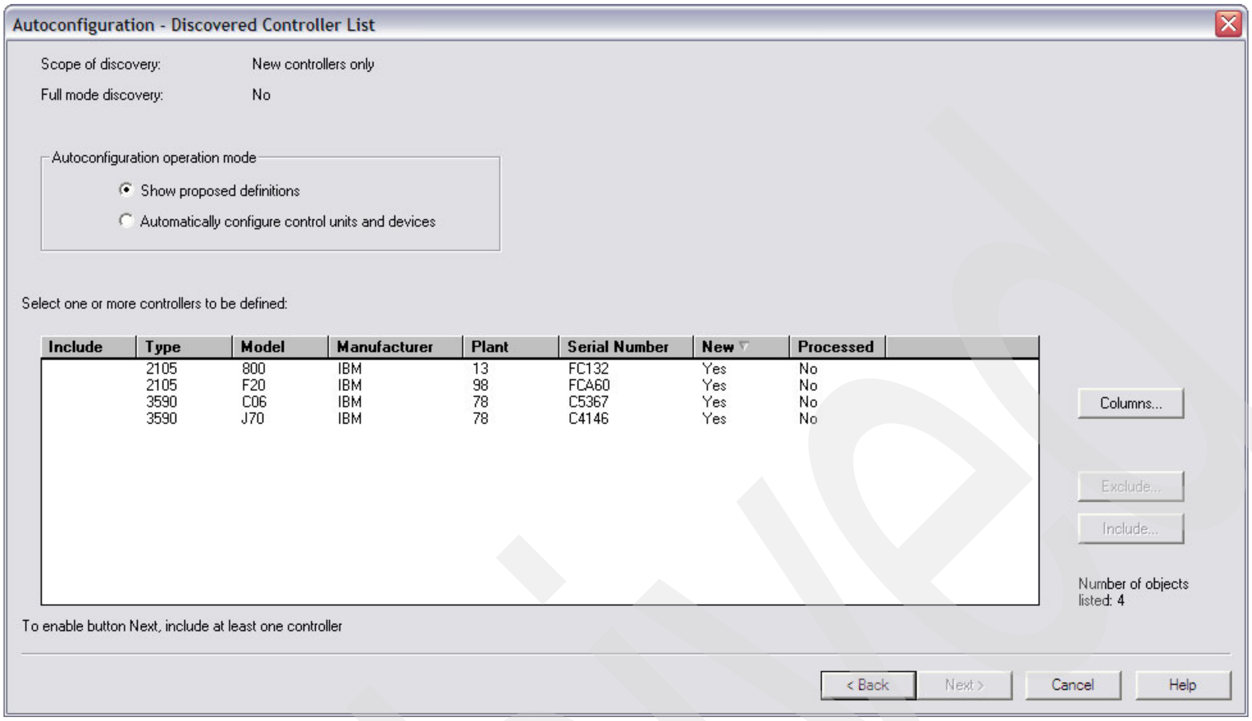
Full mode discovery

☐ Force exhaustive search for CUADDs configured on controllers

Specify autoconfiguration policies:

Figure 3-46 Autoconfiguration options

The Fabric discovery process is initiated. After this process is complete, the window shown in Figure 3-47 opens.



Scope of discovery: New controllers only

Full mode discovery: No

Autoconfiguration operation mode

● Show proposed definitions

○ Automatically configure control units and devices

Select one or more controllers to be defined:

Include	Type	Model	Manufacturer	Plant	Serial Number	New	Processed
	2105	800	IBM	13	FC132	Yes	No
	2105	F20	IBM	98	FCA60	Yes	No
	3590	C06	IBM	78	C5367	Yes	No
	3590	J70	IBM	78	C4146	Yes	No

Number of objects listed: 4

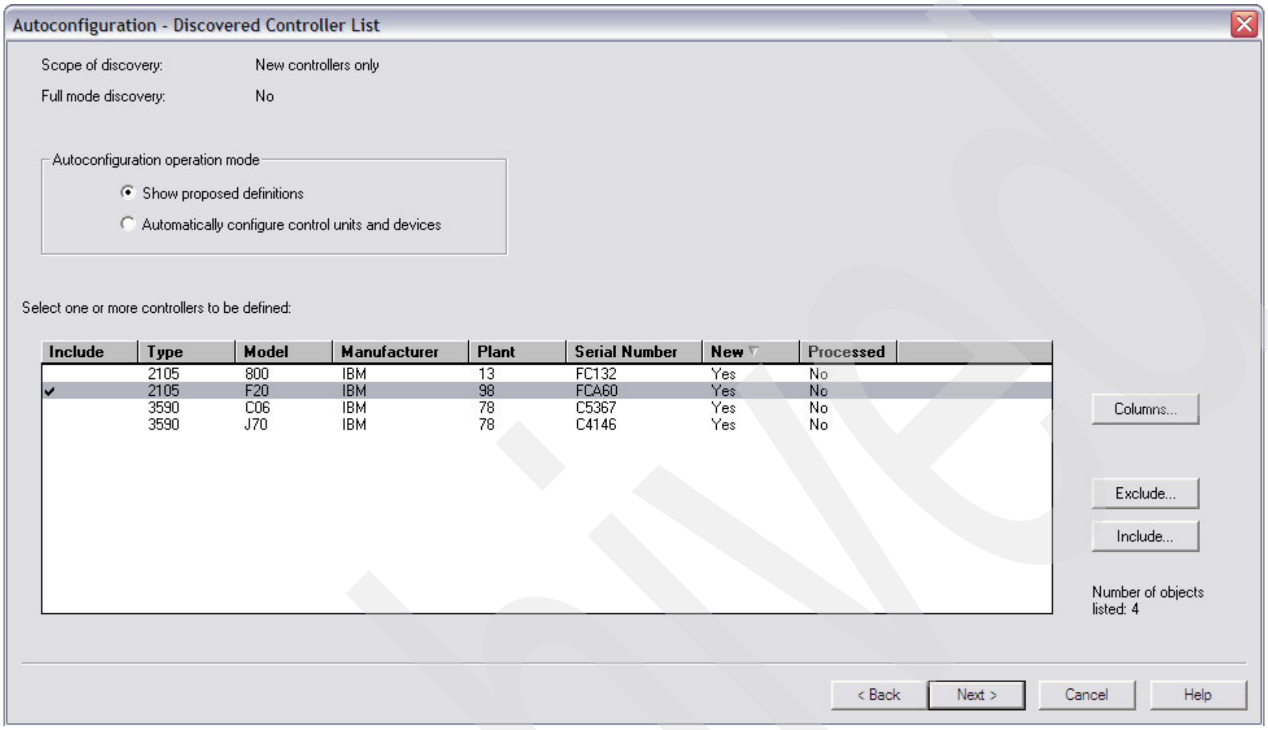
To enable button Next, include at least one controller

Figure 3-47 Fabric discovery results

3.2.16 Applying updates to the autoconfiguration proposals

To apply updates to the autoconfiguration proposals, perform the following steps:

1. Highlight the desired controller and click **Include...** to include that controller for the Controller discovery process. Note the check mark in the Include column (Figure 3-48).



Autoconfiguration - Discovered Controller List

Scope of discovery: New controllers only

Full mode discovery: No

Autoconfiguration operation mode

● Show proposed definitions

○ Automatically configure control units and devices

Select one or more controllers to be defined:

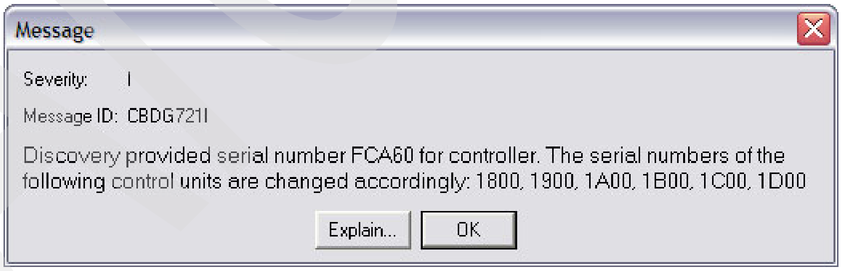
Include	Type	Model	Manufacturer	Plant	Serial Number	New	Processed
	2105	800	IBM	13	FC132	Yes	No
✓	2105	F20	IBM	98	FCA60	Yes	No
	3590	C06	IBM	78	C5367	Yes	No
	3590	J70	IBM	78	C4146	Yes	No

Number of objects listed: 4

Figure 3-48 Controller selection for discovery

2. Click **Next** to start the Controller discovery process.

   In our example, HCM issued CBDG721I message, indicating that the serial number field for the control units has been updated in the IODF with the serial number that was discovered (Figure 3-49).



Message

Severity: I

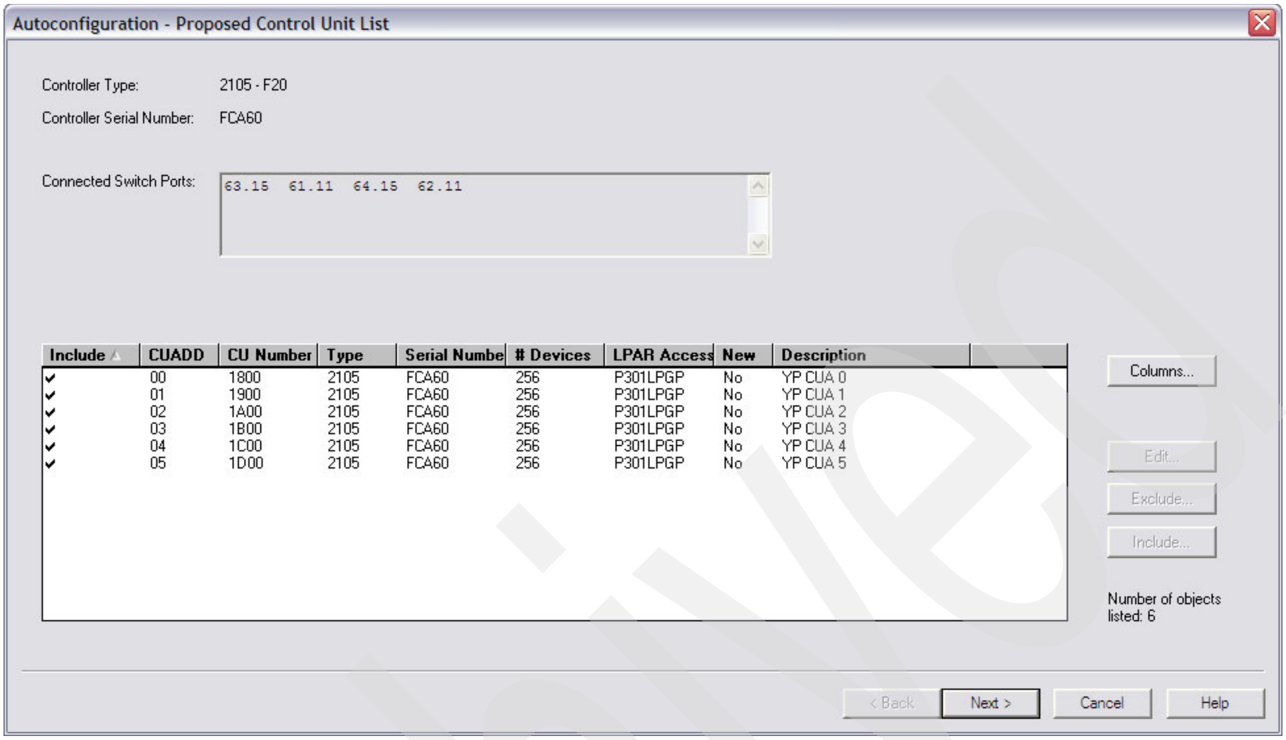
Message ID: CBDG721I

Discovery provided serial number FCA60 for controller. The serial numbers of the following control units are changed accordingly: 1800, 1900, 1A00, 1B00, 1C00, 1D00

Figure 3-49 CBDG721I message for serial number changes

Click **OK** to continue.

As a result of the discovery process, the Proposed Control Unit List offers definition proposals for the control units found in the currently processed controller. Note that all six Control Unit entries are selected as ‘Include’ by default (Figure 3-50).



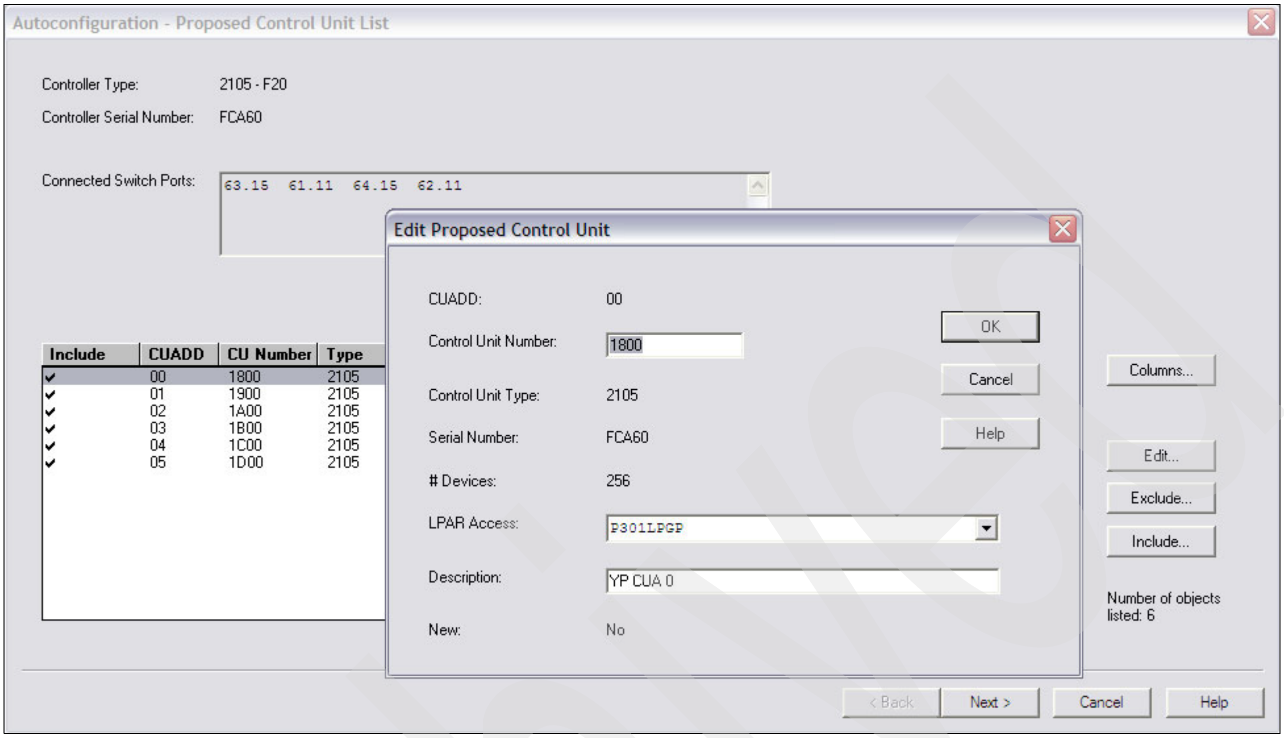
Controller Type: 2105 - F20
Controller Serial Number: FCA60
Connected Switch Ports: 63.15 61.11 64.15 62.11

Include	CUADD	CU Number	Type	Serial Numbe	# Devices	LPAR Access	New	Description
✓	00	1800	2105	FCA60	256	P301LPGP	No	YP CUA 0
✓	01	1900	2105	FCA60	256	P301LPGP	No	YP CUA 1
✓	02	1A00	2105	FCA60	256	P301LPGP	No	YP CUA 2
✓	03	1B00	2105	FCA60	256	P301LPGP	No	YP CUA 3
✓	04	1C00	2105	FCA60	256	P301LPGP	No	YP CUA 4
✓	05	1D00	2105	FCA60	256	P301LPGP	No	YP CUA 5

Number of objects listed: 6

Figure 3-50 Proposed control unit list

3. If you want to edit the proposed control units, highlight the desired control unit entry and click **Edit**. Here we can change the Control Unit Number, LPAR Access, and Description. In our example, we leave the discovered definitions unchanged (Figure 3-51).



Autoconfiguration - Proposed Control Unit List

Controller Type: 2105 - F20

Controller Serial Number: FCA60

Connected Switch Ports: 63.15 61.11 64.15 62.11

Include	CUADD	CU Number	Type
✓	00	1800	2105
✓	01	1900	2105
✓	02	1A00	2105
✓	03	1B00	2105
✓	04	1C00	2105
✓	05	1D00	2105

Edit Proposed Control Unit

CUADD: 00

Control Unit Number: 1800

Control Unit Type: 2105

Serial Number: FCA60

Devices: 256

LPAR Access: P301LPGP

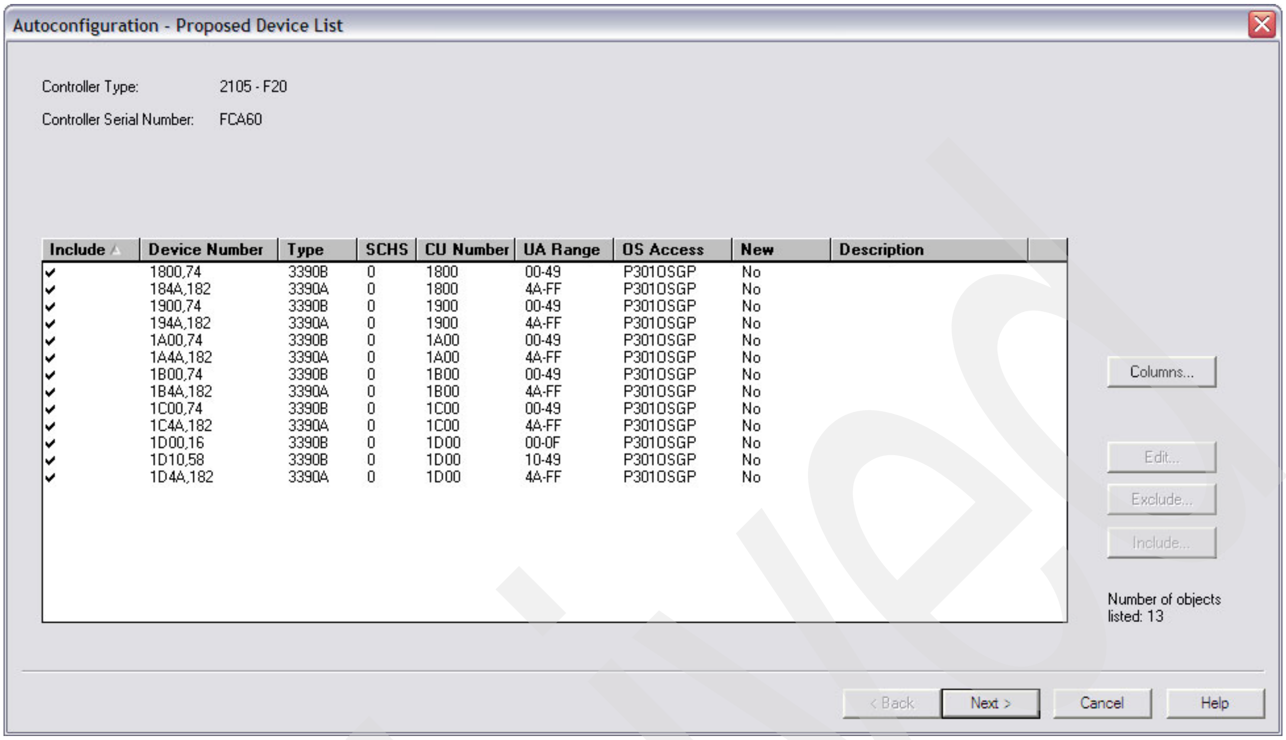
Description: YP CUA 0

New: No

Number of objects listed: 6

Figure 3-51 Edit proposed control unit list

Click **Next** to continue to the Proposed Control Unit / Device List (Figure 3-52).



Controller Type: 2105 - F20

Controller Serial Number: FCA60

Include	Device Number	Type	SCHS	CU Number	UA Range	OS Access	New	Description
✓	1800,74	3390B	0	1800	00-49	P301OSGP	No	
✓	184A,182	3390A	0	1800	4A-FF	P301OSGP	No	
✓	1900,74	3390B	0	1900	00-49	P301OSGP	No	
✓	194A,182	3390A	0	1900	4A-FF	P301OSGP	No	
✓	1A00,74	3390B	0	1A00	00-49	P301OSGP	No	
✓	1A4A,182	3390A	0	1A00	4A-FF	P301OSGP	No	
✓	1B00,74	3390B	0	1B00	00-49	P301OSGP	No	
✓	1B4A,182	3390A	0	1B00	4A-FF	P301OSGP	No	
✓	1C00,74	3390B	0	1C00	00-49	P301OSGP	No	
✓	1C4A,182	3390A	0	1C00	4A-FF	P301OSGP	No	
✓	1D00,16	3390B	0	1D00	00-0F	P301OSGP	No	
✓	1D10,58	3390B	0	1D00	10-49	P301OSGP	No	
✓	1D4A,182	3390A	0	1D00	4A-FF	P301OSGP	No	

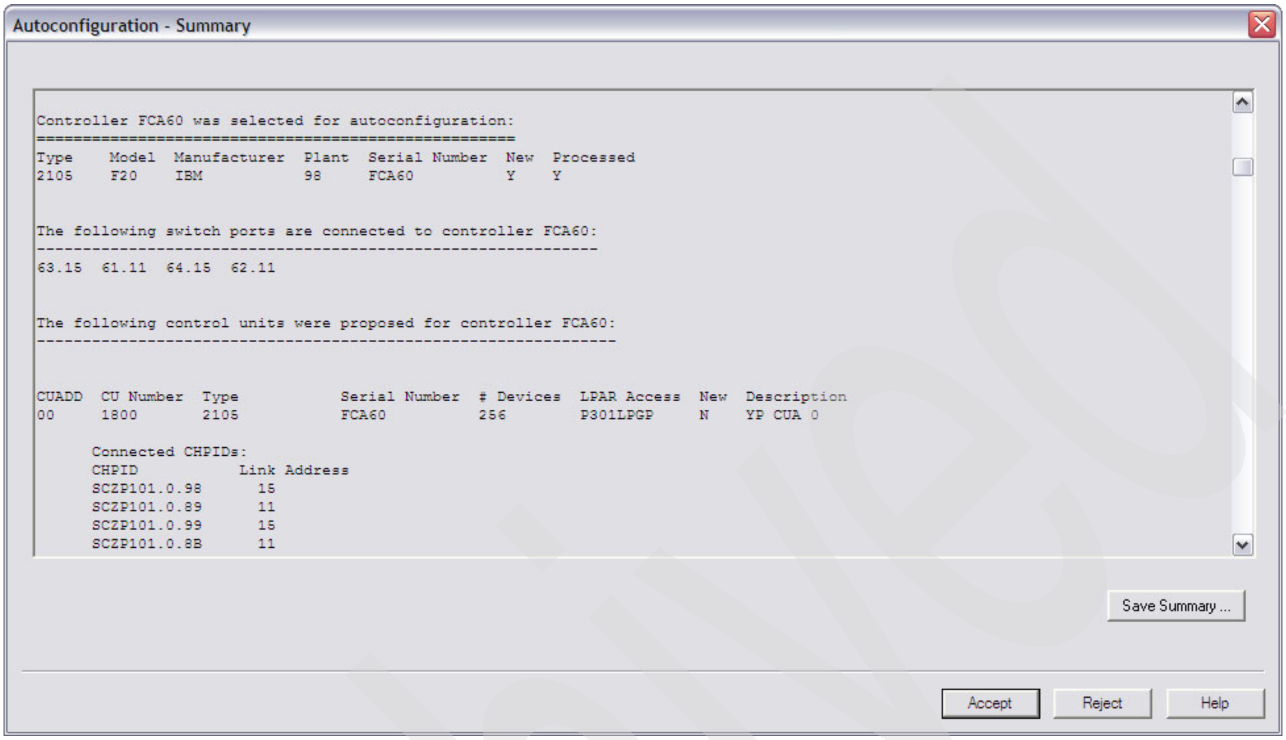
Number of objects listed: 13

Figure 3-52 Proposed control unit device list

4. Once again all entries are selected as ‘Include’ by default. If there are any device numbers that you do not want to have added to the discovery proposal, highlight them and click **Exclude.**

   In our example, we included all the device numbers there were discovered. Click **Next**.

5. HCM issues an Autoconfiguration - Summary report that may be saved to your workstation. Click **Accept** to include these discovered control unit and device definitions into the IODF, or **Reject** if you want to cancel the inclusions (Figure 3-53).

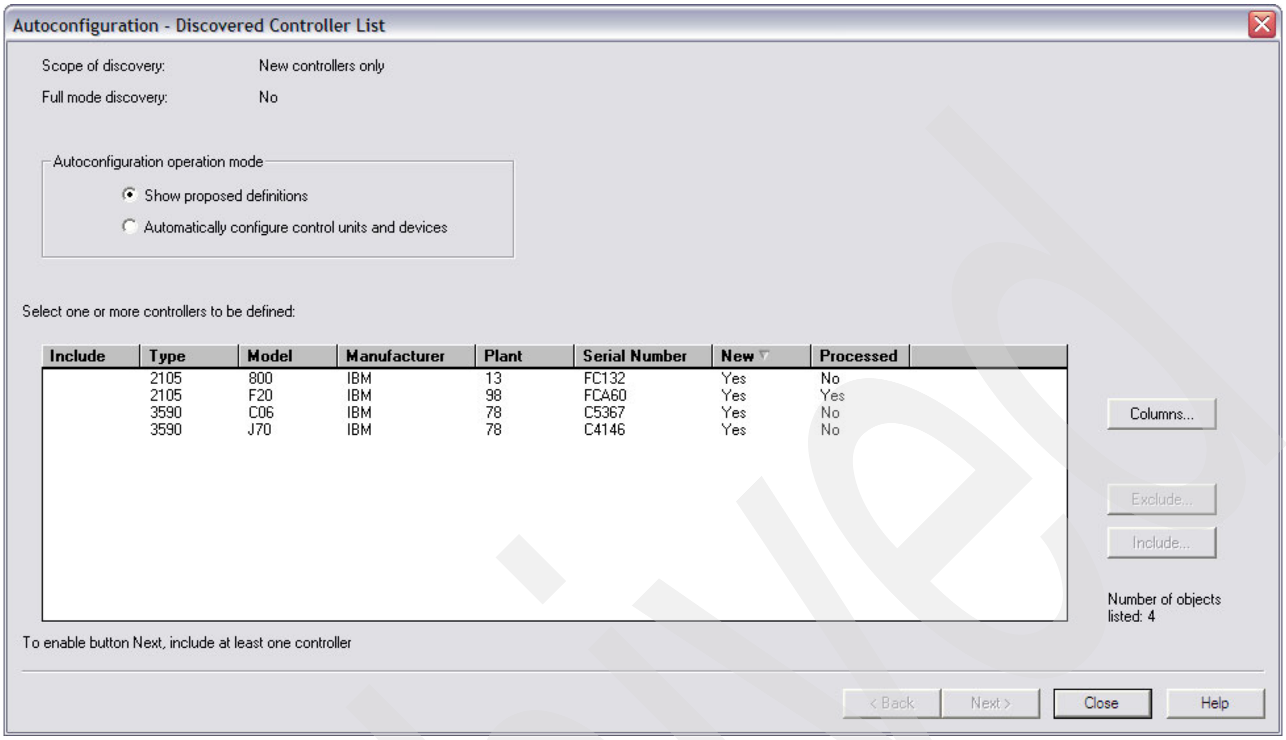


```
Controller FCA60 was selected for autoconfiguration:
====================================================
Type    Model  Manufacturer  Plant  Serial Number  New  Processed
2105    F20    IBM           98     FCA60          Y    Y


The following switch ports are connected to controller FCA60:
-------------------------------------------------------------
63.15  61.11  64.15  62.11


The following control units were proposed for controller FCA60:
---------------------------------------------------------------


CUADD  CU Number  Type           Serial Number  # Devices  LPAR Access  New  Description
00     1800       2105           FCA60          256        P301LPGP     N    YP CUA 0

      Connected CHPIDs:
      CHPID           Link Address
      SCZP101.0.98      15
      SCZP101.0.89      11
      SCZP101.0.99      15
      SCZP101.0.8B      11
```

Figure 3-53 Autoconfiguration summary report

In our example, we clicked **Accept**.

Note that for each successfully handled controller, its Processed field now has a Yes entry (Figure 3-54).



Scope of discovery: New controllers only

Full mode discovery: No

Autoconfiguration operation mode

● Show proposed definitions

○ Automatically configure control units and devices

Select one or more controllers to be defined:

Include	Type	Model	Manufacturer	Plant	Serial Number	New	Processed
	2105	800	IBM	13	FC132	Yes	No
	2105	F20	IBM	98	FCA60	Yes	Yes
	3590	C06	IBM	78	C5367	Yes	No
	3590	J70	IBM	78	C4146	Yes	No

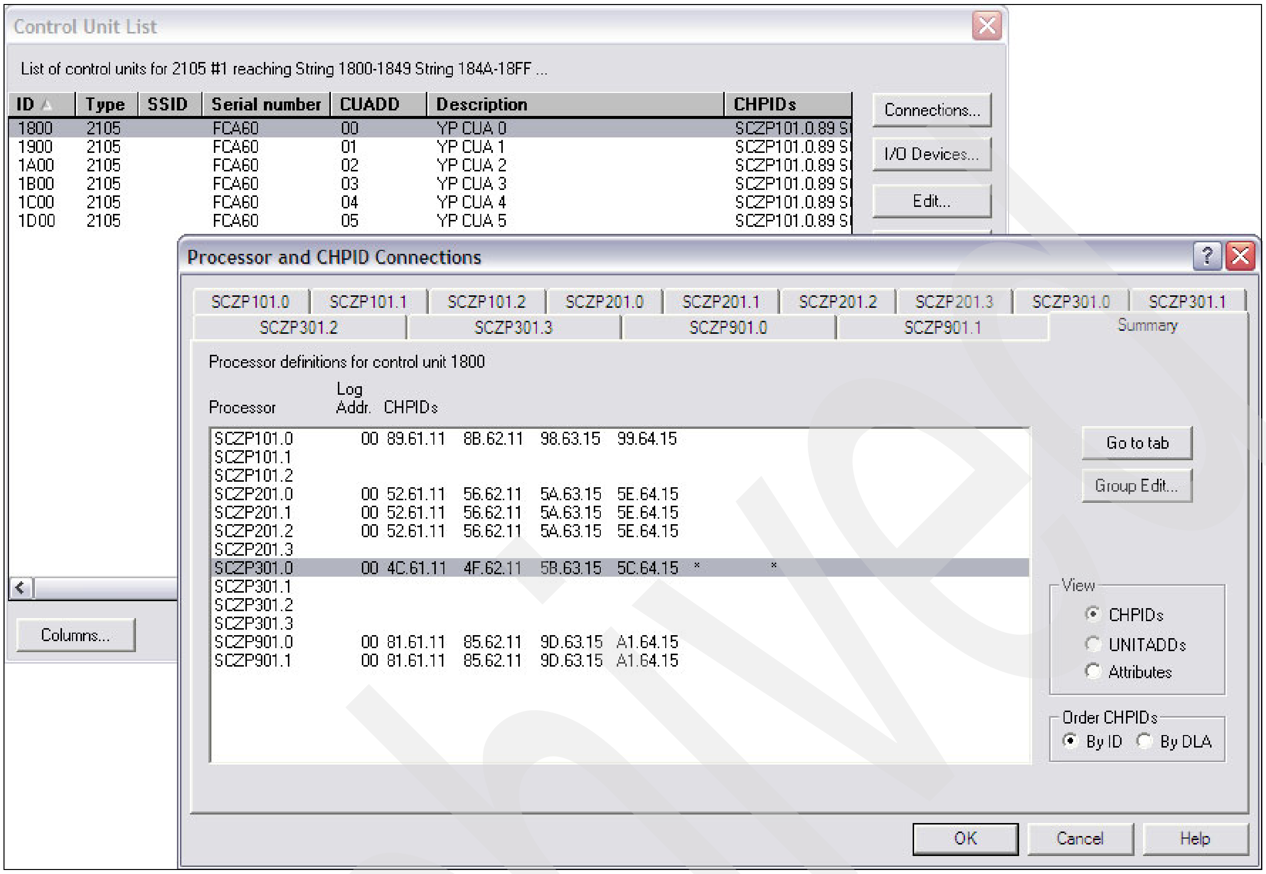
Number of objects listed: 4

To enable button Next, include at least one controller

Figure 3-54 Discovered controller processed

6. Click **Close** to complete this process or highlight and 'Include' one or more unprocessed controllers. In our example, we clicked **Close**.

Figure 3-55 shows the updated serial number FCA60 and discovered paths (four static and two dynamic) added to the control unit definitions.



List of control units for 2105 #1 reaching String 1800-1849 String 184A-18FF ...

ID	Type	SSID	Serial number	CUADD	Description	CHPIDs
1800	2105		FCA60	00	YP CUA 0	SCZP101.0.89 S
1900	2105		FCA60	01	YP CUA 1	SCZP101.0.89 S
1A00	2105		FCA60	02	YP CUA 2	SCZP101.0.89 S
1B00	2105		FCA60	03	YP CUA 3	SCZP101.0.89 S
1C00	2105		FCA60	04	YP CUA 4	SCZP101.0.89 S
1D00	2105		FCA60	05	YP CUA 5	SCZP101.0.89 S

Processor definitions for control unit 1800

Processor	Log Addr.	CHPIDs					
SCZP101.0	00	89.61.11	8B.62.11	98.63.15	99.64.15		
SCZP101.1							
SCZP101.2							
SCZP201.0	00	52.61.11	56.62.11	5A.63.15	5E.64.15		
SCZP201.1	00	52.61.11	56.62.11	5A.63.15	5E.64.15		
SCZP201.2	00	52.61.11	56.62.11	5A.63.15	5E.64.15		
SCZP201.3							
SCZP301.0	00	4C.61.11	4F.62.11	5B.63.15	5C.64.15	*	*
SCZP301.1							
SCZP301.2							
SCZP301.3							
SCZP901.0	00	81.61.11	85.62.11	9D.63.15	A1.64.15		
SCZP901.1	00	81.61.11	85.62.11	9D.63.15	A1.64.15		

Figure 3-55 Controller with discovered paths added

4

Upgrading from an IBM System z9 EC/z10 EC to an IBM zEnterprise 196

In this chapter, we describe how to upgrade an existing IBM System z10 EC (z10 EC) to an IBM zEnterprise 196 (z196).

You can also upgrade from a IBM System z9 EC (z9 EC) to a z196; however, only examples of upgrading or replacing a z10 EC are shown in detail in this book. An upgrade includes all frames, cages, support cards, and new I/O features.

Because a wide variety of environments exists, the results achieved in your environment might differ from those described here. Nevertheless, the step-by-step process we explain in this chapter should provide enough information for you to replicate the approach in your own environment.

We discuss the following topics:

- Scenario overview
- Migrating the existing 2097 IODF
- OSA: Saving and restoring configuration files
- HCD: Validating the 2817 work IODF
- CMT: Assigning PCHIDs to CHPIDs
- HCD: Updating the 2817 work IODF with PCHIDs
- HCD: Building the 2817 production IODF
- HCD: Loading the 2817 processor IOCDS
- HMC: Steps for profile activation

4.1 Scenario overview

Here is a description of the upgrade scenario.

4.1.1 The configuration process

We use the ten I/O configuration steps described in Chapter 5, “I/O configuration process”, of *I/O Configuration Using z/OS HCD and HCM,* SG24-7804 for our scenario.

Figure 4-1 shows the general process flow that we follow in our example. The numbered steps are described following the figure.

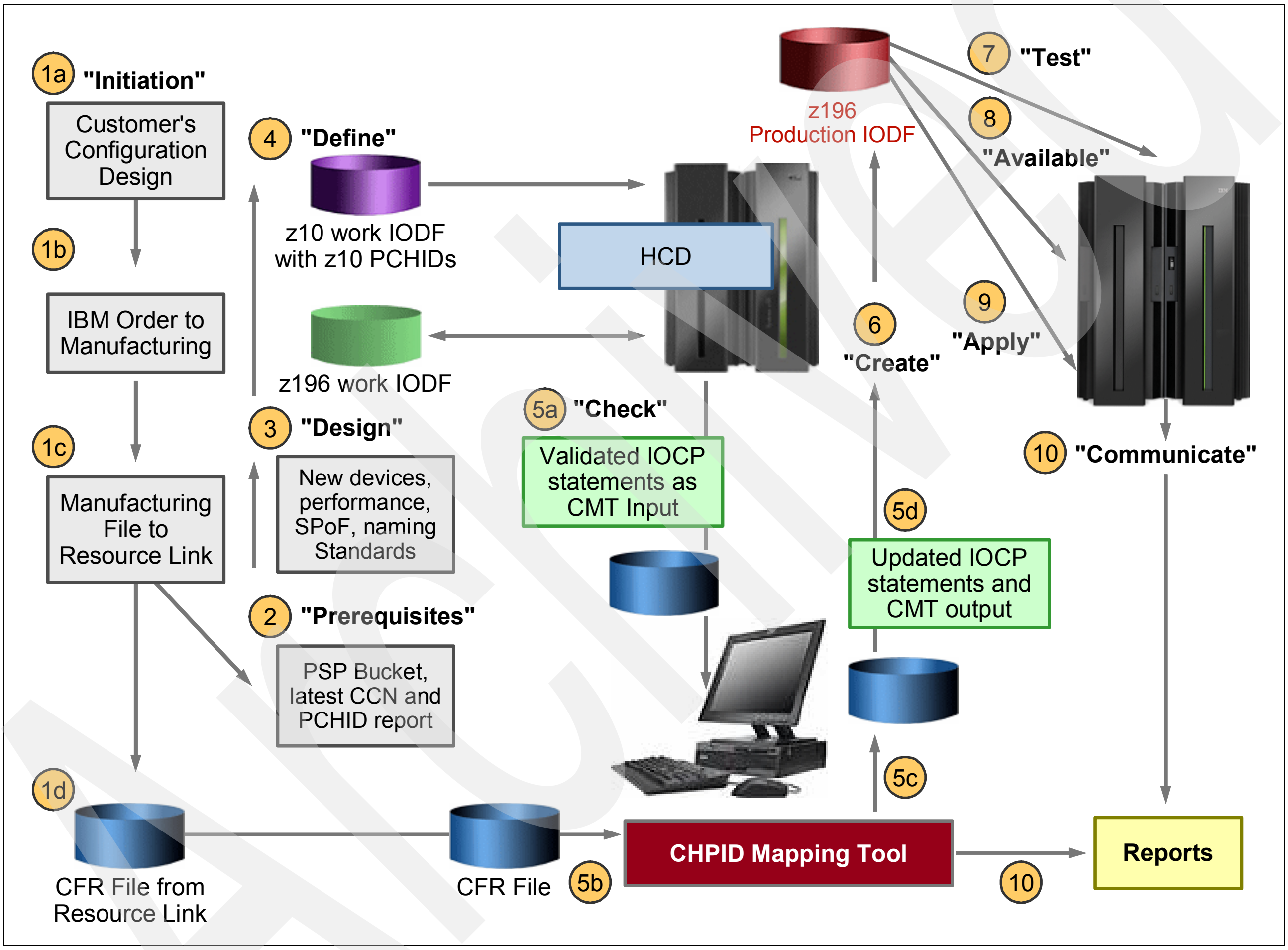


Figure 4-1 Overall configuration process flow

1. Initiation
   a. When planning to migrate to a IBM zEnterprise 196, the IBM Technical Support team can help you define a configuration design that meets your needs. The configuration is then used during the ordering process.
   b. The IBM order for the configuration is created and passed to the manufacturing process.
   c. The manufacturing process creates a configuration file that is stored at the IBM Resource Link website. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.

   d. A New Order report is created and shows the configuration summary of what is being ordered along with the Customer Control Number (CCN), which can be used to retrieve `CFReport` (a data file that contains a listing of hardware configuration and changes for a CPC) from Resource Link.

2. Prerequisites

   It is important that you check, for example, that you have the current PSP Bucket installed. You should also run the SMP/E report with fixcat exceptions to determine if any PTFs need to be applied. Also, ensure that you have the most current PCHID report and CCN from your IBM service representative.

3. Design

   When you plan your configuration, consider naming standards, FICON switch and port redundancy, adequate I/O paths to your devices for performance, OSA CHPID configuration for network and console communications, and coupling facility connections internally and to other machines.

   Additional changes to the way your sysplex receives its time source now that External Time Reference (ETR) is no longer supported and only Server Time Protocol (STP) can be used on the z196 may be required. The z196 can be run at Stratum 3 or Stratum 2 when in a mixed Coordinated Timing Network (CTN) or Stratum 1 when in a non-mixed CTN.

4. Define

   The existing System z9 EC or System z10 EC I/O configuration is used as a starting point for using HCD. The System z9 EC or System z10 EC production IODF is used as input to HCD to create a work IODF that will be the base of the new z196 configuration.

   When the new z196 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2817 validated work IODF.

5. Check

   a. From the validated work IODF, create a file containing the z196 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT). HCM may also be used here to transfer the IOCP deck to and from the CMT.

   b. The configuration file created by the IBM Manufacturing process in step 1d is downloaded from Resource Link to the CMT workstation.

      The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z196 hardware.

      You might have to make decisions in response to situations that might arise, such as:

      i. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware to resolve some SPoF situations.

      ii. Prioritizing certain hardware items over others.

   c. After the CHPID Mapping Tool processing finishes, the IOCP statements contain the physical channels assignment to logical channels, based on the actual purchased hardware configuration.

      The CHPID Mapping Tool also creates configuration reports to be used by the IBM service representative and the installation team.

      The file containing the updated IOCP statements created by the CHPID Mapping Tool, which now contains the physical channels assignment, is transferred to the host system.

   d. Using HCD again, and using the validated work IODF file created in step 5a and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments created by the CMT to the configuration data in the work IODF.

6. Create

   After the physical channel data has been migrated into the work IODF, a 2817 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2817 production IODF when the final power-on reset is done, yielding a z196 with an I/O configuration ready to be used.

7. Test

   IODFs that are modifying existing configurations may be tested in most cases to verify that the IODF is changing what is intended.

8. Available

   a. If you are upgrading an existing 2094 or 2097, you may be able to use HCD to write an IOCDS to your current 2094 or 2097 in preparation for the upgrade. If you can write an IOCDS to your current 2094 or 2097 in preparation for upgrading it to a 2817, do so and let the IBM service representative know which IOCDS to use.

      Note: Using the HCD option Write IOCDS in preparation of an upgrade is the preferred method for writing the initial IOCDS when upgrading from a 2094 or a 2097 to a 2817. This scenario will use the HCD option Write IOCDS process.

   b. If the 2817 is not network connected to the CPC where HCD is running, or if you are not upgrading or cannot write an IOCDS in preparation for the upgrade, use HCD to produce an IOCP input file and download the input file to a USB memory stick.

9. Apply

   The new production IODF can be applied to the z196 in two ways:

   – Using the Power-on Reset process

   – Using the Dynamic IODF Activate process

10. Communicate

   It is important to communicate new and changed configurations to operations and the appropriate users and departments.

4.1.2 Migration path considerations

The migration path from a z9 EC or z10 EC to a z196 can be either in the form of a field upgrade to the existing z9 EC or z10 EC, or a replacement (push/pull) of an existing z9 EC or z10 EC with a new z196. Note the following points:

1. A *field upgrade* means that the existing z9 EC or z10 EC processor serial number is retained during the upgrade.
2. A *replacement* of the existing z9 EC or z10 EC by a new z196 implies physically removing (push) the z9 EC or z10 EC and bringing in a new z196 (pull) to take its place. The replacement z196 has a new serial number that is different from that of the existing z9 EC or z10 EC.

In this chapter, we document the *field upgrade* scenario.

4.1.3 Planning considerations

The following I/O features can be ordered for a new z196:

- ESCON
- FICON Express8 LX (long wavelength—10 km)
- FICON Express8 SX (short wavelength)
- OSA-Express3 10 GbE LR (long reach)
- OSA-Express3 10 GbE SR (short reach)
- OSA-Express3 GbE LX (long wavelength)
- OSA-Express3 GbE SX (short wavelength)
- OSA-Express3 1000BASE-T Ethernet
- Crypto Express3
- ISC-3 (peer mode only)
- HCA2-O for PSIFB coupling

The following features cannot be ordered for a z196, but if present in a z9 EC server or z10 EC server, may be carried forward when upgrading to a z196:

- FICON Express4 LX (4 km and 10 km)
- FICON Express4 SX
- OSA-Express2 LX (long wavelength)
- OSA-Express2 SX (short wavelength)
- OSA-Express2 1000BASE-T Ethernet

The following features are not supported on a z196:

- FICON Express2 (LX and SX)
- FICON Express (LX and SX)
- FICON (pre-FICON Express)
- OSA-Express2 10 GbE Long Reach
- OSA-Express
- ICB-2
- ICB-3
- ICB-4
- ISC-3 Links in Compatibility Mode
- Crypto Express2
- PCIXCC and PCICA
- Parallel channels (use an ESCON converter)

Table 4-1 lists the channel types as described in an IOCDS that are supported with the z9 EC, z10 EC and z196.

Table 4-1 Channels, links, and adapters with CHPID type and support

Channels	CHPID Type	2094 support	2097 support	2817 support
ESCON channels:				
Connection Channel (ESCON architecture)	CNC	Yes	Yes	Up to 240
Channel to Channel (connects to CNC)	CTC	Yes	Yes	Up to 240
Converter Channel Path (for BL types)	CVC	Yes	Yes	Up to 240
Converter Channel Path (for BY types)	CBY	Yes	Yes	Up to 240
FICON bridge: A FICON channel that attaches to an ESCON Director Model 5.	FCV	Yes	Yes	No

Channels	CHPID Type	2094 support	2097 support	2817 support
FICON native channels that attach to FICON directors or directly to FICON control units: FICON Express 1 Gb SX and LX FICON Express 1 and 2 Gb SX and LX FICON Express 1, 2, and 4 Gb SX and LX FICON Express 2, 4, and 8 Gb SX and LX	FC FC FC FC	Yes Yes Yes No	Carried forward Yes Yes Yes	No No Carried forward Up to 288
FICON channels that attach to Fibre Channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges	FCP	Yes	Yes	Yes
ISC-3 peer mode channels (connects to another CFP)	CFP	Yes	Yes	Up to 48
ICB-4 peer channels (connects to another ICB-4)	CBP	Yes	Yes	No
IC peer channels (connects to another ICP)	ICP	Yes	Yes	Up to 32
PSIFB InfiniBand host channel adapters (HCA)	CIB	Yes	Yes	Up to 16 HCAs
HiperSocket (IQDIO) channels	IQD	Yes	Yes	Up to 32
OSA-Express2 GbE LX/SX	OSD and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 GbE LX/SX	OSD and OSN	No	Yes	Up to 96 ports
OSA-Express2 1000BASE-T	OSE, OSD, OSC, and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 1000BASE-T	OSE, OSD, OSC, OSN, and OSM	No	OSC, OSD, OSE, OSN-yes OSM-no	Up to 96 ports
OSA-Express2 10 GbE LR	OSD	Yes	Yes	No
OSA-Express3 10 GbE	OSD and OSX	Yes[a]	Yes[a]	Yes

[a] CHPID type OSX is not supported.

Keep the considerations in the following sections in mind when planning your configuration.

Coupling links

Only the following Coupling Facility CHPIDs are supported:

- CHPID Type=CFP: ISC-3 links in peer mode
- CHPID Type=CIB: PSIFB links connecting to an HCA2-O (Optical) card
- CHPID Type=ICP: Internal Coupling links

Note: Coupling links can be defined as both Coupling and STP links or STP-only links.

HMC

The HMC can appear either as the current HMC does, or as a HMC that can run code to manage an Ensemble. The current HMC is used to manage, monitor, and operate one or more System z servers and their associated logical partitions. A HMC that has ensemble code running is a HMC attached to one or more zEnterprise System(s) configured as Ensemble member(s). A particular Ensemble is managed by a pair of HMCs in primary and alternate roles.

The HMC has a global (Ensemble) management function, whereas the SE has local node management responsibility. When tasks are performed on the HMC, the commands are sent to one or more SEs, which then issue commands to their CPCs

The z196 requires HMC Application V2.11.0 (driver level 86) or higher and only uses Ethernet for its network connection. The HMC and the SEs do not contain a floppy disc drive, requiring the use of a USB flash memory drive to input and back up customer configuration data.

Software support

HCD V1.12 (or HCD V1.7 and later with Preventive Service Planning (PSP) bucket for 2817DEVICE and PTFs) is required to define and support some of the new features of the z196.

Open Systems Adapter-Integrated Console Controller

As support has now been withdrawn for the 2074 console controllers, you might consider using OSA-Express2 1000BASE-T or OSA-Express3 1000BASE-T CHPIDs defined as TYPE=OSC. These OSA cards allow you to set up a console function supported by a configuration file defined on the Support Element for that processor.

Fibre Channel Protocol

When using CHPIDs defined as TYPE=FCP, you may want to consider N Port ID Virtualization (NPIV).

Refer to 2.1.6, “Worldwide Port Name tool” on page 32 for more information about Fibre Channel Protocol (FCP) CHPIDs and the new WWPN prediction tool to manage them.

CPC name versus Processor ID

HCD allows you to define different processors (logical) to the same CPC (physical). The Processor ID needs to be unique within the same IODF, but the CPC name does not. Therefore, the CPC name does not need to match the Processor ID, which is useful when you might have several processor/logical partition/control unit setups that share the same physical CPC within the same IODF. Furthermore, the Processor ID is what is defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC name is coded in HCD Option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. It is the CPC name, and not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC over the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP301). These values are defined in the Support Element for the CPC and they need to match the values set in the IODF so that HCD Option 2.11 can find the CPC to write an IOCDS in the S/390® Microprocessor Cluster List.

Local system name

An additional system name, LSYSTEM, is used to identify the local system name of a server when defining PSIFB type=CIB coupling links.

This data field can be found when changing a CIB-capable processor under HCD Option 1.3.

The LSYSTEM field can be set or changed to any one to eight alphanumeric characters and also can begin with either an alpha or numeric character. All characters are upper case.

Here are the rules that will determine whether, and where, HCD will set the LSYSTEM keyword automatically:

1. If a CIB-capable processor is defined and the CPC name is set but the local system name is not set, HCD defaults the local system name to the CPC name.
2. If a CIB-capable processor that has not yet defined a CPC name is changed to get a CPC name but no local system name, HCD defaults the CPC name to the local system name.
3. If a non-CIB capable processor is changed to a support level that is CIB capable, and the processor has a CPC name set but no local system name, the local system name is defaulted to the CPC name.
4. If the processor definition is changed such that the local system name is explicitly removed, HCD does not do any defaulting.
5. If a processor has a local system name set (whether it has a CPC name or not), any change to the local system name has to be done explicitly. There will be no implicit name if the CPC name or the support level is changed.
6. During Build Production IODF, it is verified that a local system name has to be set for the processor if the processor has a CIB channel path defined. If this verification fails, an error message is given and the production IODF is not built.

As a best practice, you should set the local system name to be the same as the CPC name.

Additional keywords in the CHPID statement in an IOCP deck include:

AID	Adapter ID.
Port	HCA port.
CPATH	Specifies the CCSID and CHPID on the connecting system.

4.1.4 Miscellaneous Equipment Specification upgrade scenario

This scenario describes the configuration steps to upgrade an existing 2097 processor to a 2817 processor. The key factors are:

- HCD requires a new Processor ID for the 2817.
- We recommend keeping the same CPC name for the 2817.
- The 2817 processor channels connect to the same switch ports and access the same control unit interfaces.
- The control unit interfaces connect to the same switch ports.
- The starting IODF is the current 2097 production IODF.
- The target IODF is a new 2817 work IODF.
- HCD actions:
  - Migrate updated IOCP statements.
  - Build production IODF.

  - Remote write IODF to IOCDS.
- HMC actions:
  - Build Reset Profile and point to required IOCDS.
  - Build/verify Image Profiles.
  - Build/verify Load Profiles.
  - Performing a power-on reset.

The example here uses a 2097-E26 with a Processor ID of SCZP201 and four CSSs (CSS ID=0, CSS ID=1, CSS ID=2, and CSS ID=3) and is being upgraded to a 2817-M32 with a Processor ID of SCZP301. The CPC name SCZP201 and serial number 01DE50 are not changed.

The following CHPID types are migrated:

- OSD and OSC
- CTC and CNC
- FC and FCP
- CFP and ICP
- IQD

The following Hardware/CHPID types are not supported and not migrated to the 2817:

- PCIXCC and PCICA
- ICB-4 links
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring
- FICON Express2 (CHPID type FCV)

Table 4-2 summarizes the migration options and tool requirements. The step-by-step process is documented later in this chapter.

Table 4-2 2097 I/O configuration migrated to a 2817

2094 or 2097 to 2817	**Upgrade an existing 2094 or 2097 to a 2817 (Miscellaneous Equipment Specification upgrade)**
Processor ID	Required to change the Processor ID to a new ID.
CPC name	Recommended to be the same name.
Channel to switch port connections	Same ports.
Control Unit to switch port connections	Same ports.
Starting IODF	Current active production IODF.
Target IODF	Create a new work IODF.
HCD action	Repeat and change (see step 5 on page 144).
CHPID Mapping Tool (CMT) Program	Optional, but recommended.
`CFReport` file (CCN)	Required for CMT.
IOCP (import from validated work IODF)	Yes.
CHPID Mapping Tool actions (PCHID reset)	Yes.
CHPID Mapping Tool IOCP Output	Yes.

2094 or 2097 to 2817	**Upgrade an existing 2094 or 2097 to a 2817 (Miscellaneous Equipment Specification upgrade)**
CHPID Mapping Tool Reports	Yes, CHPID and CHPID to CU Report.

4.2 Migrating the existing 2097 IODF

The following steps explain how to define the existing I/O configuration to the new 2817 server using HCD, and then migrate the channel subsystem and logical partitions from the 2094 or 2097 to the 2817 server. Using HCD, the sequence of operations is as follows:

1. Create a work IODF from the current 2097 production IODF.
2. Repeat the 2097 processor being upgraded.
3. Observe CF link messages for later reference.
4. Delete unsupported items for the repeated 2097.
5. Change the repeated 2097 to a 2817 and delete the 2097.
6. Redefine all CF connections to other processors and any Internal CF required connections.
7. Define any additional CHPIDs, control units, and devices you may want to add during the upgrade.
8. Overdefine channel paths where needed.
9. Save OSA configuration information.
10. Build a 2817 validated work IODF.
11. Create an IOCP statements file and file transfer to your workstation. This step may be performed with HCM.
12. Import CFReport and IOCP statements into the CMT.
13. Perform hardware resolution and PCHID/CHPID availability.
14. Create configuration reports for yourself and the IBM service representative.
15. Import IOCP statements updated with PCHIDs back into the validated work IODF.
16. Build the production IODF.
17. Remote write the IOCP to an IOCDS on the processor.
18. Build Reset, Image, and Load Profiles if required.
19. Perform a power-on reset (activate) of 2817.

In the following sections, we describe these steps in more detail.

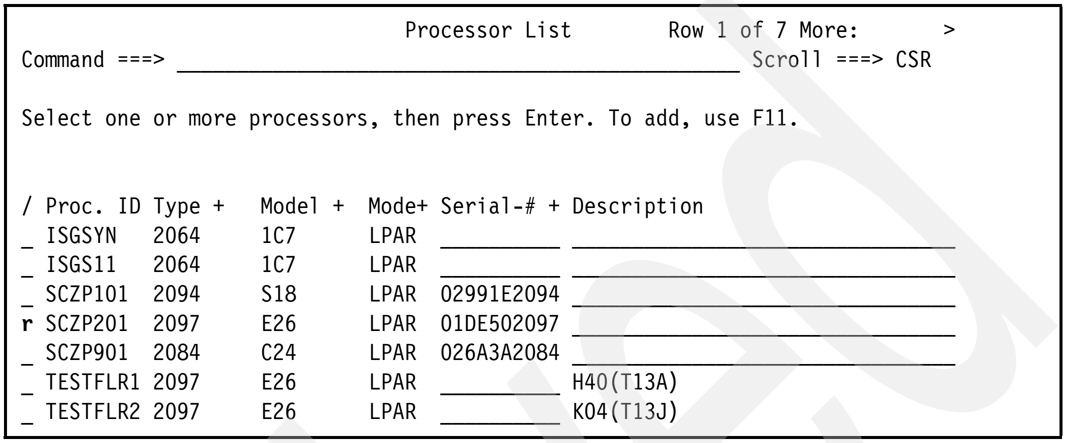
4.2.1 Creating the work IODF from the current 2097 production IODF

Use HCD to select the current production IODF that contains the 2097 processor you are upgrading (for example, SYS6.IODF3C).

4.2.2 Repeating the 2097 processor being upgraded

To repeat the 2097 processor being upgraded, perform the following step:

1. From the main HCD panel, select Option 1.3. Processor List. Enter `r` (for repeat) next to the 2097 you want to upgrade and press Enter (Figure 4-2).

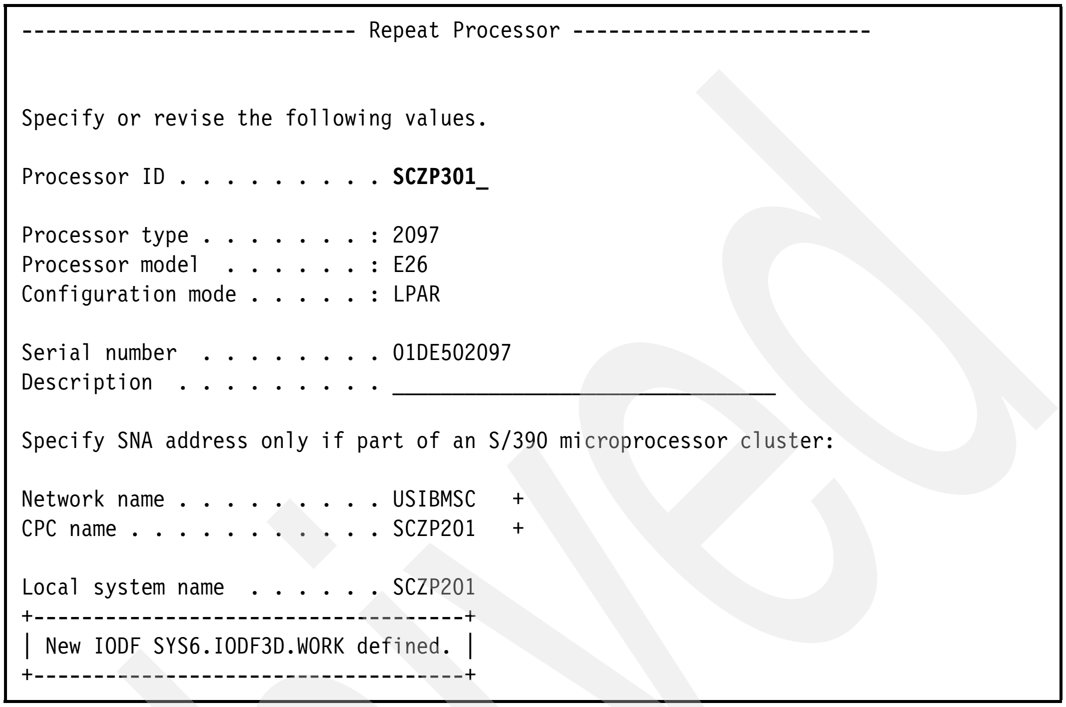


```
                                Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
r SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 4-2 Processor List (repeating processor)

2. The Identify Target IODF panel opens. Perform one of the following actions:
   - To retain all the other processor definitions in the IODF, press Enter.
   - Otherwise, enter a Target IODF data set name. In this case, only the processor you are repeating is retained in the Target IODF.
3. The Create Work I/O Definition File panel now prompts you to enter the data set name of the Target IODF (for example, `SYS6.IODF3D.WORK`).

4. The Repeat Processor panel opens (Figure 4-3). Enter the Processor ID of the new 2817 (in this example, `SCZP301`), leave all the other fields unchanged, and press Enter to continue.

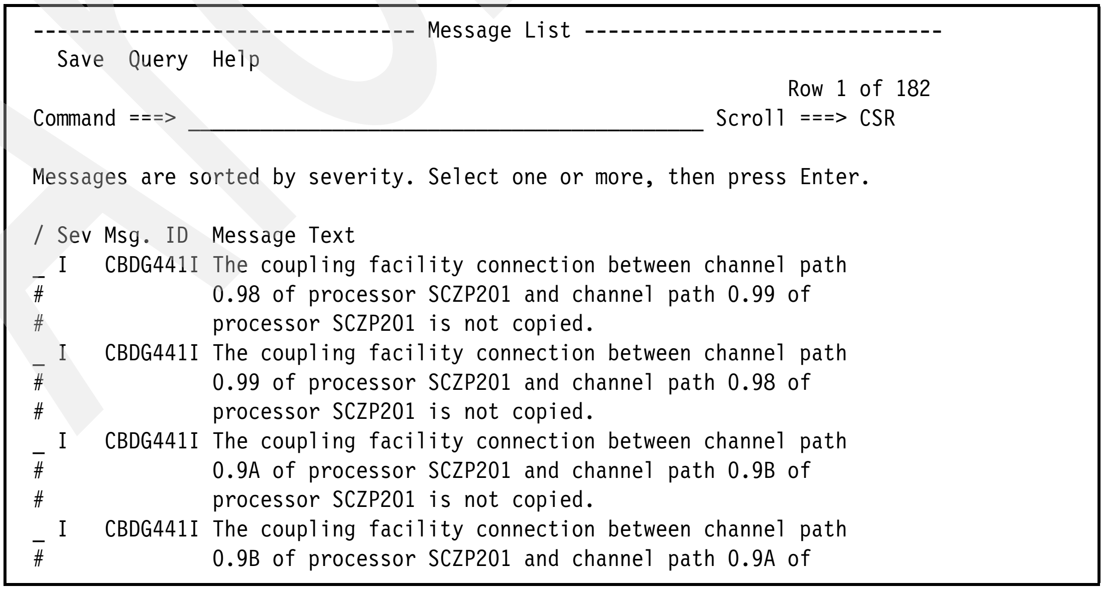


```
---------------------------- Repeat Processor -------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . SCZP301_

Processor type . . . . . . . : 2097
Processor model  . . . . . . : E26
Configuration mode . . . . . : LPAR

Serial number  . . . . . . . . 01DE502097
Description  . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . SCZP201   +

Local system name  . . . . . . SCZP201
+------------------------------------+
| New IODF SYS6.IODF3D.WORK defined. |
+------------------------------------+
```

Figure 4-3 Repeat Processor

4.2.3 CF Link information messages

At this point, you might receive Severity E, I, or W messages. As shown in Figure 4-4, in our example, CBDG441I, Severity I messages appear because the CF Link CHPIDs were not copied over to the 2817 definition.

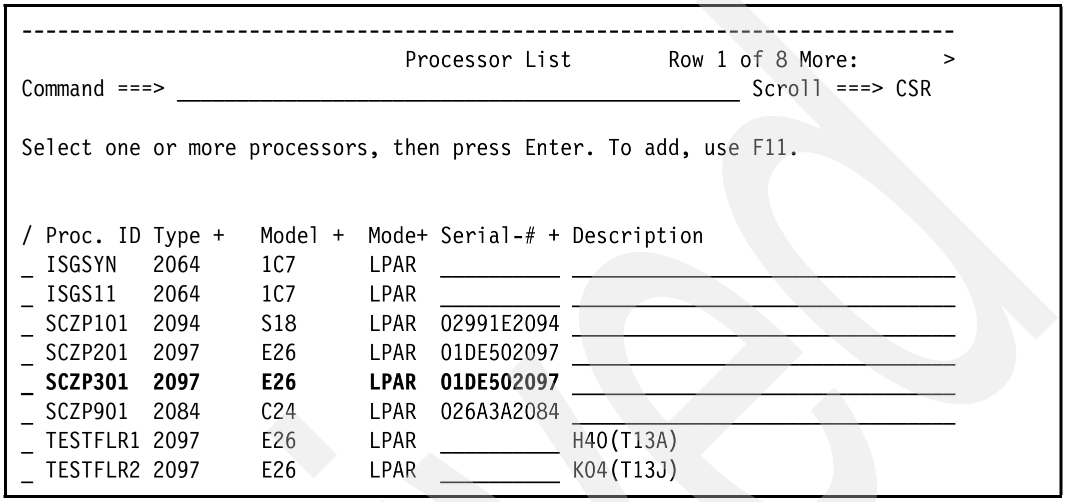


```
-------------------------------- Message List ------------------------------
  Save  Query  Help
                                                                 Row 1 of 182
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ I   CBDG441I The coupling facility connection between channel path
#              0.98 of processor SCZP201 and channel path 0.99 of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.99 of processor SCZP201 and channel path 0.98 of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.9A of processor SCZP201 and channel path 0.9B of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.9B of processor SCZP201 and channel path 0.9A of
```

Figure 4-4 Message List (CBDG441I)

Perform the following steps:

1. Scroll down until you reach the end of the messages and see the `CBDG271I requested action on object SCZP201 successfully processed` message.
2. Press PF3 or PF12 to continue. As shown in Figure 4-5, there is now an additional 2097 processor named SCZP301.



```
------------------------------------------------------------------------------
                                Processor List       Row 1 of 8 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

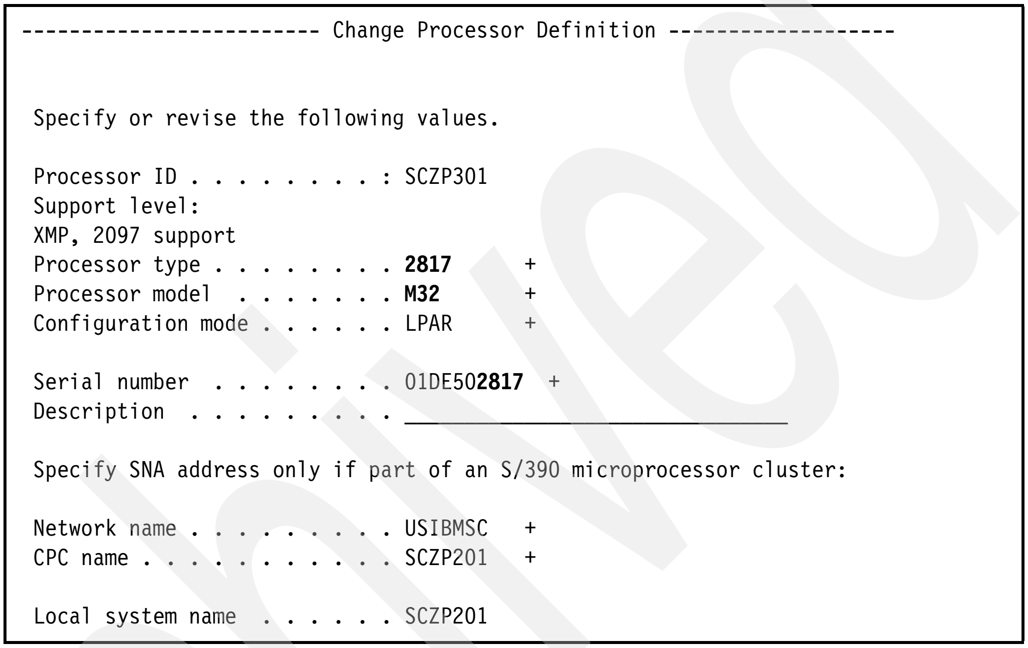
Figure 4-5 Processor List (repeated processor)

4.2.4 Changing the 2097 to a 2817 and deleting the 2097

At this point, you can either keep the original copy of the 2097 (SCZP201) or delete it from the IODF. In our example, we kept it in the IODF for a few more steps.

Perform the following steps:

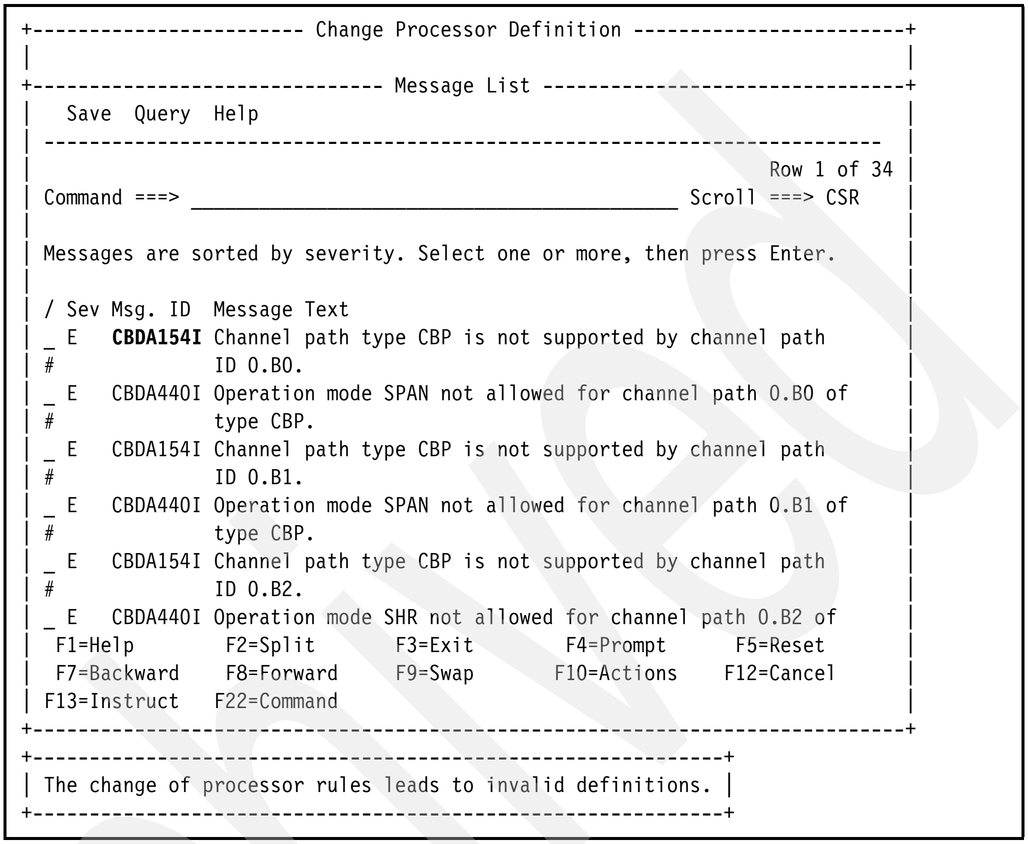
1. Enter `c` (for change) next to SCZP301 to change the 2097 to a 2817 and press Enter (Figure 4-6).
2. Make the following updates and press Enter:
   - Update `Processor type` to `2817`.
   - Update `Processor model` to `M32`.
   - Update the 2097 part of the serial number to 2817 (that is, `01DE502097` to `01DE502817`).



```
------------------------ Change Processor Definition -------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP301
 Support level:
 XMP, 2097 support
 Processor type . . . . . . . . 2817      +
 Processor model  . . . . . . . M32       +
 Configuration mode . . . . . . LPAR      +

 Serial number  . . . . . . . . 01DE502817  +
 Description  . . . . . . . . . ________________________________

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP201   +

 Local system name  . . . . . . SCZP201
```

Figure 4-6 Change Processor Definition (changing repeated processor)

c. Press Enter. In our example, we have deliberately left CBP type CHPIDs defined in the processor that we are upgrading to demonstrate the error message received when upgrading a processor definition with unsupported CHPID types (Figure 4-7).

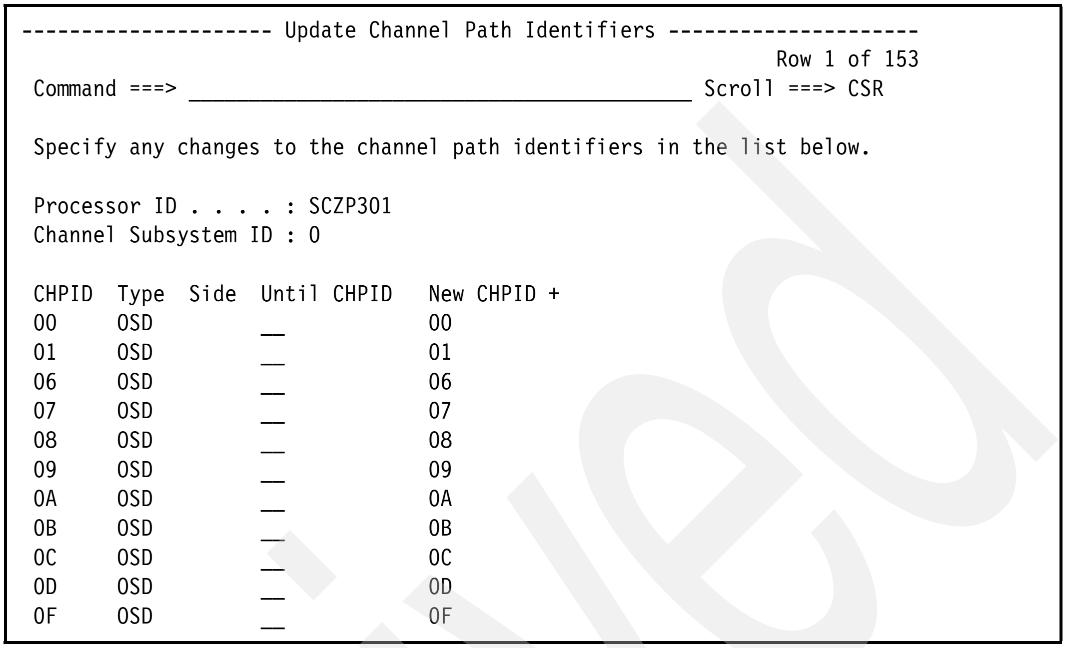


```
+------------------------ Change Processor Definition ------------------------+
|                                                                             |
+------------------------------- Message List --------------------------------+
|   Save  Query  Help                                                         |
| -------------------------------------------------------------------------- |
|                                                                 Row 1 of 34 |
| Command ===> ___________________________________________ Scroll ===> CSR    |
|                                                                             |
| Messages are sorted by severity. Select one or more, then press Enter.      |
|                                                                             |
| / Sev Msg. ID  Message Text                                                 |
| _ E   CBDA154I Channel path type CBP is not supported by channel path       |
| #              ID 0.B0.                                                     |
| _ E   CBDA440I Operation mode SPAN not allowed for channel path 0.B0 of     |
| #              type CBP.                                                    |
| _ E   CBDA154I Channel path type CBP is not supported by channel path       |
| #              ID 0.B1.                                                     |
| _ E   CBDA440I Operation mode SPAN not allowed for channel path 0.B1 of     |
| #              type CBP.                                                    |
| _ E   CBDA154I Channel path type CBP is not supported by channel path       |
| #              ID 0.B2.                                                     |
| _ E   CBDA440I Operation mode SHR not allowed for channel path 0.B2 of      |
|  F1=Help        F2=Split       F3=Exit        F4=Prompt      F5=Reset       |
|  F7=Backward    F8=Forward     F9=Swap       F10=Actions    F12=Cancel      |
| F13=Instruct   F22=Command                                                  |
+-----------------------------------------------------------------------------+
+-------------------------------------------------------------+
| The change of processor rules leads to invalid definitions. |
+-------------------------------------------------------------+
```

Figure 4-7 CBDA154I error message when changing a model with CBP definitions

3. Press PF12 twice to return to the processor list and delete all unsupported CHPID types, and then perform the change processor type step once more.

4. Press Enter. The Update Channel Path Identifiers panel opens (Figure 4-8). We are not making any changes in our example.

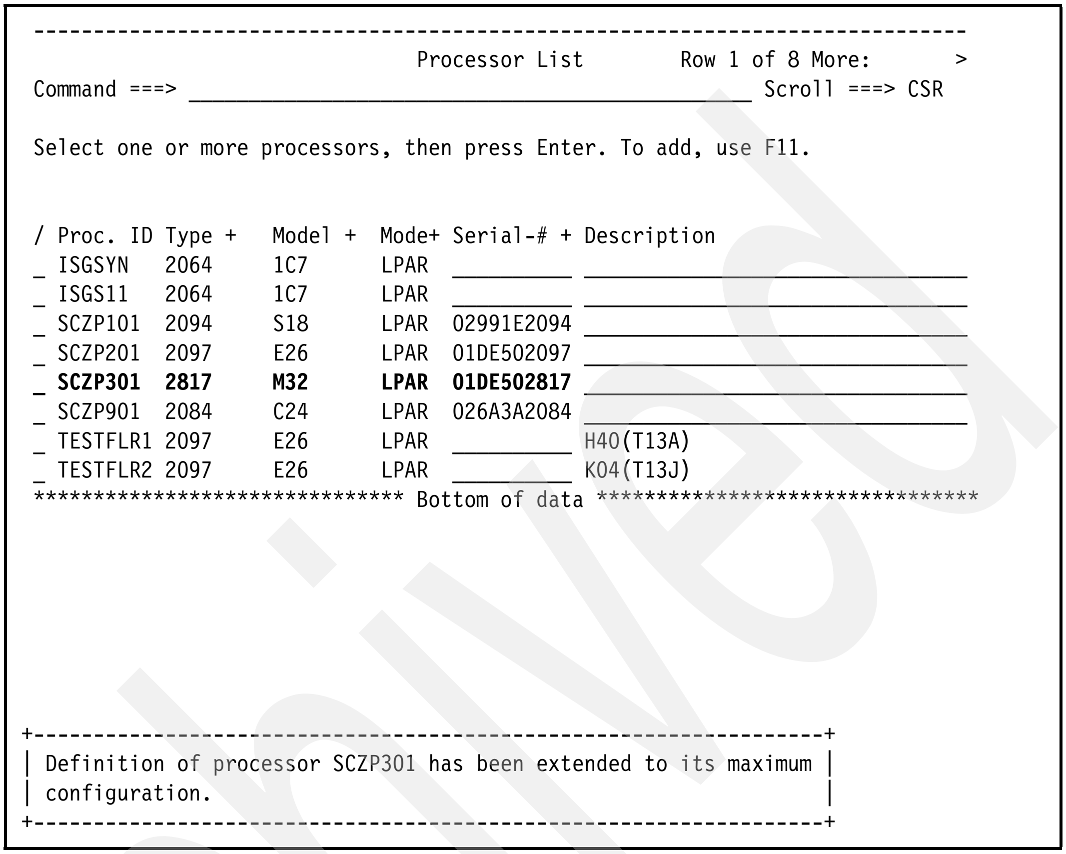


```
--------------------- Update Channel Path Identifiers ---------------------
                                                              Row 1 of 153
 Command ===> __________________________________________ Scroll ===> CSR

 Specify any changes to the channel path identifiers in the list below.

 Processor ID . . . . : SCZP301
 Channel Subsystem ID : 0

 CHPID  Type  Side  Until CHPID   New CHPID +
 00     OSD         __            00
 01     OSD         __            01
 06     OSD         __            06
 07     OSD         __            07
 08     OSD         __            08
 09     OSD         __            09
 0A     OSD         __            0A
 0B     OSD         __            0B
 0C     OSD         __            0C
 0D     OSD         __            0D
 0F     OSD         __            0F
```

Figure 4-8 Update Channel Path Identifiers (not changed)

5. Press Enter *for each of the Channel Subsystem IDs*.

   The repeated 2097 processor has successfully changed to a 2817-M32 (Figure 4-9).



```
------------------------------------------------------------------------------
                                Processor List       Row 1 of 8 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2817     M32      LPAR  01DE502817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
******************************* Bottom of data ********************************







+-------------------------------------------------------------------+
| Definition of processor SCZP301 has been extended to its maximum |
| configuration.                                                    |
+-------------------------------------------------------------------+
```

Figure 4-9 Processor List (changed processor)

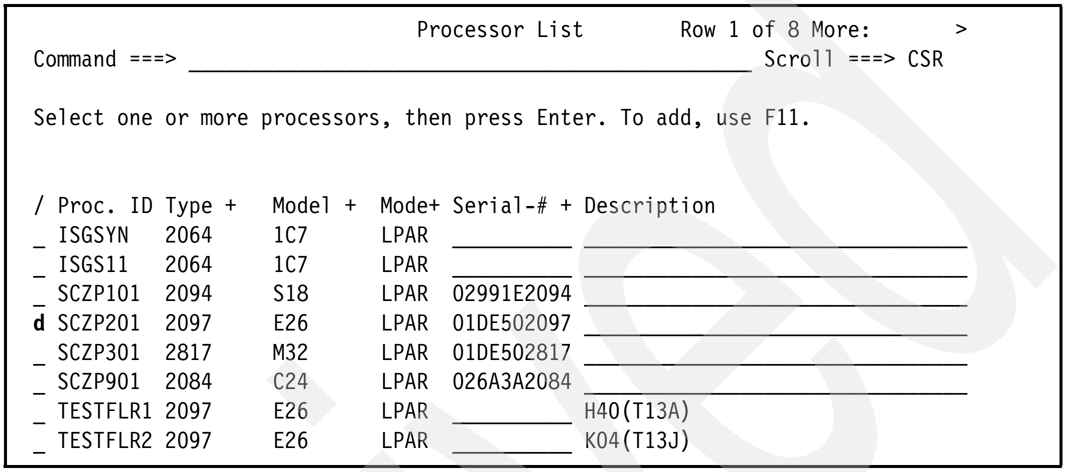
Observe the message displayed at the bottom of the panel indicating that the processor definition has been extended to its maximum configuration. This action occurred because part of the main storage is allocated as a fixed-size Hardware System Area that is not addressable by application programs. In HCD, when you define a new processor or redefine a processor as 2097 or 2817, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

4.2.5 Deleting the 2097 processor definition

Now that the 2097 has been repeated and changed to a 2817, the original 2097 definition (SCZP201) must be deleted so that the required CF Links can be restored.

Perform the following steps:

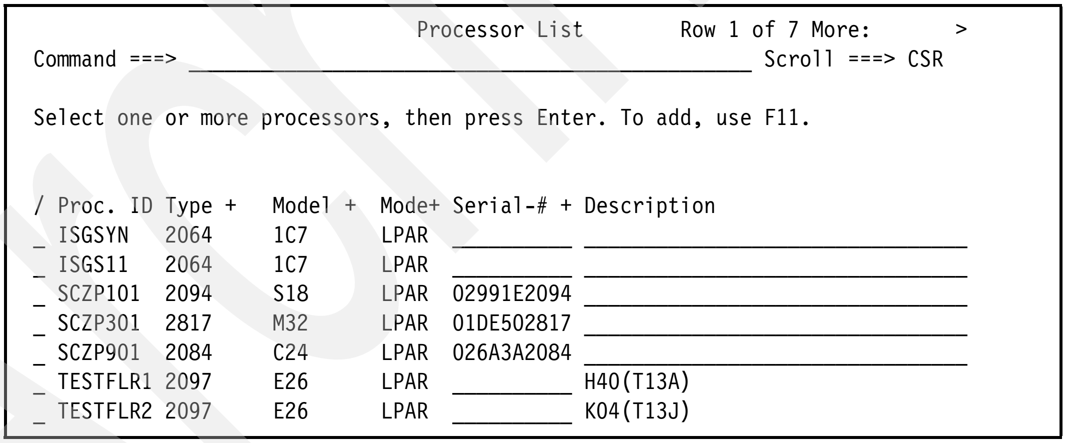
1. Enter `d` (for delete) next to the SCZP201 processor in the Processor List (Figure 4-10).



```
                                Processor List       Row 1 of 8 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
d SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2817     M32      LPAR  01DE502817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 4-10 Processor List (deleting processor)

2. Press Enter to confirm the deletion of the processor (Figure 4-11).



```
                                Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP301  2817     M32      LPAR  01DE502817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

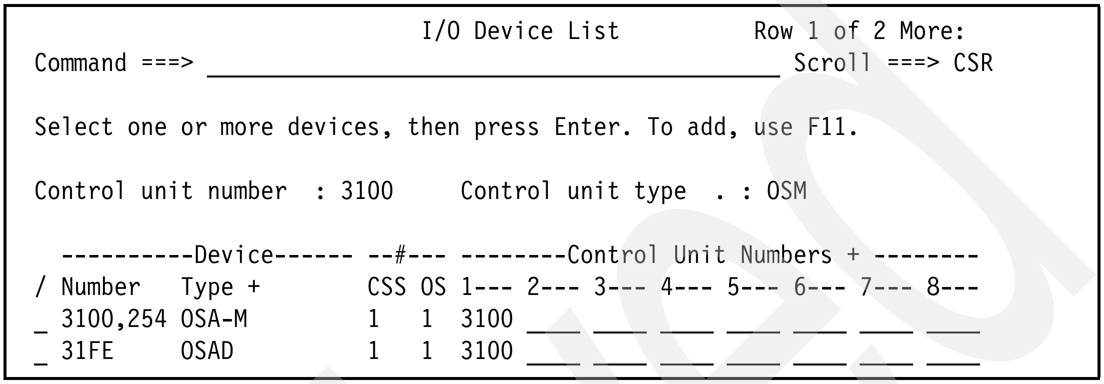
Figure 4-11 Processor List (processor deleted)

4.2.6 Reconnecting the CF channel paths there were not migrated

Manually redefine the CF Links you want from the SCZP301 processor to any other processor, along with any desired Internal Coupling Facility links. To help you with this effort, you can get a CF connection report from the previous production IODF containing the 2097. Alternatively, you can make a note of all CBDG441I error messages received in the previous step.

4.2.7 Defining additional I/O

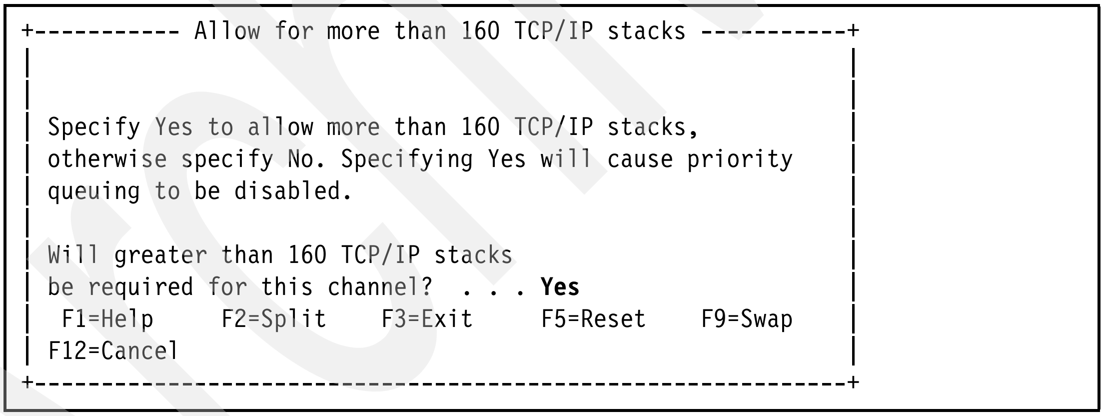
Define any additional CHPIDs, control units and devices, CTCs, and so on, that you might be adding into the 2817 during the upgrade. As we plan to connect the z196 to an IBM zEnterprise BladeCenter® Extension (zBX) in the future, we define the new OSA type CHPIDs OSM and OSX. Figure 4-12 shows the new device type=OSA-M connected to control unit type=OSM, which is connected to the new CHPID type=OSM.



```
                               I/O Device List         Row 1 of 2 More:
Command ===> ___________________________________________ Scroll ===> CSR

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

Control unit number  : 3100     Control unit type  . : OSM

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +        CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 3100,254 OSA-M         1   1  3100 ____ ____ ____ ____ ____ ____ ____
_ 31FE     OSAD          1   1  3100 ____ ____ ____ ____ ____ ____ ____
```

Figure 4-12 OSM I/O Device List sample definition

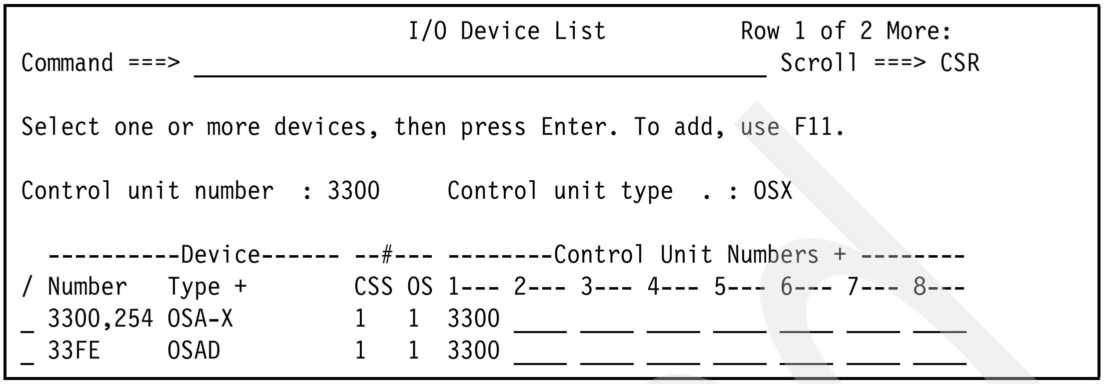
When defining CHPID type=OSM, priority queuing must be disabled. Specify **Yes** in the “Will greater than 160 TCP/IP stacks be required for this channel” field in the HCD when defining or modifying the CHPID definition (Figure 4-13).



```
+----------- 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?  . . . Yes                    |
|  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    |
| F12=Cancel                                                  |
+-------------------------------------------------------------+
```

Figure 4-13 OSM allowing more than 160 TCP/IP stacks

Figure 4-14 shows the new device type=OSA-X connected to control unit type=OSX, which is connected to the new CHPID type=OSX.



```
                             I/O Device List         Row 1 of 2 More:
Command ===> ___________________________________________ Scroll ===> CSR

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

Control unit number  : 3300     Control unit type  . : OSX

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +       CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 3300,254 OSA-X        1   1  3300 ____ ____ ____ ____ ____ ____ ____
_ 33FE     OSAD         1   1  3300 ____ ____ ____ ____ ____ ____ ____
```

Figure 4-14 OSX I/O Device List sample definition

4.2.8 Overdefining channel paths on an XMP processor

Sometimes you might need to define a channel path that is not physically installed on the processor. This path might be useful if you are planning to add additional channel cards to the processor in the future and want to have the definitions in the IODF before the hardware is installed.

HCD allows you to overdefine CHPIDs by using an asterisk (*) for the PCHID value. An overdefined CHPID must adhere to all the validation rules, but it is not taken into account by an IOCDS download. Also, it is not included in the IOCP statements, in a CONFIGxx member, or during dynamic activation.

If a control unit contains only CHPIDs with a PCHID value of an asterisk (*), then 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 * with its valid PCHID.

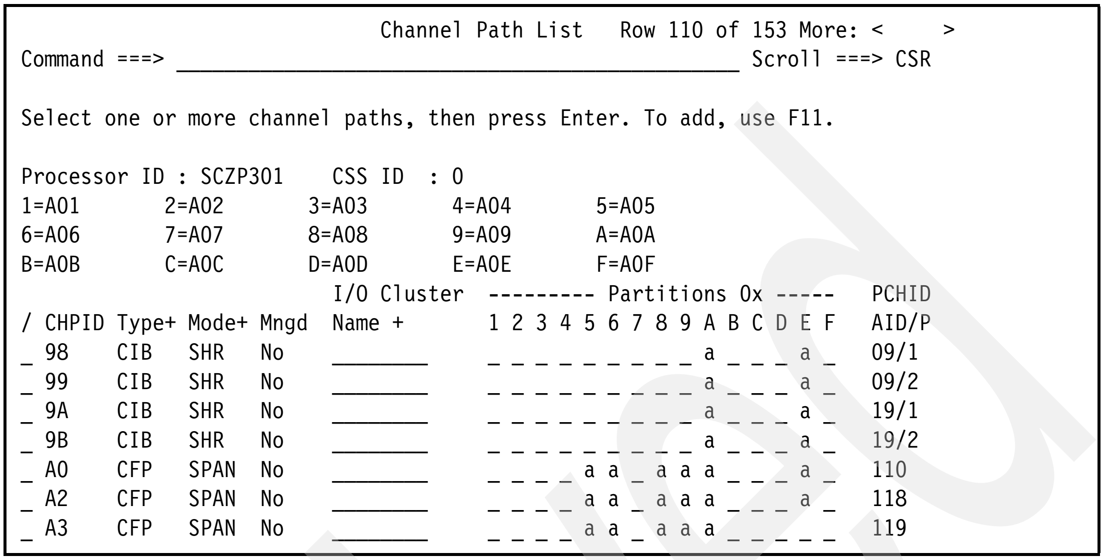
Note: This configuration is not the case for CFP type CHPIDs, where these CHPIDs have connections to other CFP type CHPIDs.

Therefore, HCD only allows you to define CFP type CHPIDs as overdefined if they are unconnected.

Overdefining is now supported for CIB type CHPID definitions.

The 2817 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

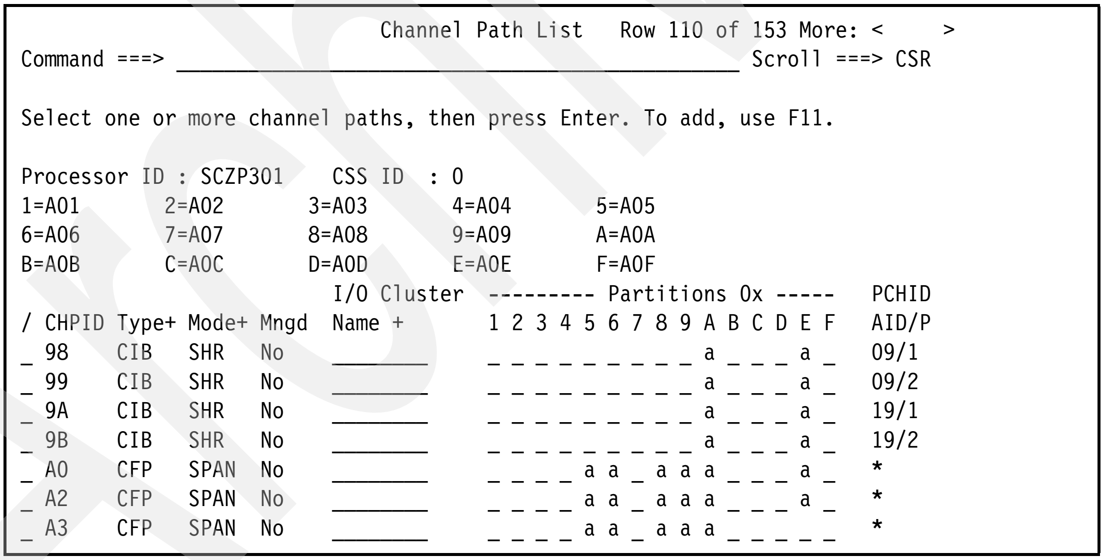
Figure 4-15 shows what the CHPID/PCHID definitions look like before being defined as overdefined. Press PF20 (right) in the Channel Path List.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   110
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   118
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   119
```

Figure 4-15 Channel Path List (Reserving CHPIDs)

Figure 4-16 shows what the CHPID/PCHID definitions look like after being defined as overdefined.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   *
```

Figure 4-16 Channel Path List (overdefined CHPIDs)

4.3 OSA: Saving and restoring configuration files

On the z9 EC and z10 EC, customization information for certain channel types is stored in files on the SE. The files are called *configuration files*, and they are named based on the physical location (PCHID value) of the feature.

Table 4-3 lists CHPID types that have configuration files on a z9 EC and z10 EC.

Table 4-3 Channel or CHPID type information in configuration files

Feature or CHPID type	Information stored in configuration files
OSA-Express2 types OSD/OSE	Any user-specified MAC addresses and OAT tables
OSA-Express3 types OSD/OSE	Any user-specified MAC addresses and OAT tables
OSA- Express2 1000BASE-T defined as CHPID type OSC	Console session information
OSA- Express3 1000BASE-T defined as CHPID type OSC	Console session information

If channels or CHPIDs have associated configuration files, the CHPID Mapping Tool can assign PCHIDs to the logical CHPID definitions or move a CHPID definition to a new location. This action can occur regardless of whether channels are moving.

The CHPID Mapping Tool can override PCHID assignments for:

- FICON channels supporting FCP
- OSA-Express2 and OSA- Express3 channels supporting OSC

The Miscellaneous Equipment Specification (MES) upgrade process preserves configuration files on an upgrade from a z9 EC and 10 EC to a z196. However, it is your responsibility to keep a backup of the customization data stored in the configuration files.

During an MES upgrade, the following actions occur:

- The channel cards are moved as part of the normal rebalancing of all I/Os.
- The configuration files are copied from your old system, restored to the new z196, and renamed to match their new PCHIDs of the new physical locations of the channel cards.
- The CHPID Mapping Tool forces the logical CHPID previously assigned to the old PCHID location to be now assigned to the new PCHID location.

  The CHPID Mapping Tool can only perform this function if the initial IOCP input contains the PCHID assignments from the old system.

For more information about configuration files, refer to Appendix A, “An explanation of configuration files”, *in CHPID Mapping Tool User’s Guide,* GC28-6825.

In this book, we show examples of backing up the configuration data with OSA/SF for OSA-Express2 and Express3 features, and with the HMC for OSA-ICC (OSC).

4.3.1 Saving OSA configuration information with OSA/SF

The Open Systems Adapter Support Facility (OSA/SF) is an application that helps you to customize and manage your OSA-2 and OSA-Express features. It also allows you to obtain status and operational information.

OSA/SF includes a graphical user interface (GUI) and a REXX interface. The OSA/SF GUI runs on Windows and Linux software that have graphics and Java 1.4 support. From a single OSA/SF GUI, you can establish connections to all server images that have OSA/SF running. This setup potentially allows you to have centralized control of OSA-2 and OSA-Express features that span server boundaries (Figure 4-18 on page 158).

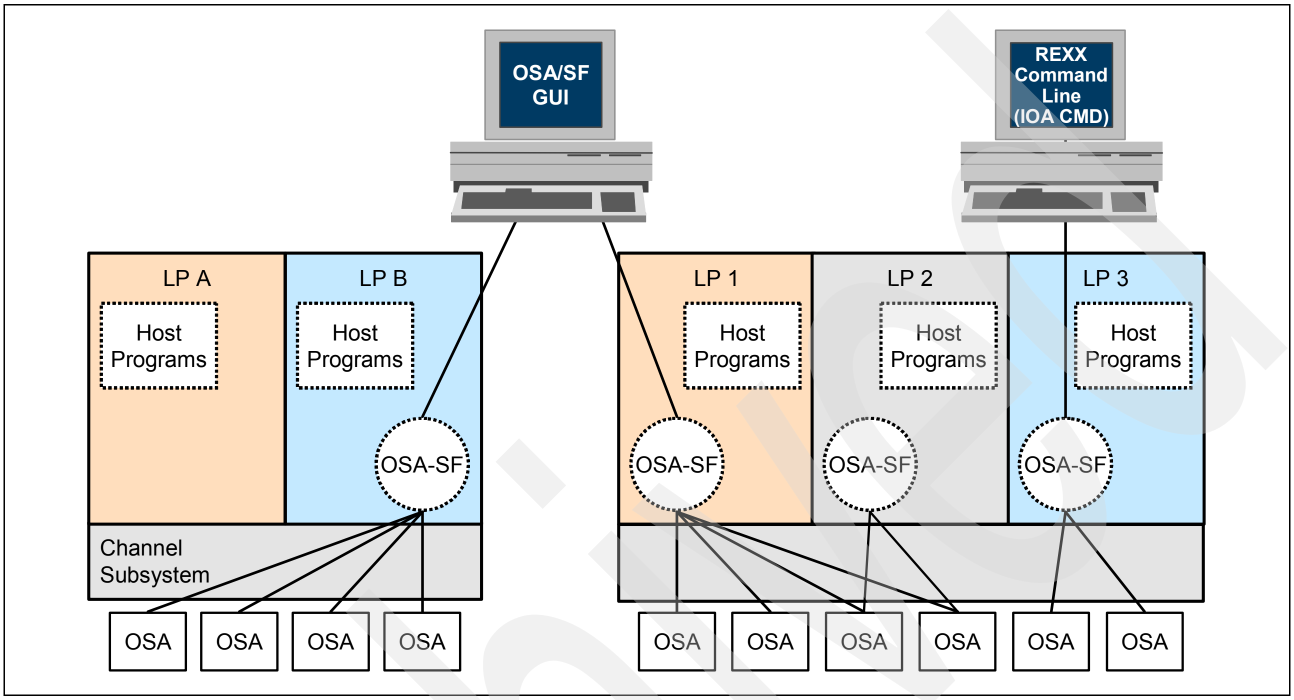


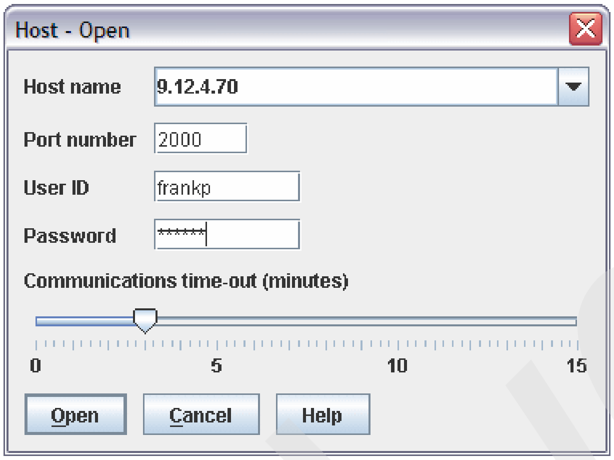
Figure 4-17 OSA/SF

Using OSA/SF, you can save the OSA-Express2 definitions for user-specified MAC addresses and OAT tables. For information about setting up OSA/SF, refer to *Open Systems Adapter-Express Customer's Guide and Reference*, SA22-7935 and *OSA-Express Implementation Guide,* SG24-5948.

Saving the current OSA-Express configuration

To customize, manage, and save the configurations of your OSA-Express features with the OSA/SF, perform the following steps:

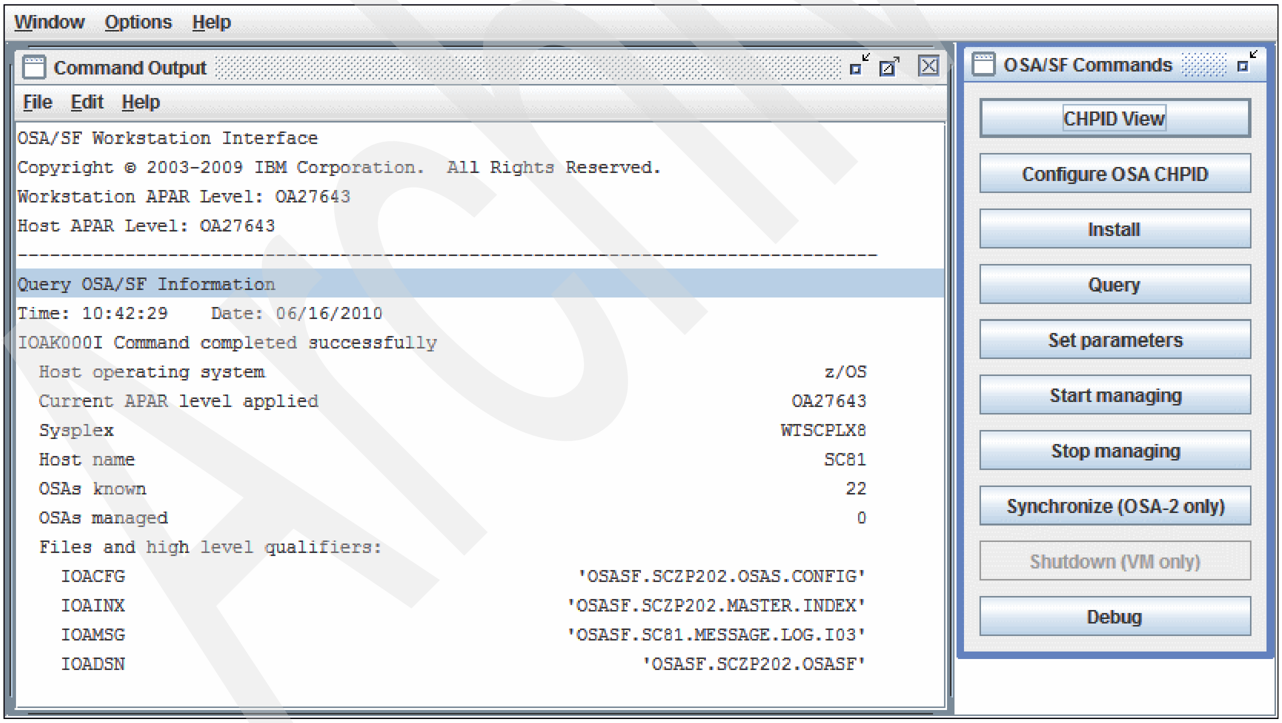
1. From a Windows workstation, start a DOS session and issue the `java ioajava` command to start the OSA/SF GUI. Log on to OSA/SF (Figure 4-18).



Host name: 9.12.4.70
Port number: 2000
User ID: frankp
Password: ******

Figure 4-18 OSA/SF Workstation Interface: Logon

The OSA/SF main windows open (Figure 4-19).



```
OSA/SF Workstation Interface
Copyright © 2003-2009 IBM Corporation.  All Rights Reserved.
Workstation APAR Level: OA27643
Host APAR Level: OA27643
--------------------------------------------------------------------------------
Query OSA/SF Information
Time: 10:42:29    Date: 06/16/2010
IOAK000I Command completed successfully
  Host operating system                                                     z/OS
  Current APAR level applied                                             OA27643
  Sysplex                                                               WTSCPLX8
  Host name                                                                 SC81
  OSAs known                                                                  22
  OSAs managed                                                                 0
  Files and high level qualifiers:
    IOACFG                                             'OSASF.SCZP202.OSAS.CONFIG'
    IOAINX                                            'OSASF.SCZP202.MASTER.INDEX'
    IOAMSG                                            'OSASF.SC81.MESSAGE.LOG.I03'
    IOADSN                                                   'OSASF.SCZP202.OSASF'
```

Figure 4-19 OSA/SF Workstation Interface

2. From the OSA/SF Commands window, click **CHPID View.** The CHPID View window opens and lists all OSA features in the configuration.

3. From the CHPID list displayed in the CHPID View window, select the CHPID with which you want to work. Select **Selected** → **Configurations** → **Configuration...** (Figure 4-20).

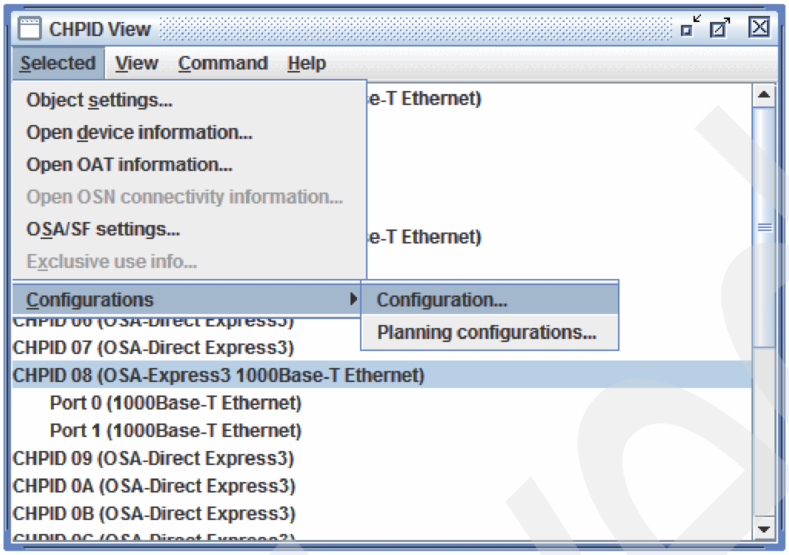
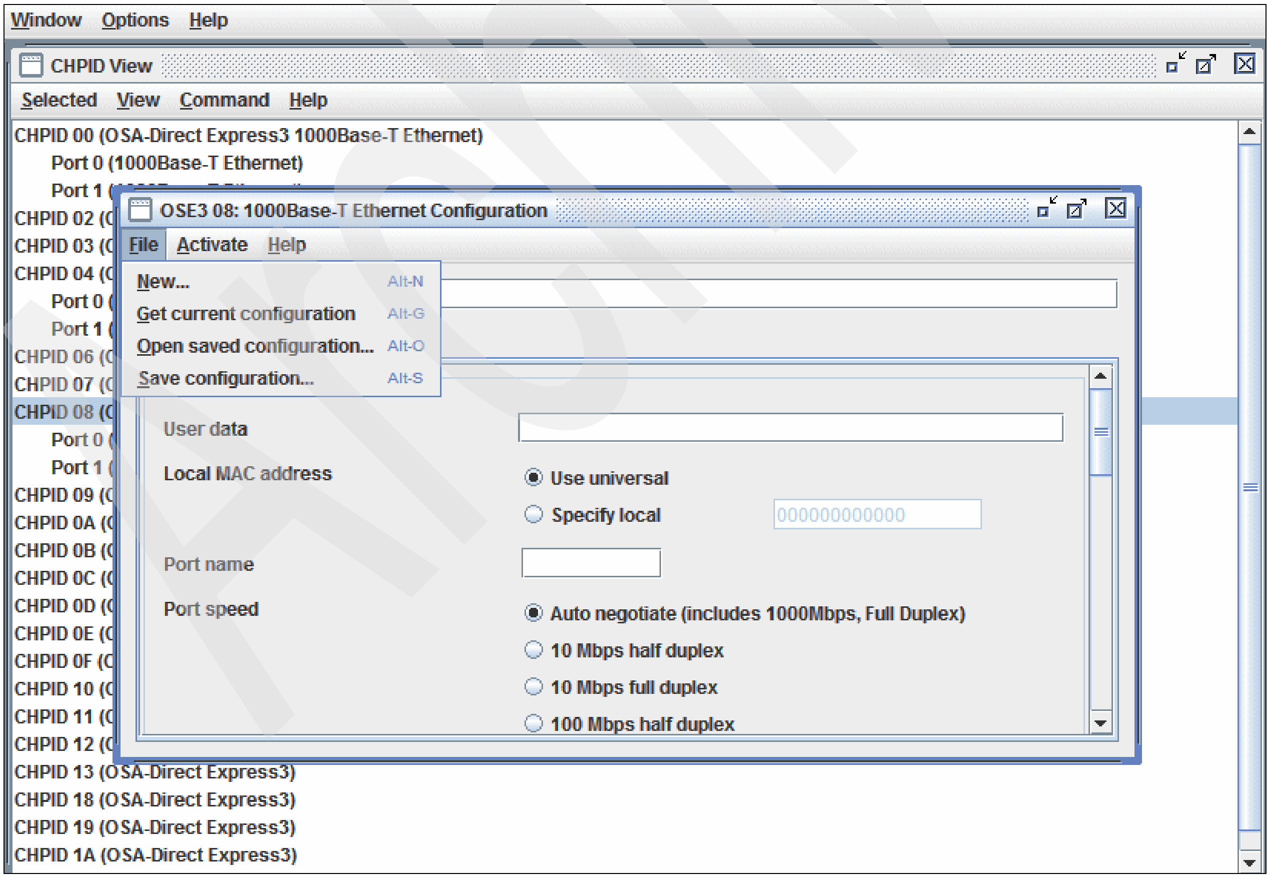


Figure 4-20 OSA/SF Workstation Interface: Selected Configurations

4. A CHPID configuration window open with blank fields. From this window, select **File** → **Get current configuration** (Figure 4-21).



User data

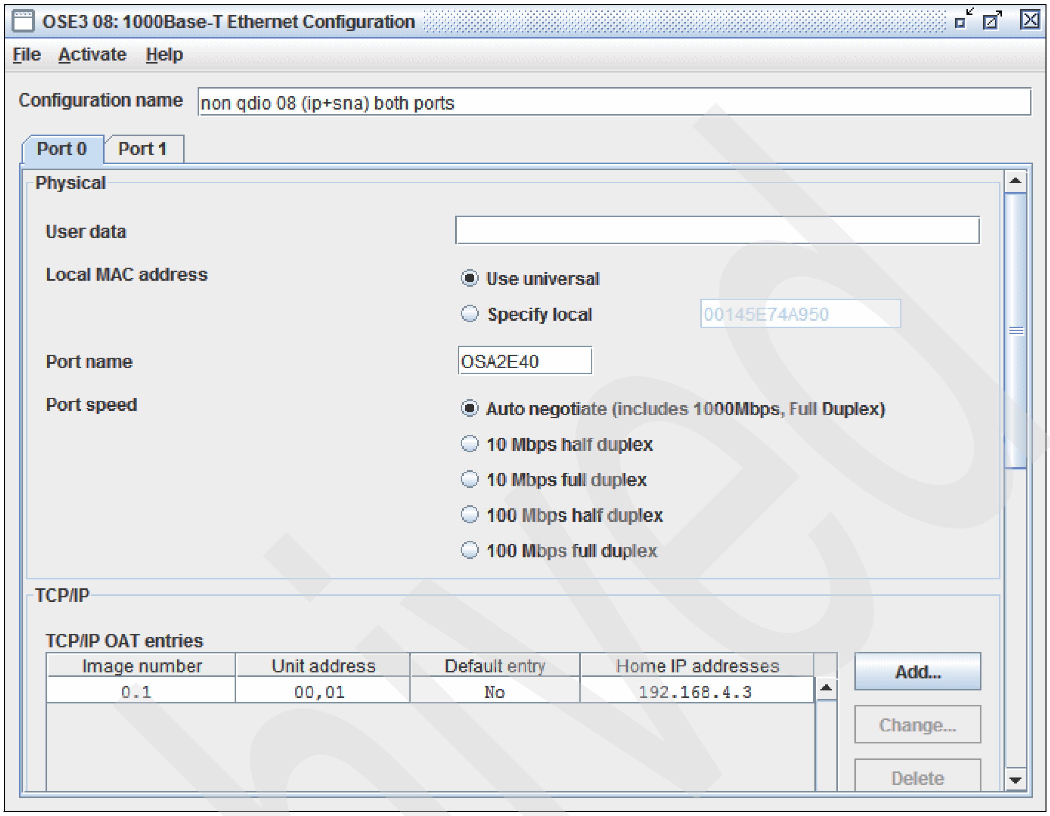
Local MAC address ● Use universal ○ Specify local 000000000000

Port name

Port speed ● Auto negotiate (includes 1000Mbps, Full Duplex) ○ 10 Mbps half duplex ○ 10 Mbps full duplex ○ 100 Mbps half duplex

Figure 4-21 OSA/SF Workstation Interface: Get current configuration

5. The CHPID configuration window opens again, and now has the current OSA CHPID configuration information. Enter the Configuration name (Figure 4-22).



OSE3 08: 1000Base-T Ethernet Configuration

Configuration name: non qdio 08 (ip+sna) both ports

Port 0

Physical

User data:

Local MAC address: ● Use universal ○ Specify local 00145E74A950

Port name: OSA2E40

Port speed:

● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex
○ 100 Mbps half duplex
○ 100 Mbps full duplex

TCP/IP

TCP/IP OAT entries

Image number	Unit address	Default entry	Home IP addresses
0.1	00,01	No	192.168.4.3

Figure 4-22 OSA/SF Workstation Interface: Current configuration

6. Select **File** → **Save configuration...** (Figure 4-23). The configuration file is saved by OSA/SF and can be reused later.

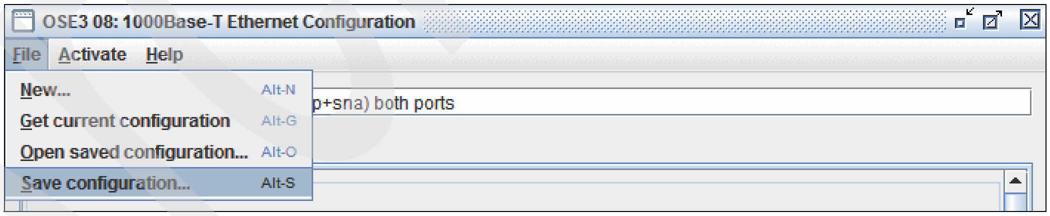


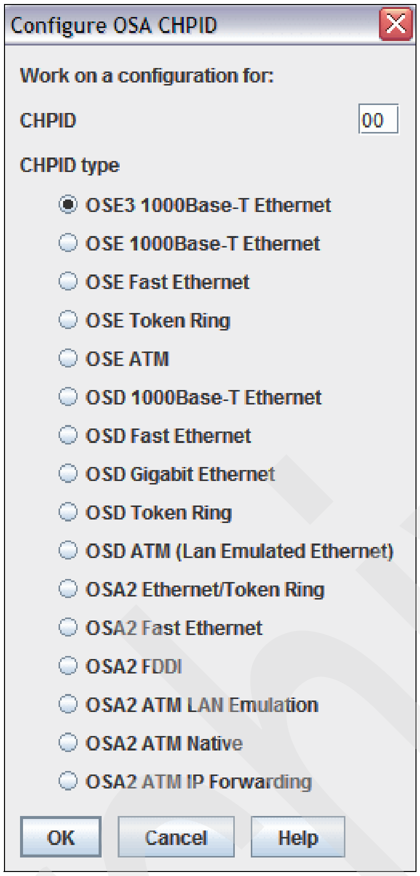
Figure 4-23 OSA/SF Workstation Interface: Save current configuration

Restoring a saved OSA-Express configuration

You can use OSA/SF to install previously saved configuration information using the install and activate functions. Note that to use the GUI, you need to manually install and activate at least one OSA feature to enable communication between the GUI and the OSA/SF application.

Perform the following steps:

1. From the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...** or click **Configure OSA CHPID** in the OSA/SF Commands window. The Configure OSA CHPID window opens (Figure 4-24).



Configure OSA CHPID

Work on a configuration for:

CHPID 00

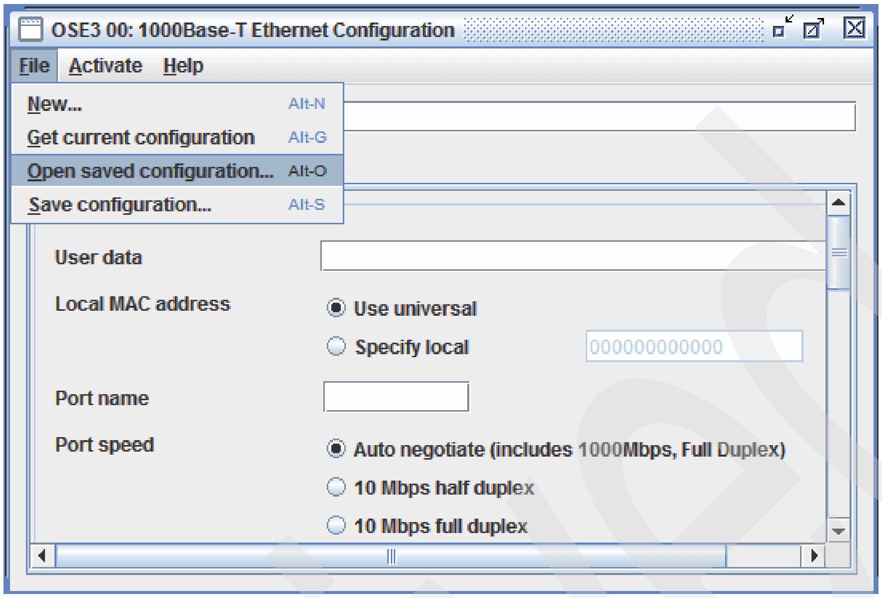
CHPID type

- ● OSE3 1000Base-T Ethernet
- ○ OSE 1000Base-T Ethernet
- ○ OSE Fast Ethernet
- ○ OSE Token Ring
- ○ OSE ATM
- ○ OSD 1000Base-T Ethernet
- ○ OSD Fast Ethernet
- ○ OSD Gigabit Ethernet
- ○ OSD Token Ring
- ○ OSD ATM (Lan Emulated Ethernet)
- ○ OSA2 Ethernet/Token Ring
- ○ OSA2 Fast Ethernet
- ○ OSA2 FDDI
- ○ OSA2 ATM LAN Emulation
- ○ OSA2 ATM Native
- ○ OSA2 ATM IP Forwarding

Figure 4-24 OSA/SF Workstation Interface: Configure OSA CHPID

2. Select the CHPID number and the CHPID Type that you want to define, and click **OK**.

3. OSA/SF opens a default window for the type of feature selected. Select **File** → **Open saved configuration...** (Figure 4-25).



User data

Local MAC address
● Use universal
○ Specify local 000000000000

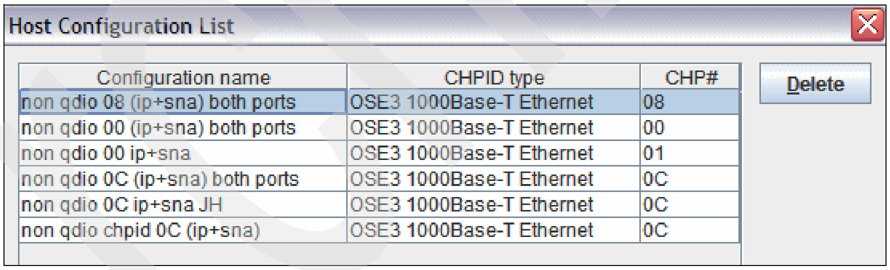
Port name

Port speed
● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex

Figure 4-25 OSA/SF Workstation Interface: Open saved configuration

OSA/SF opens a Host Configuration List windows containing the names of previously saved configuration files that match the feature type (Figure 4-26).

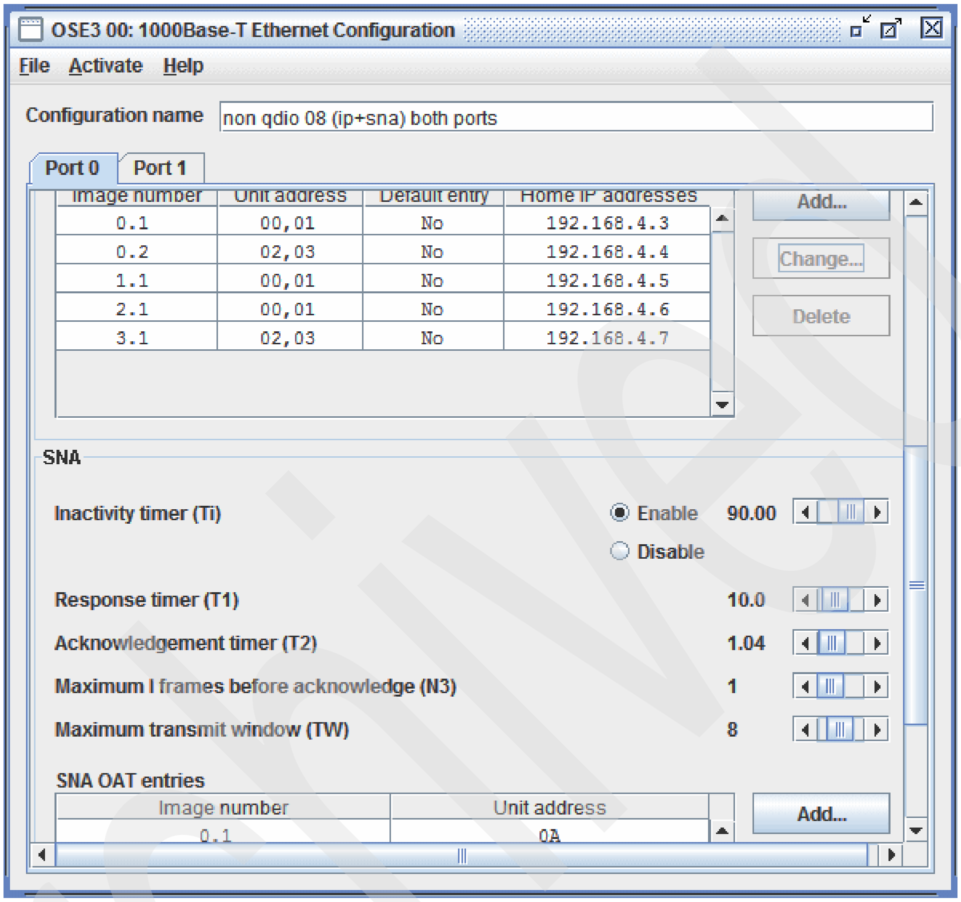
Note that the Host Configuration List being displayed varies with the OSA-Express3 feature type selected in Figure 4-24 on page 161. For example, a request for OSA-Express31000BASE-T Ethernet displays the list shown in Figure 4-26.



Configuration name	CHPID type	CHP#
non qdio 08 (ip+sna) both ports	OSE3 1000Base-T Ethernet	08
non qdio 00 (ip+sna) both ports	OSE3 1000Base-T Ethernet	00
non qdio 00 ip+sna	OSE3 1000Base-T Ethernet	01
non qdio 0C (ip+sna) both ports	OSE3 1000Base-T Ethernet	0C
non qdio 0C ip+sna JH	OSE3 1000Base-T Ethernet	0C
non qdio chpid 0C (ip+sna)	OSE3 1000Base-T Ethernet	0C

Figure 4-26 OSA/SF Workstation Interface: Host Configuration List

4. From the list, select the saved configuration name and click **Load**. The configuration information previously saved is now displayed on the OSA configuration window. Any changes that may be needed can be done for this configuration by using OSA/SF (Figure 4-27).



Configuration name: non qdio 08 (ip+sna) both ports

Image number	Unit address	Default entry	Home IP addresses
0.1	00,01	No	192.168.4.3
0.2	02,03	No	192.168.4.4
1.1	00,01	No	192.168.4.5
2.1	00,01	No	192.168.4.6
3.1	02,03	No	192.168.4.7

SNA

Inactivity timer (Ti): ● Enable ○ Disable 90.00

Response timer (T1): 10.0

Acknowledgement timer (T2): 1.04

Maximum I frames before acknowledge (N3): 1

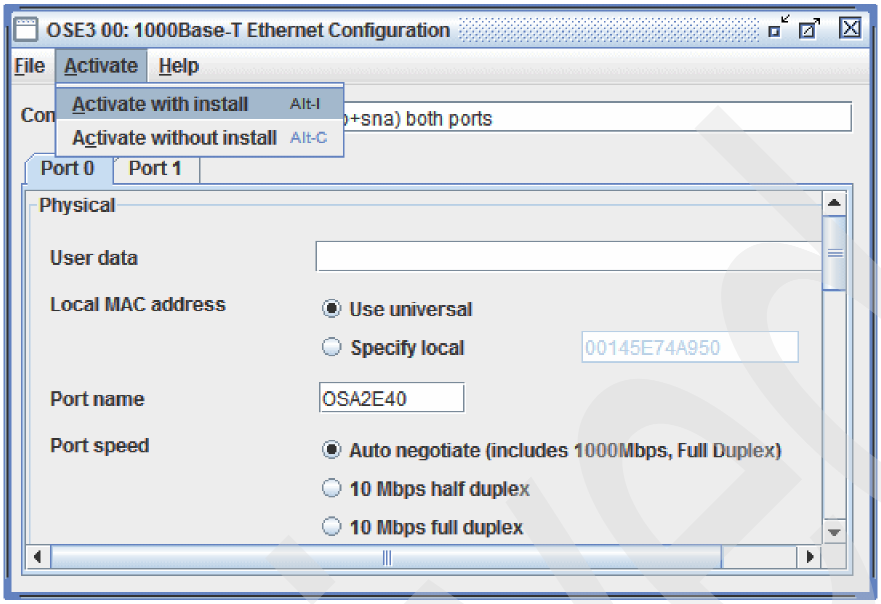
Maximum transmit window (TW): 8

SNA OAT entries

Image number	Unit address
0.1	0A

Figure 4-27 OSA/SF Workstation Interface: Change configuration

5. Select **Activate** → **Activate with install** to restore the OSA feature configuration (Figure 4-28).



Con… +sna) both ports

User data

Local MAC address
● Use universal
○ Specify local 00145E74A950

Port name OSA2E40

Port speed
● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex

Figure 4-28 OSA/SF Workstation Interface: Install

4.3.2 OSA-ICC and CHPID=OSC

If the 2094 or 2097 being upgraded contains any TYPE=OSC CHPIDs, then the operator console, TN3270, and printer definitions are stored and managed on the Support Element and their definitions only are associated with a PCHID, not a CHPID. Therefore, it is a best practice to have a backup copy of these definitions.

Exporting the configuration data for OSA-ICC using HMC V2.11.0

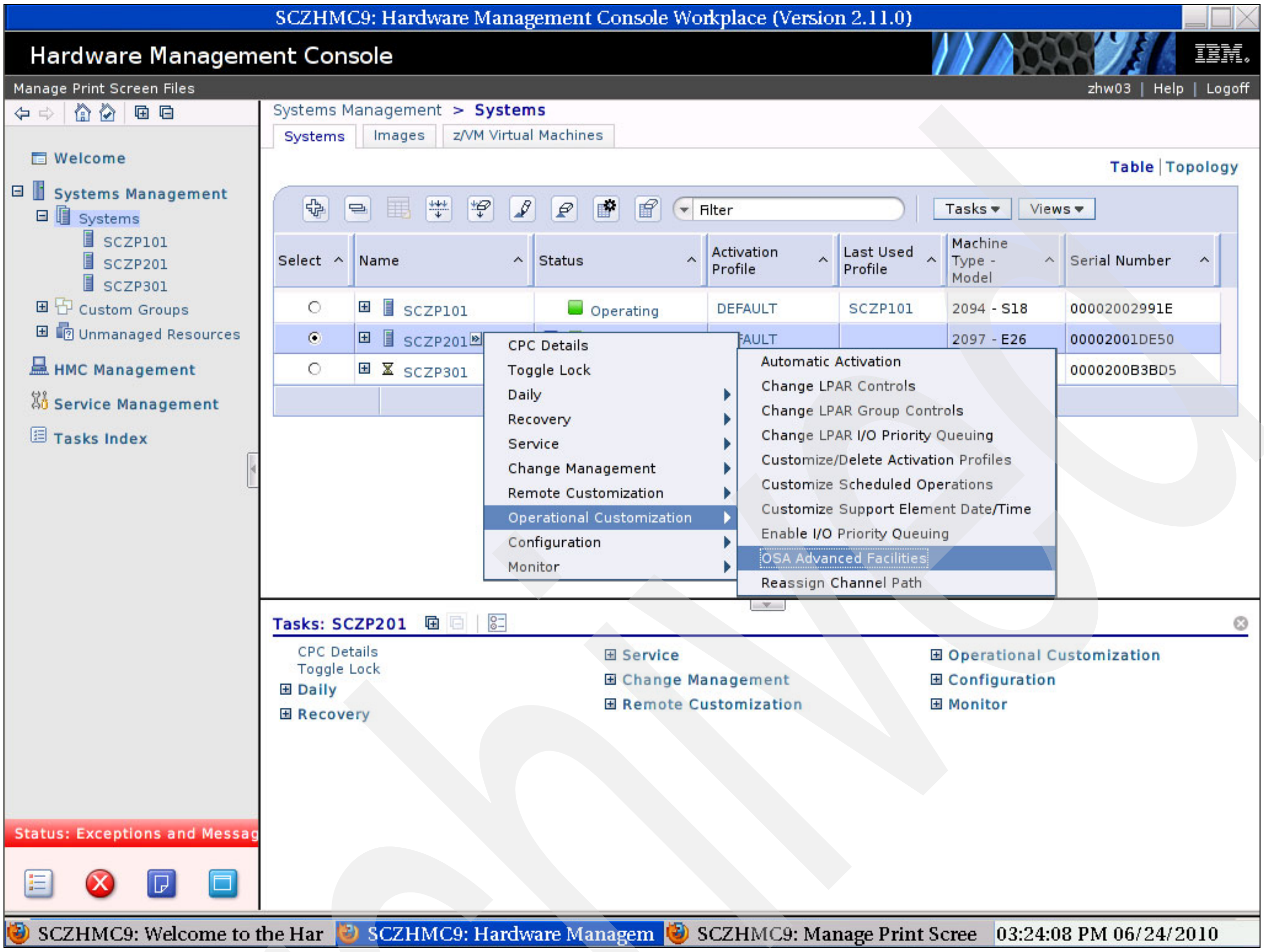
To export the configuration data, perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094 or 2097 (as opposed to a remote web browser) and select the CPC that contains the OSC CHPIDs for which you want to export the configuration data (in our example, SCZP201).

> **Note:** An HMC upgraded from V2.9.2 to V2.10.2 might contain a usable floppy disk drive. A new HMC installed with a z10 EC or later will not contain a floppy disk drive.

2. Under Systems Management, click **Servers** to expand the list.
   a. In the right pane, you see all the servers defined to this HMC. Click the radio button for the server you want to access (in this example, SCZP201).

b. Click the drop-down menu arrow just after the CPC name and use it to expand and select the **OSA Advanced Facilities** menu (Figure 4-29).

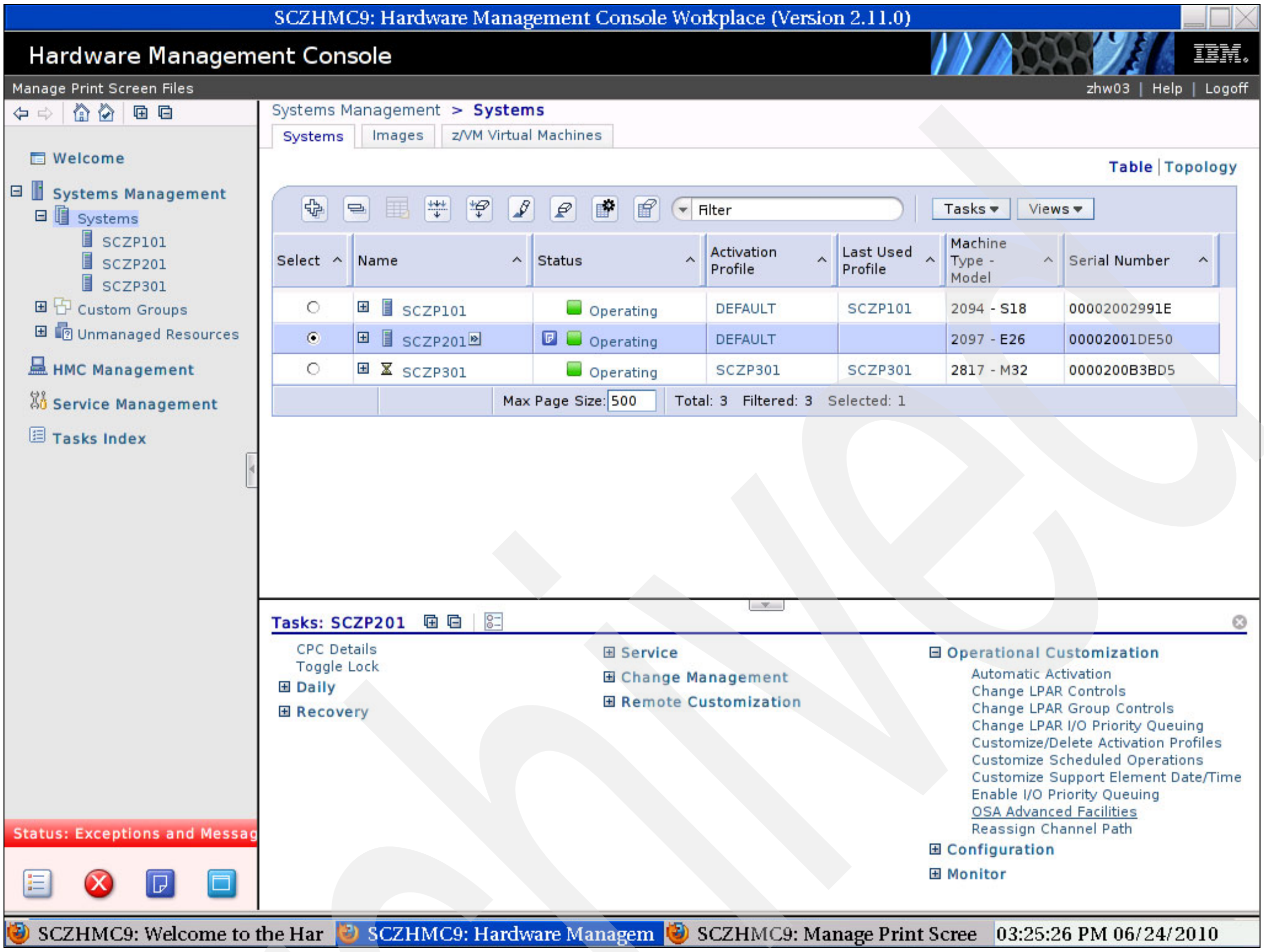


Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
●	SCZP201		FAULT		2097 - E26	00002001DE50
○	SCZP301					0000200B3BD5

Figure 4-29 OSA Advanced Facilities

3. Alternatively, you can access the OSA options the following way:
   a. Under Systems Management, click **Servers** to expand the list.
   b. Under Servers, click the server to select it (in this example, SCZP201).

c. On the Tasks pane, click **Operational Customization** to expand it, and select **OSA Advanced Facilities** (Figure 4-30).

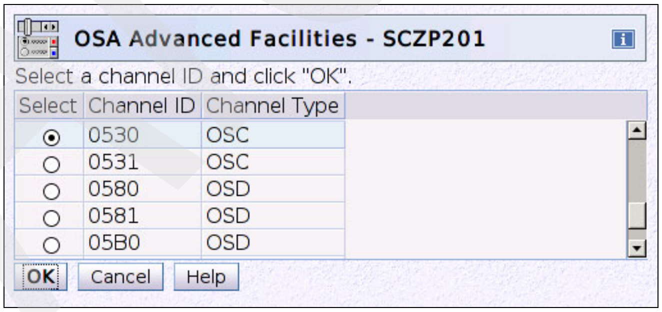


Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
●	SCZP201	Operating	DEFAULT		2097 - E26	00002001DE50
○	SCZP301	Operating	SCZP301	SCZP301	2817 - M32	0000200B3BD5

Max Page Size: 500 Total: 3 Filtered: 3 Selected: 1

Figure 4-30 OSA Advanced Facilities (Task Menu)

4. Click the radio button for the Channel ID card that you want to export, and click **OK** (Figure 4-31).

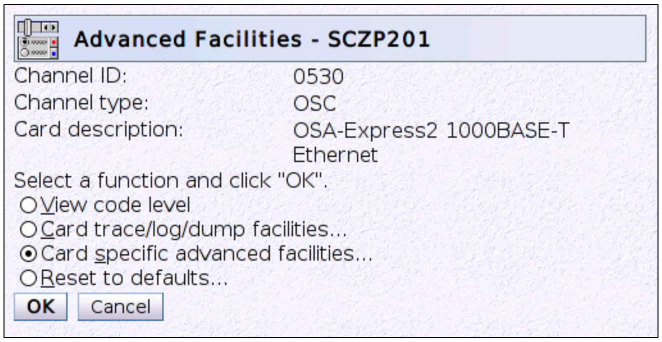


Select a channel ID and click "OK".

Select	Channel ID	Channel Type
●	0530	OSC
○	0531	OSC
○	0580	OSD
○	0581	OSD
○	05B0	OSD

Figure 4-31 OSA Advanced Facilities (OSC Channel)

5. Select the **Card specific advanced facilities...** radio button and click **OK** (Figure 4-32).



Advanced Facilities - SCZP201

Channel ID: 0530
Channel type: OSC
Card description: OSA-Express2 1000BASE-T Ethernet

Select a function and click "OK".

○ View code level
○ Card trace/log/dump facilities...
● Card specific advanced facilities...
○ Reset to defaults...

Figure 4-32 OSA Advanced Facilities (Card specific)

6. Select the **Manual configuration options...** radio button and click **OK** (Figure 4-33).

Advanced Facilities - SCZP201

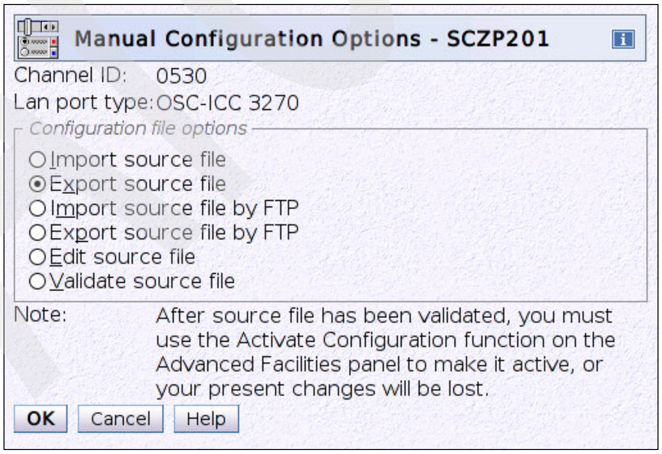
Channel ID: 0530
Lan port type: OSC-ICC 3270

Select a function and click "OK".

○ View port parameters...
○ Run port diagnostics
○ Set card mode...
○ Display client connections...
○ Display active sessions configuration...
○ Display active server configuration...
○ Panel configuration options...
● Manual configuration options...
○ Activate configuration
○ Display activate configuration errors...
○ Debug utilities...

Figure 4-33 OSA Advanced Facilities (Manual config)

7. Select the **Export source file** radio button and click **OK (**Figure 4-34).



Manual Configuration Options - SCZP201

Channel ID: 0530
Lan port type: OSC-ICC 3270

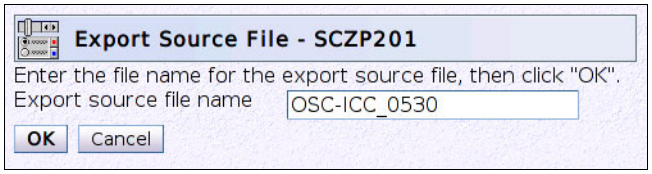
Configuration file options

○ Import source file
● Export source file
○ Import source file by FTP
○ Export source file by FTP
○ Edit source file
○ Validate source file

Note: After source file has been validated, you must use the Activate Configuration function on the Advanced Facilities panel to make it active, or your present changes will be lost.

Figure 4-34 OSA Advanced Facilities (Export source)

8. The task requests a file name to be written onto the installed media device. In our example, we entered OSC-ICC_0530 (Figure 4-35). Click **OK**.



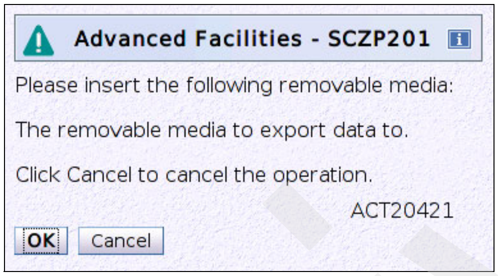
Export Source File - SCZP201

Enter the file name for the export source file, then click "OK".

Export source file name: OSC-ICC_0530

Figure 4-35 OSA Advanced Facilities (Export file name)

9. HMC displays the ACT20421 window, where we can insert removable media (Figure 4-36).



Advanced Facilities - SCZP201

Please insert the following removable media:

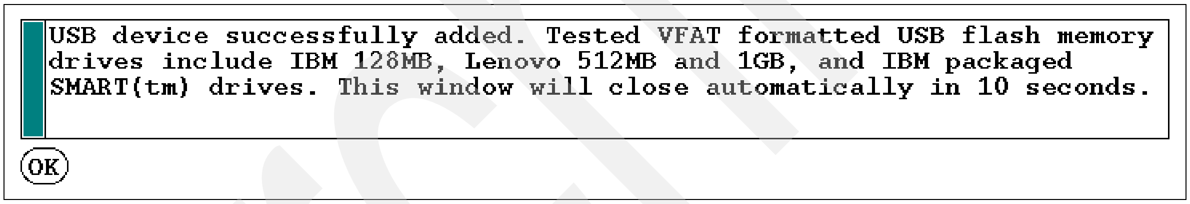
The removable media to export data to.

Click Cancel to cancel the operation.

ACT20421

Figure 4-36 OSA Advanced Facilities (insert removable media)

10. Insert the USB flash memory drive to which you want to export the OSA-ICC source file. Wait for the following message to appear (Figure 4-37).

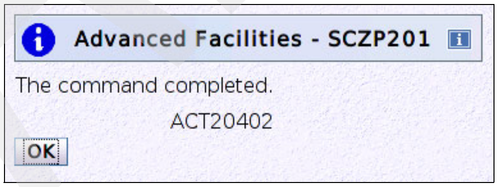


```
USB device successfully added. Tested VFAT formatted USB flash memory
drives include IBM 128MB, Lenovo 512MB and 1GB, and IBM packaged
SMART(tm) drives. This window will close automatically in 10 seconds.
```

Figure 4-37 OSA Advanced Facilities (removable media inserted)

11. Click **OK** to return to the ACT20421 message.

12. The HMC task writes the configuration data for the Channel ID that was selected onto the media device and displays a message window when it has completed (Figure 4-38). Click **OK**.



Advanced Facilities - SCZP201

The command completed.

ACT20402

Figure 4-38 OSA Advanced Facilities (Export source file complete)

13. You can now remove the USB flash memory drive at any time.

14.HMC displays a message advising you that the USB device has been removed (Figure 4-39).

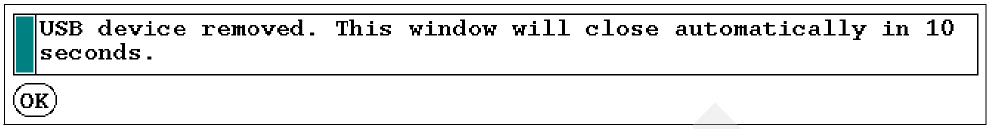

USB device removed. This window will close automatically in 10 seconds.

Figure 4-39 OSA Advanced Facilities (removable media removed)

15.Click **Cancel** to exit all the OSA Advanced Facilities windows.

Example 4-1 shows a sample of the configuration data on the USB flash drive.

Example 4-1 OSC configuration sample (OSC-0530)

```
<OSC_SERVER>
  HOST_IP= 9.12.4.97
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 1492
  NAME= OSAF280
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 01 DEVICE= F280
  GROUP=  "SCZCF280"
  CONSOLE_TYPE= 2    RESPONSE= OFF    READ_TIMEOUT= 60
  DEFER_HOST_DISCONNECT= 0
</SESSION1>

<SESSION2>
  CSS= 01 IID= 02 DEVICE= F281
  GROUP=  "SCZCF281"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION2>
...........................................

...........................................
<SESSION32>
  CSS= 01 IID= 09 DEVICE= F283
  GROUP=  "SCC19283"
  CONSOLE_TYPE= 2    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION32>

</CONFIG_SESSION>
```

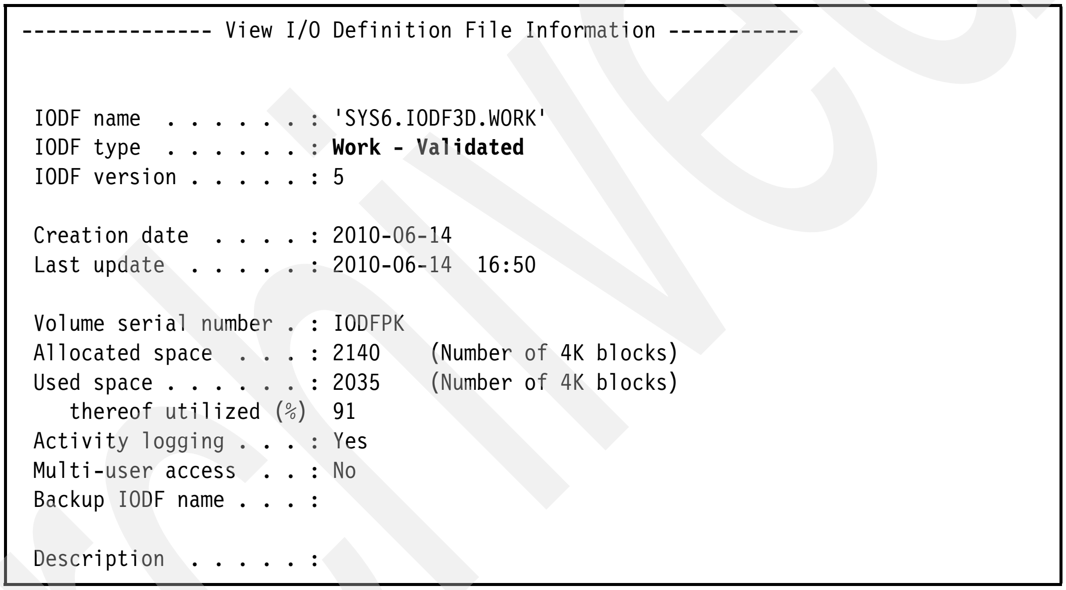
4.4 HCD: Validating the 2817 work IODF

In this section, we explain the steps needed to validate the 2817 work IODF.

4.4.1 Validating the work IODF

To validate the work IODF, perform the following steps:

1. Select HCD Option 2.12. Build validated work I/O definition file. Review the message list and correct any errors.
2. Press PF3 to continue. The message `Requested action successfully processed` is displayed.
3. Go to HCD Option 6.4. View I/O Definition File Information and note that the IODF type is now `Work–Validated` (Figure 4-40).



```
---------------- View I/O Definition File Information -----------


 IODF name  . . . . . . : 'SYS6.IODF3D.WORK'
 IODF type  . . . . . . : Work - Validated
 IODF version . . . . . : 5

 Creation date  . . . . : 2010-06-14
 Last update  . . . . . : 2010-06-14  16:50

 Volume serial number . : IODFPK
 Allocated space  . . . : 2140    (Number of 4K blocks)
 Used space . . . . . . : 2035    (Number of 4K blocks)
    thereof utilized (%)  91
 Activity logging . . . : Yes
 Multi-user access  . . : No
 Backup IODF name . . . :

 Description  . . . . . :
```

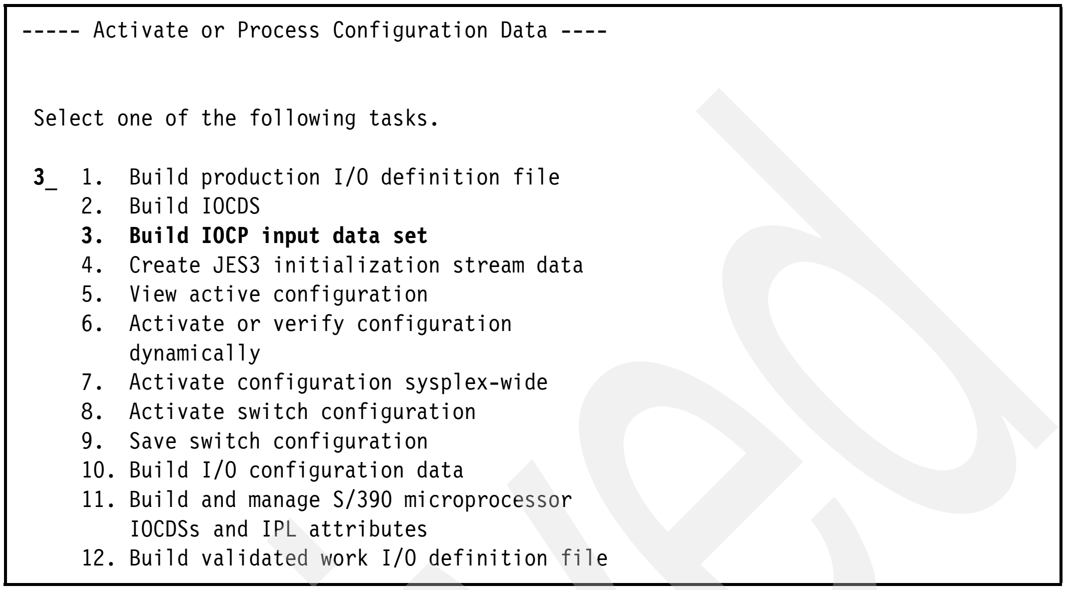
Figure 4-40 View I/O Definition File Information (validated work IODF)

4.4.2 Creating the IOCP for the CHPID Mapping Tool

> **Note:** If you are an HCM user, you may prefer to use HCM to create the IOCP statements file and transfer the file to your workstation. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

To create the IOCP for the CHPID Mapping Tool, perform the following steps:

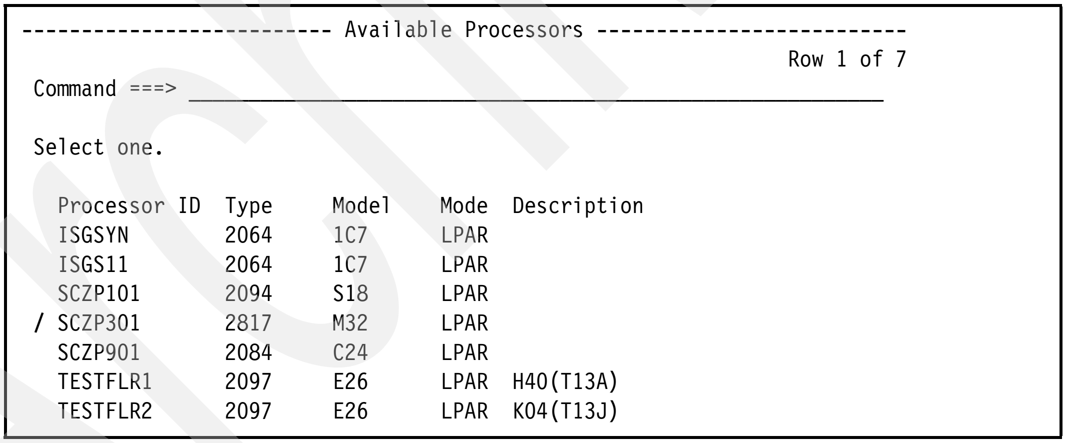
1. Select HCD Option 2.3. Build IOCP input data set and press Enter (Figure 4-41).



```
----- Activate or Process Configuration Data ----


 Select one of the following tasks.

 3_  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

Figure 4-41 Activate or Process Configuration Data (Build IOCP for SCZP301)

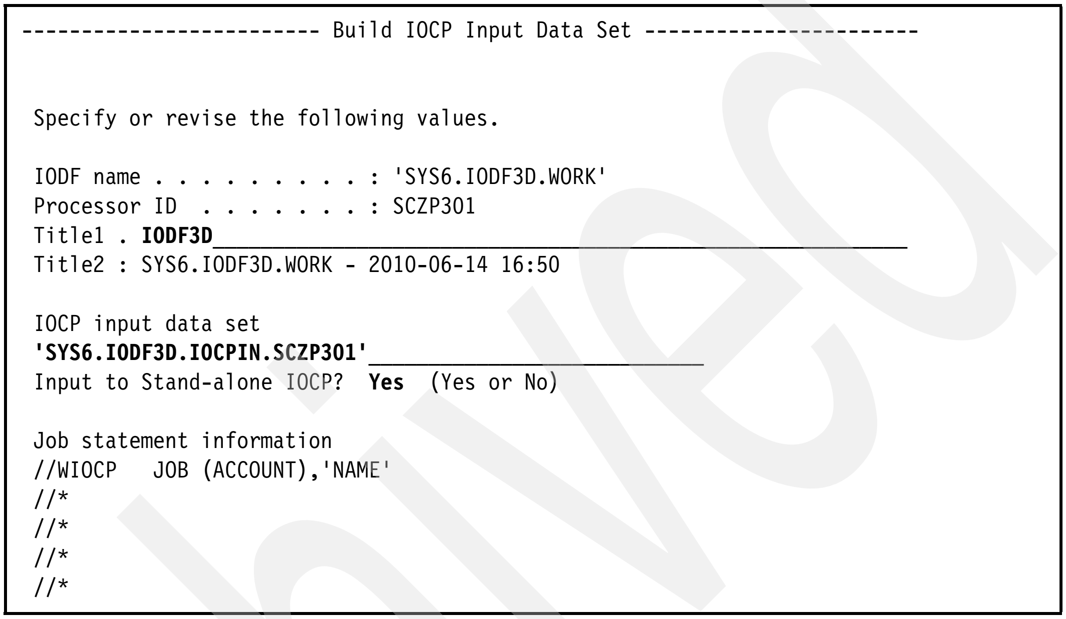
2. HCD displays the list of available processors to chose. Select the SCZP301 processor by entering a forward slash mark (/) and pressing Enter (Figure 4-42).



```
-------------------------- Available Processors --------------------------
                                                                Row 1 of 7
 Command ===> ___________________________________________________________

 Select one.

   Processor ID  Type     Model    Mode  Description
   ISGSYN        2064     1C7      LPAR
   ISGS11        2064     1C7      LPAR
   SCZP101       2094     S18      LPAR
 / SCZP301       2817     M32      LPAR
   SCZP901       2084     C24      LPAR
   TESTFLR1      2097     E26      LPAR  H40(T13A)
   TESTFLR2      2097     E26      LPAR  K04(T13J)
```

Figure 4-42 Available Processors (select processor for the IOCP file)

3. HCD displays a panel on which you enter information regarding the IOCP input data set to be created (Figure 4-43). Complete the following fields:
   - Title1
   - IOCP input data set
   - Enter `Yes` in the Input to Stand-alone IOCP field.
   - Complete the Job statement information for your installation.
4. Press Enter. HCD submits a batch job to create the data set.

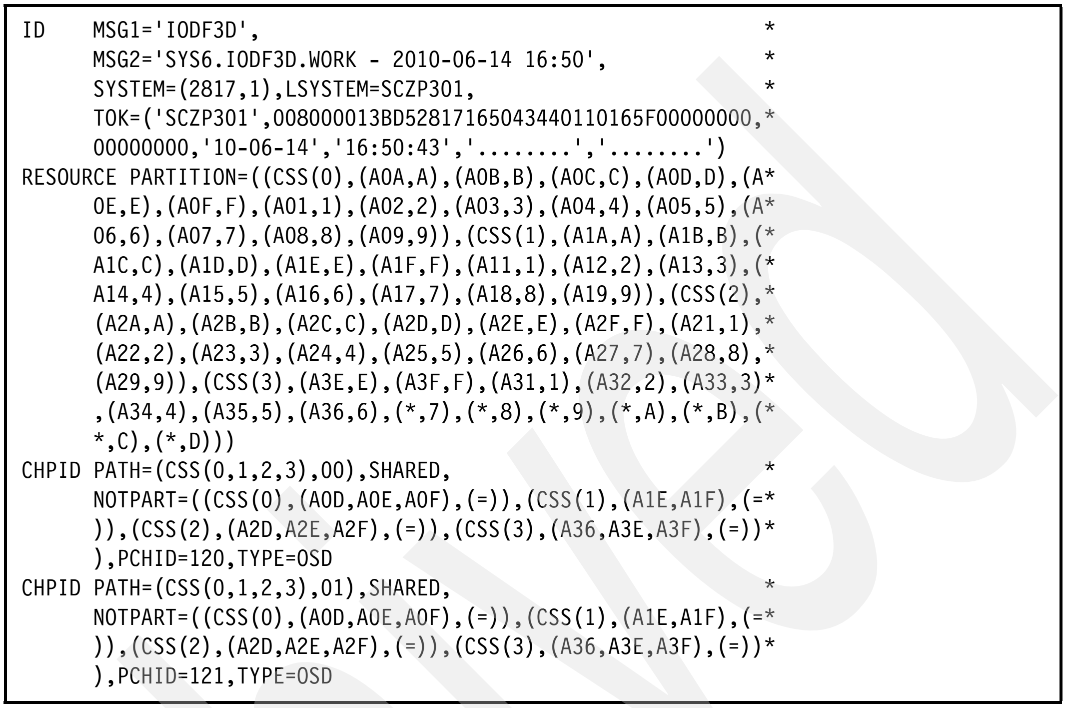


```
------------------------- Build IOCP Input Data Set ------------------------


 Specify or revise the following values.

 IODF name . . . . . . . . . : 'SYS6.IODF3D.WORK'
 Processor ID  . . . . . . . : SCZP301
 Title1 . IODF3D__________________________________________________________
 Title2 : SYS6.IODF3D.WORK - 2010-06-14 16:50

 IOCP input data set
 'SYS6.IODF3D.IOCPIN.SCZP301'____________________________
 Input to Stand-alone IOCP?  Yes  (Yes or No)

 Job statement information
 //WIOCP   JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
 //*
```

Figure 4-43 Build IOCP Input Data Set

5. In TSO, verify that the data set just created exists and that it contains IOCP statements (Figure 4-44).

   The data set is used as input into the CHPID Mapping Tool.



```
ID    MSG1='IODF3D',                                         *
      MSG2='SYS6.IODF3D.WORK - 2010-06-14 16:50',            *
      SYSTEM=(2817,1),LSYSTEM=SCZP301,                       *
      TOK=('SCZP301',008000013BD52817165043440110165F00000000,*
      00000000,'10-06-14','16:50:43','........','........')
RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
      0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
      06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1A,A),(A1B,B),(*
      A1C,C),(A1D,D),(A1E,E),(A1F,F),(A11,1),(A12,2),(A13,3),(*
      A14,4),(A15,5),(A16,6),(A17,7),(A18,8),(A19,9)),(CSS(2),*
      (A2A,A),(A2B,B),(A2C,C),(A2D,D),(A2E,E),(A2F,F),(A21,1),*
      (A22,2),(A23,3),(A24,4),(A25,5),(A26,6),(A27,7),(A28,8),*
      (A29,9)),(CSS(3),(A3E,E),(A3F,F),(A31,1),(A32,2),(A33,3)*
      ,(A34,4),(A35,5),(A36,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*
      *,C),(*,D)))
CHPID PATH=(CSS(0,1,2,3),00),SHARED,                         *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1E,A1F),(=*
      )),(CSS(2),(A2D,A2E,A2F),(=)),(CSS(3),(A36,A3E,A3F),(=))*
      ),PCHID=120,TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),01),SHARED,                         *
      NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1E,A1F),(=*
      )),(CSS(2),(A2D,A2E,A2F),(=)),(CSS(3),(A36,A3E,A3F),(=))*
      ),PCHID=121,TYPE=OSD
```

Figure 4-44 IOCP input data set contents (truncated)

   Also note that part of the TOK statement has been blanked out with dots (Example 4-2).

   Example 4-2 IOCP file (TOK statement)

```
TOK=('SCZP301',008000013BD52817165043440110165F00000000,*
00000000,'10-06-14','16:50:43','........','........')
```

   These dots are a safeguard to ensure that this IOCP file cannot be written to a processor and used for a power-on reset, because this IOCP file was created from a validated work IODF and not a Production IODF, which is something that can be done only for processors that contain PCHID definitions.

   Important: When an IOCP statement file is exported from a Validated Work IODF using HCD, it must be imported back to HCD in order for the process to be valid. The IOCP file cannot be used directly by the IOCP program.

6. Download this IOCP file from TSO to the CMT workstation. Use a workstation file transfer facility such as the one in the IBM Personal Communications Workstation Program, or any equivalent 3270 emulation program. Be sure to use TEXT as the transfer type. In this example, we named the file `SCZP301in.iocp`.

4.5 CMT: Assigning PCHIDs to CHPIDs

In the following steps, we take the output from the previous set of HCD steps (IOCP), and the output from the 2817 order process (CFReport), and, using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2817.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to 2.1.5, "CHPID Mapping Tool" on page 28 for information about downloading and installing the CMT. If you already have CMT installed, verify that you have the latest updates installed.

Using the CHPID Mapping Tool, perform the following steps:

1. Import the IOCP statements file and the `CFReport` file into the CHPID Mapping Tool. Obtaining the IOCP statements may be performed with HCM.
2. Resolve CHPIDs with a PCHID conflict.
3. Resolve CHPIDs without associated hardware.
4. Resolve hardware resolution.
5. Set the priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
6. Run the CHPID Mapping Tool availability function.
7. Create CHPID Mapping Tool reports.
8. Create an updated IOCP statements file and transfer it back to the host z/OS image. This step may be performed with HCM.

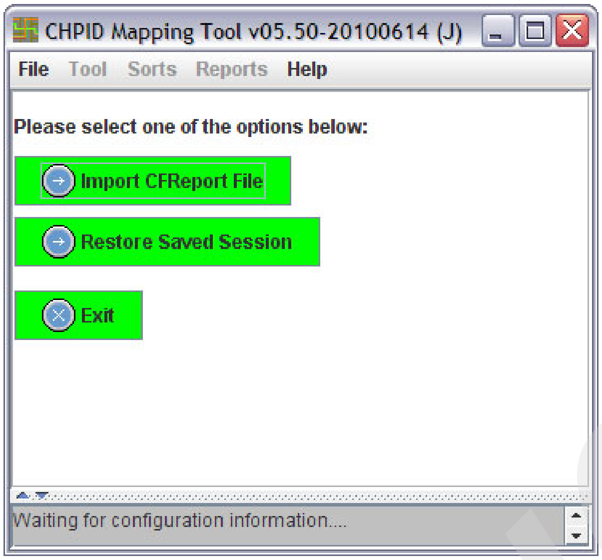
Note: When upgrading from a 2094 or a 2097 to a 2817, you must use the CHPID Mapping Tool level that supports the 2817. The internal availability characteristics of the 2817 are different from previous System z processors.

4.5.1 Importing the CFReport file into the CHPID Mapping Tool

To import the CFReport file into the CHPID Mapping Tool, perform the following steps:

1. Start the CHPID Mapping Tool on your workstation.
2. Import the `CFReport` file into the CHPID Mapping Tool.

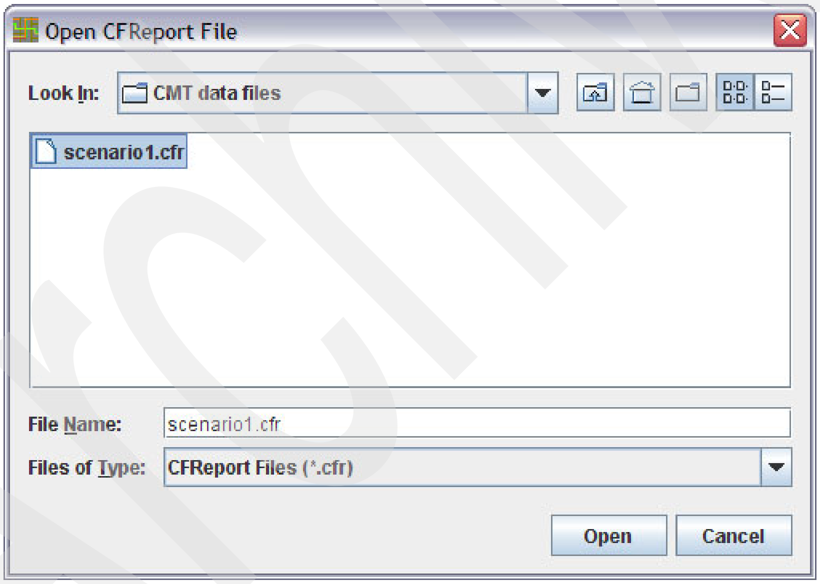
3. Select **File** → **Import CFReport file** (Figure 4-45).



Waiting for configuration information....

Figure 4-45 Import CFReport Order file

4. Select the `CFReport` file and click **Open** (Figure 4-46).



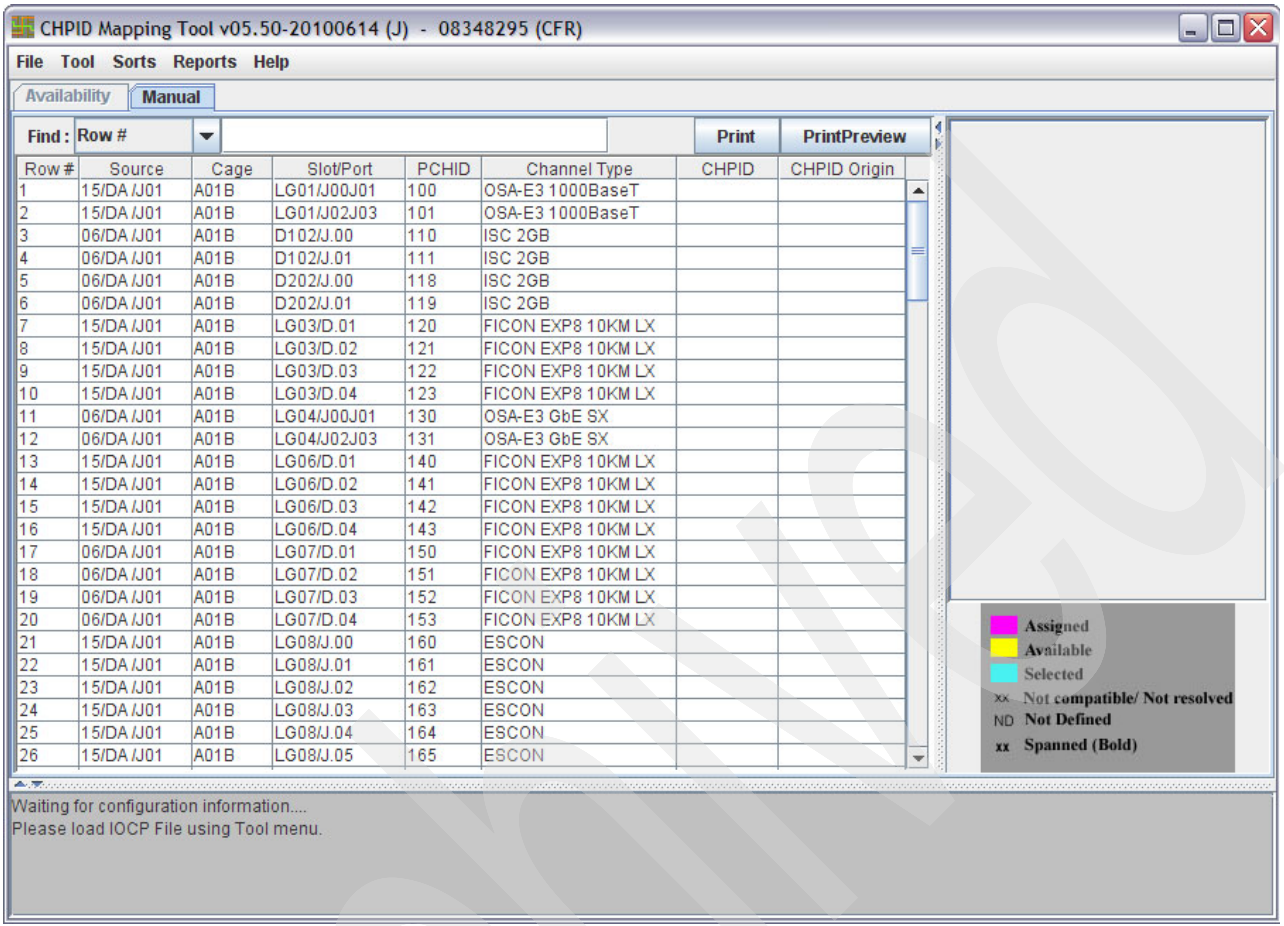
Look In: CMT data files

File Name: scenario1.cfr

Files of Type: CFReport Files (*.cfr)

Figure 4-46 Open CFReport file

Information from the `CFReport` file is displayed on the left side of the window (Figure 4-47).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA/J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA/J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA/J01	A01B	D102/J.00	110	ISC 2GB		
4	06/DA/J01	A01B	D102/J.01	111	ISC 2GB		
5	06/DA/J01	A01B	D202/J.00	118	ISC 2GB		
6	06/DA/J01	A01B	D202/J.01	119	ISC 2GB		
7	15/DA/J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA/J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA/J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA/J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA/J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX		
12	06/DA/J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA/J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA/J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA/J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA/J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA/J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX		
18	06/DA/J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA/J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA/J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA/J01	A01B	LG08/J.00	160	ESCON		
22	15/DA/J01	A01B	LG08/J.01	161	ESCON		
23	15/DA/J01	A01B	LG08/J.02	162	ESCON		
24	15/DA/J01	A01B	LG08/J.03	163	ESCON		
25	15/DA/J01	A01B	LG08/J.04	164	ESCON		
26	15/DA/J01	A01B	LG08/J.05	165	ESCON		

```
Waiting for configuration information....
Please load IOCP File using Tool menu.
```

Figure 4-47 Imported CFReport Order file

4.5.2 Importing the 2817 IOCP file into the CHPID Mapping Tool

To import the 2817 IOCP file into the CHPID Mapping Tool, perform the following steps:

1. Select **Tool** → **Import IOCP File** (Figure 4-48).

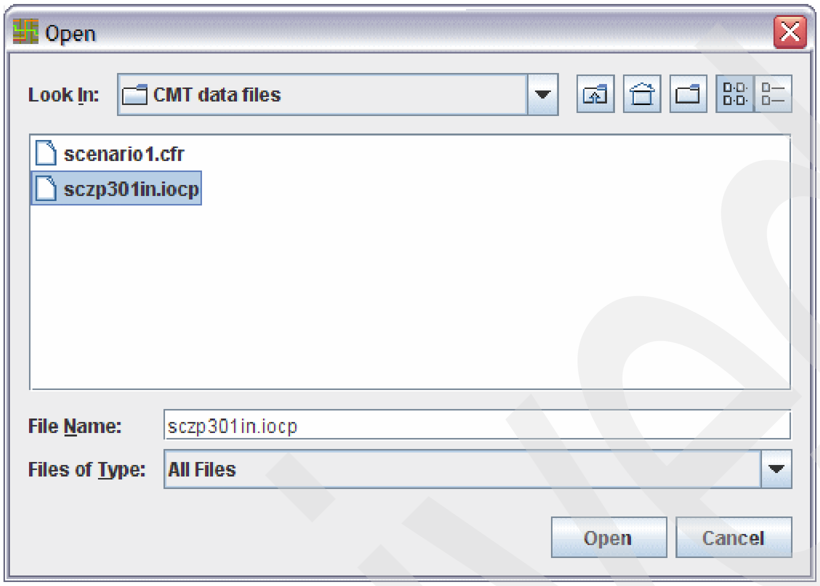


Figure 4-48 Import IOCP file

2. Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**.

In our example, the CHPID Mapping Tool issues the following output:

- Matching CHPID: This window lists all CHPIDs that are assigned with PCHIDs that have been moved during MES the upgrade. This window is for informational purposes only.
- Invalid CHPID: This window lists all the CHPIDs that have been found with Invalid PCHID values assigned in the IOCP Input file. PCHID may represent hardware that is not compatible with a given CHPID type, or there may be no hardware present at a given PCHID.
- HW Resolution: A few CHPIDs support more than one available channel type. Users should select the preferred channel type for any given CHPID. CHPIDs are grouped and displayed per CHPID type.
- CHPID Reset: The availability considers only CHPIDs that are not assigned with a PCHID. CHPIDs that already have PCHIDs assigned can be reset using this window.
- Reset CHPIDs assigned by Availability: Checking this option resets all CHPIDs that were processed by prior availability runs in this session.

  By default, this option is checked.
- Reset CHPIDs assigned by Manual Remap: Checking this option resets CHPIDs that were assigned a PCHID in the Manual window. If this option is not checked, then availability PCHIDs for these CHPIDs are not reset.

  By default, this option is clear.
- Reset CHPIDs assigned by the CHPID Mapping Tool for config files: The CFReport indicates that you are doing an MES/upgrade, and you have channels or CHPIDs (or both)

that might have configuration files currently associated with them. The MES/upgrade might be moving some of those channel cards.

Regardless of whether the channels are moving or not, the CHPID Mapping Tool either has assigned PCHIDs to the logical CHPID definitions to keep the CHPID definition associated with its current configuration file, or has moved the definition to the new location where the channel is moving.

If you reset the CHPID Mapping Tool assignments, it is your responsibility to have a backup of the configuration file data prior to the MES, and to restore that data to the new location (the PCHID where the affected CHPIDs are assigned) before you can use the CHPIDs.

By default, this option is clear.

- Reset CHPIDs assigned by IOCP: If some of the CHPIDs were assigned in the IOCP Input file, then checking this option resets the CHPIDs. Checking this option may require recabling after availability assignments.

  This option should be checked.

If none of the options are checked, availability only works on CHPIDs that do not have PCHIDs assigned.

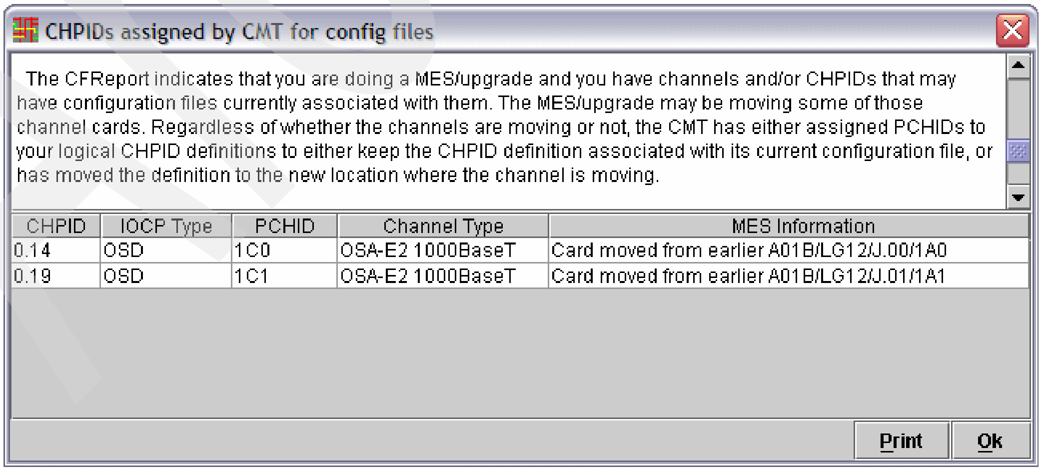
To give the CHPID Mapping Tool the most choices when using the availability option, we recommend that you choose **Reset all IOCP assigned PCHIDs**.

However, if you choose **Reset only the PCHID/hardware mismatch**, then review the intersects from availability processing carefully to ensure that preserving the prior CHPID-to-PCHID relationship is not causing unacceptable availability.

If you choose to run Availability mapping, this will reset any previously mapped CHPID assignments and could result in recabling of the server.

4.5.3 CHPIDs that might have configuration files associated

As shown in Figure 4-49, here you can see any PCHIDs that could potentially have configuration files associated with them. Click **OK**.



CHPIDs assigned by CMT for config files

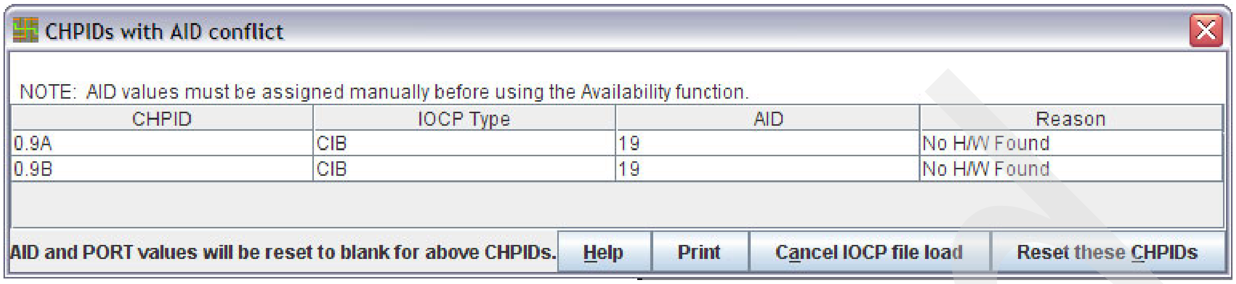
The CFReport indicates that you are doing a MES/upgrade and you have channels and/or CHPIDs that may have configuration files currently associated with them. The MES/upgrade may be moving some of those channel cards. Regardless of whether the channels are moving or not, the CMT has either assigned PCHIDs to your logical CHPID definitions to either keep the CHPID definition associated with its current configuration file, or has moved the definition to the new location where the channel is moving.

CHPID	IOCP Type	PCHID	Channel Type	MES Information
0.14	OSD	1C0	OSA-E2 1000BaseT	Card moved from earlier A01B/LG12/J.00/1A0
0.19	OSD	1C1	OSA-E2 1000BaseT	Card moved from earlier A01B/LG12/J.01/1A1

Figure 4-49 CHPIDs assigned by CMT

4.5.4 Resolving CHPIDs with AID conflicts

Now the CMT displays the CHPIDs with AID conflicts (Figure 4-50).



NOTE: AID values must be assigned manually before using the Availability function.

CHPID	IOCP Type	AID	Reason
0.9A	CIB	19	No H/W Found
0.9B	CIB	19	No H/W Found

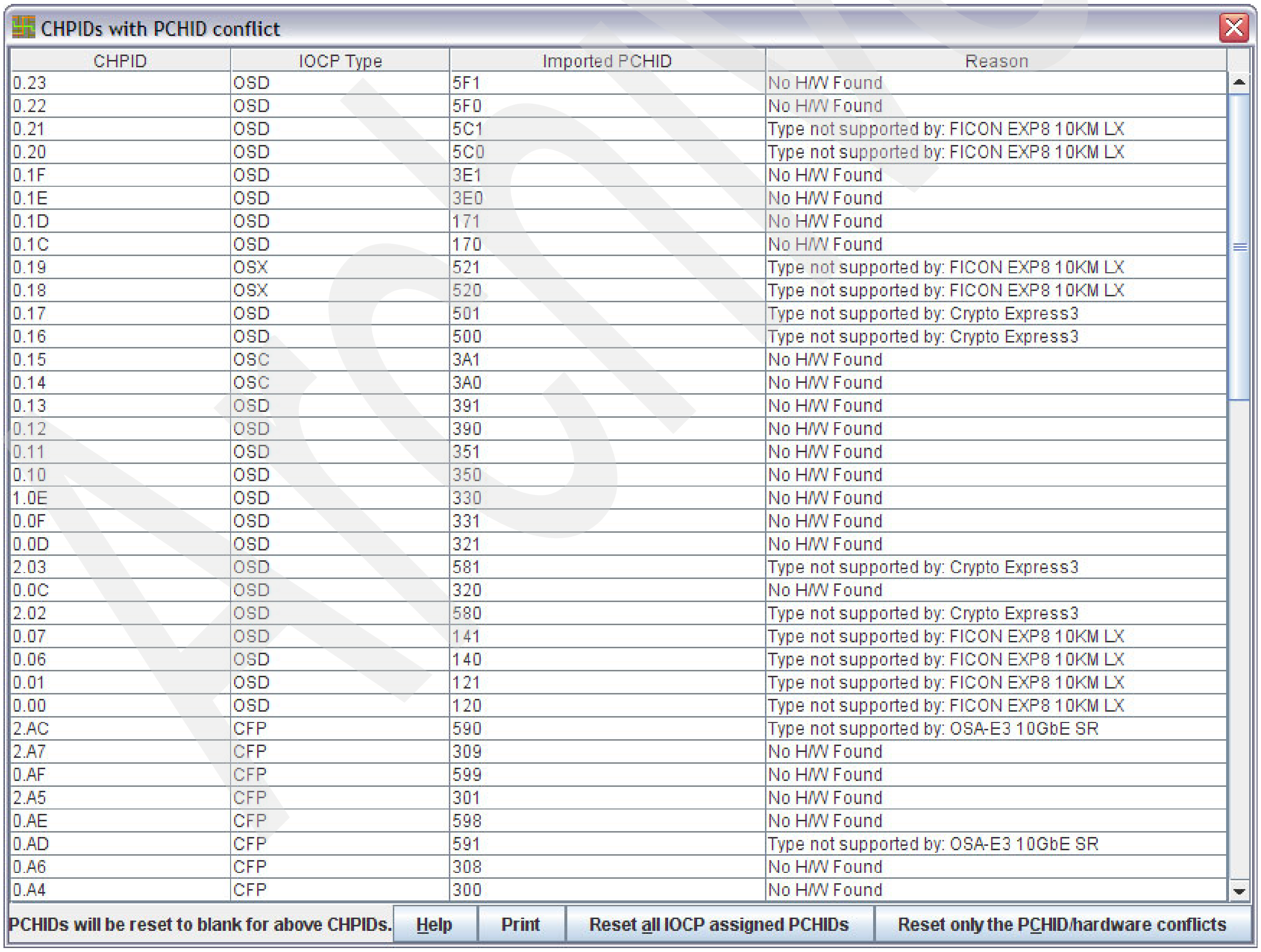
AID and PORT values will be reset to blank for above CHPIDs.

Figure 4-50 CHPIDs with AID conflicts

In our example, we selected **Reset these CHPIDs**.

4.5.5 Resolving CHPIDs with PCHID conflict

Now the CMT displays the CHPIDs with PCHID conflicts (Figure 4-51).



CHPID	IOCP Type	Imported PCHID	Reason
0.23	OSD	5F1	No H/W Found
0.22	OSD	5F0	No H/W Found
0.21	OSD	5C1	Type not supported by: FICON EXP8 10KM LX
0.20	OSD	5C0	Type not supported by: FICON EXP8 10KM LX
0.1F	OSD	3E1	No H/W Found
0.1E	OSD	3E0	No H/W Found
0.1D	OSD	171	No H/W Found
0.1C	OSD	170	No H/W Found
0.19	OSX	521	Type not supported by: FICON EXP8 10KM LX
0.18	OSX	520	Type not supported by: FICON EXP8 10KM LX
0.17	OSD	501	Type not supported by: Crypto Express3
0.16	OSD	500	Type not supported by: Crypto Express3
0.15	OSC	3A1	No H/W Found
0.14	OSC	3A0	No H/W Found
0.13	OSD	391	No H/W Found
0.12	OSD	390	No H/W Found
0.11	OSD	351	No H/W Found
0.10	OSD	350	No H/W Found
1.0E	OSD	330	No H/W Found
0.0F	OSD	331	No H/W Found
0.0D	OSD	321	No H/W Found
2.03	OSD	581	Type not supported by: Crypto Express3
0.0C	OSD	320	No H/W Found
2.02	OSD	580	Type not supported by: Crypto Express3
0.07	OSD	141	Type not supported by: FICON EXP8 10KM LX
0.06	OSD	140	Type not supported by: FICON EXP8 10KM LX
0.01	OSD	121	Type not supported by: FICON EXP8 10KM LX
0.00	OSD	120	Type not supported by: FICON EXP8 10KM LX
2.AC	CFP	590	Type not supported by: OSA-E3 10GbE SR
2.A7	CFP	309	No H/W Found
0.AF	CFP	599	No H/W Found
2.A5	CFP	301	No H/W Found
0.AE	CFP	598	No H/W Found
0.AD	CFP	591	Type not supported by: OSA-E3 10GbE SR
0.A6	CFP	308	No H/W Found
0.A4	CFP	300	No H/W Found

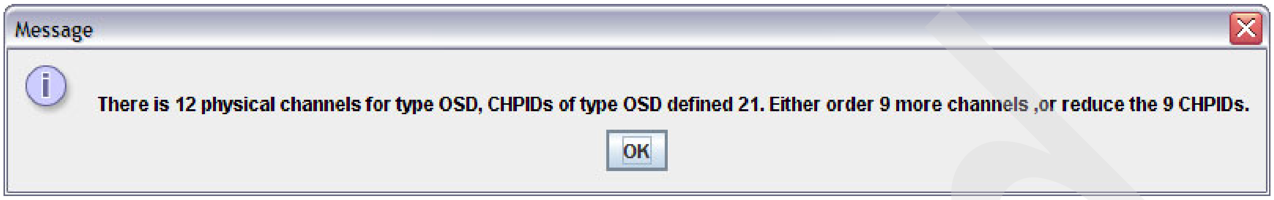
PCHIDs will be reset to blank for above CHPIDs.

Figure 4-51 CHPIDs with PCHID conflicts

In our example, we selected **Reset only the PCHID/hardware conflicts**.

4.5.6 Resolving CHPIDs without associated hardware

The CHPID Mapping Tool now displays messages about any CHPID types that were imported from the IOCP input file (IODF) into the CMT that do not have any associated hardware support in the CFReport file (Figure 4-52). Click **OK**.



There is 12 physical channels for type OSD, CHPIDs of type OSD defined 21. Either order 9 more channels ,or reduce the 9 CHPIDs.

Figure 4-52 Required Hardware unavailable

The following message is issued:

CHPIDs with invalid/incompatible hardware found.

We left excessive numbers of CHPID types *OSD* in our IODF to show how the CHPID Mapping Tool would handle this condition and to provide an opportunity to explain how you can resolve this situation. Refer to 4.2.8, “Overdefining channel paths on an XMP processor” on page 154 for more information about this topic.

This is an example of where you can use this option to change the PCHID value to an asterisk (*) in the IODF, if you should still want to retain the OSD CHPID definitions in the IODF and expect to have OSD CHPIDs installed in the processor at a later date.

> **Note:** Other CHPID types can also be *overdefined* by entering an asterisk (*) for the PCHID value. Overdefining is now supported for CIB type CHPID definitions.

Alternatively, you could remove the OSD CHPID definitions from the IODF.

To continue with this example, perform the following steps:

1. Go back to the IODF and change the PCHID values for the OSD CHPIDs (or any other CHPIDs that have no supporting hardware in the CFReport) to an asterisk (*).
2. Re-validate the IODF by using HCD Option 2.12.
3. Recreate the IOCP statements file and transfer it to your workstation.
4. Import the IOCP file by selecting **Tool** → **Import IOCP File**.

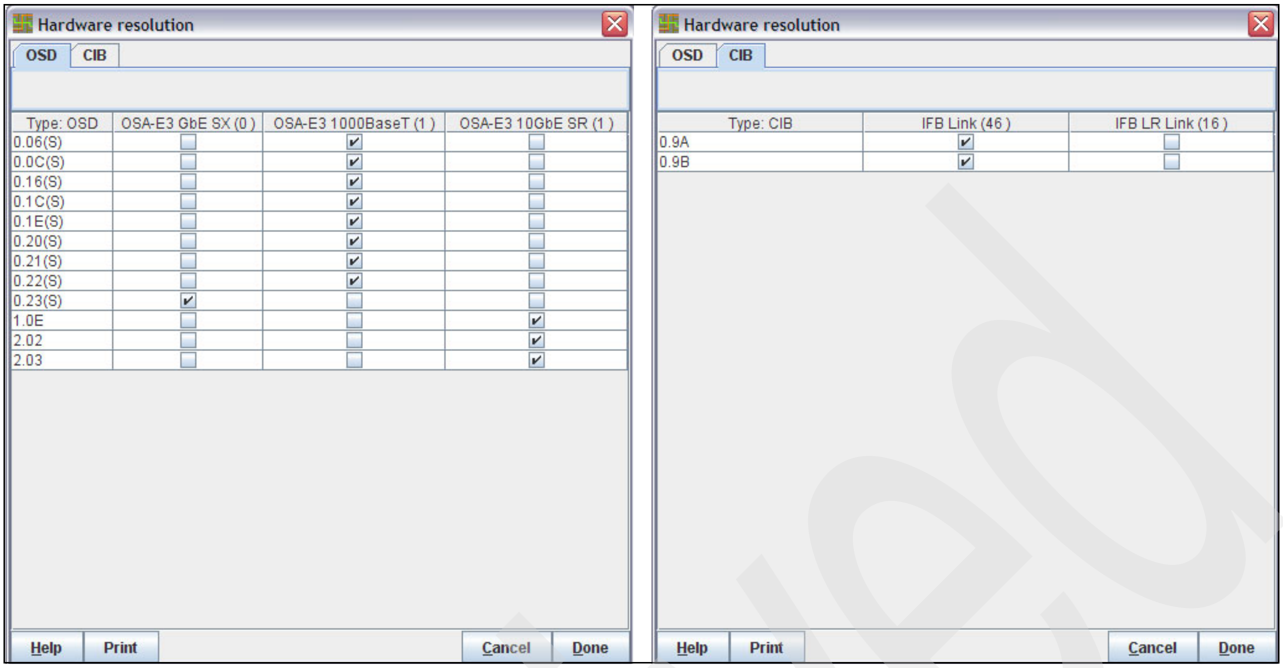
> **Note**: If you look at the IOCP statements file now, note that the OSD CHPIDs have been omitted from the file, but are still defined in the IODF.

Now when you click **Reset only the PCHID/hardware conflicts**, the CHPID Mapping Tool asks you to resolve some hardware.

4.5.7 Hardware resolution

The CHPID Mapping Tool might prompt you to resolve issues that might arise from importing the IOCP file. In our example, the CHPID Mapping Tool wanted clarification on the TYPE=OSD and TYPE=CIB channels.

In each case, we must check off for what each of the channels is used (Figure 4-53).



Type: OSD	OSA-E3 GbE SX (0)	OSA-E3 1000BaseT (1)	OSA-E3 10GbE SR (1)
0.06(S)	☐	☑	☐
0.0C(S)	☐	☑	☐
0.16(S)	☐	☑	☐
0.1C(S)	☐	☑	☐
0.1E(S)	☐	☑	☐
0.20(S)	☐	☑	☐
0.21(S)	☐	☑	☐
0.22(S)	☐	☑	☐
0.23(S)	☑	☐	☐
1.0E	☐	☐	☑
2.02	☐	☐	☑
2.03	☐	☐	☑

Type: CIB	IFB Link (46)	IFB LR Link (16)
0.9A	☑	☐
0.9B	☑	☐

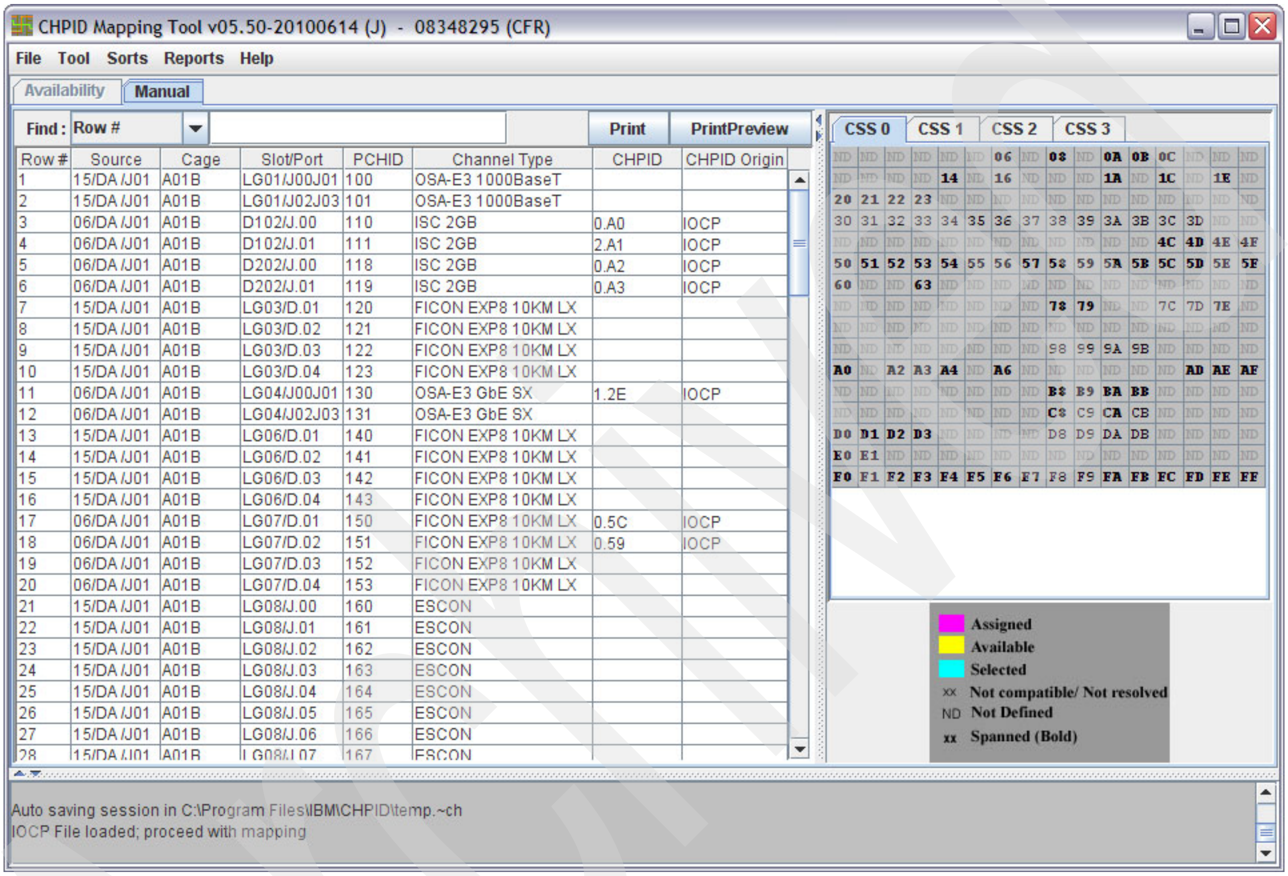
Figure 4-53 Hardware resolution after IOCP import

Perform the following steps:

1. Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the OSD CHPID definitions use between the OSA-Express3 GbE, OSA-Express3 100BaseT, and OSA-Express3 10 GbE. Select the desired box and move to the next tab until all CHPID definitions have hardware selected (Figure 4-54).

   The CHPID Mapping Tool displays all of the information that it currently knows.

2. Click **Done** when all the selections have been made.



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.A0	IOCP
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.A1	IOCP
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A2	IOCP
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	0.A3	IOCP
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	1.2E	IOCP
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.5C	IOCP
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX	0.59	IOCP
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON		
22	15/DA /J01	A01B	LG08/J.01	161	ESCON		
23	15/DA /J01	A01B	LG08/J.02	162	ESCON		
24	15/DA /J01	A01B	LG08/J.03	163	ESCON		
25	15/DA /J01	A01B	LG08/J.04	164	ESCON		
26	15/DA /J01	A01B	LG08/J.05	165	ESCON		
27	15/DA /J01	A01B	LG08/J.06	166	ESCON		
28	15/DA /J01	A01B	LG08/J.07	167	ESCON		

ND	ND	ND	ND	ND	ND	06	ND	08	ND	0A	0B	0C	ND	ND	ND
ND	ND	ND	ND	14	ND	16	ND	ND	ND	1A	ND	1C	ND	1E	ND
20	21	22	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	ND	ND	63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	78	79	ND	ND	7C	7D	7E	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	A2	A3	A4	ND	A6	ND	ND	ND	ND	ND	ND	AD	AE	AF
ND	ND	ND	ND	ND	ND	ND	ND	B8	B9	BA	BB	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	C8	C9	CA	CB	ND	ND	ND	ND
D0	D1	D2	D3	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	E1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

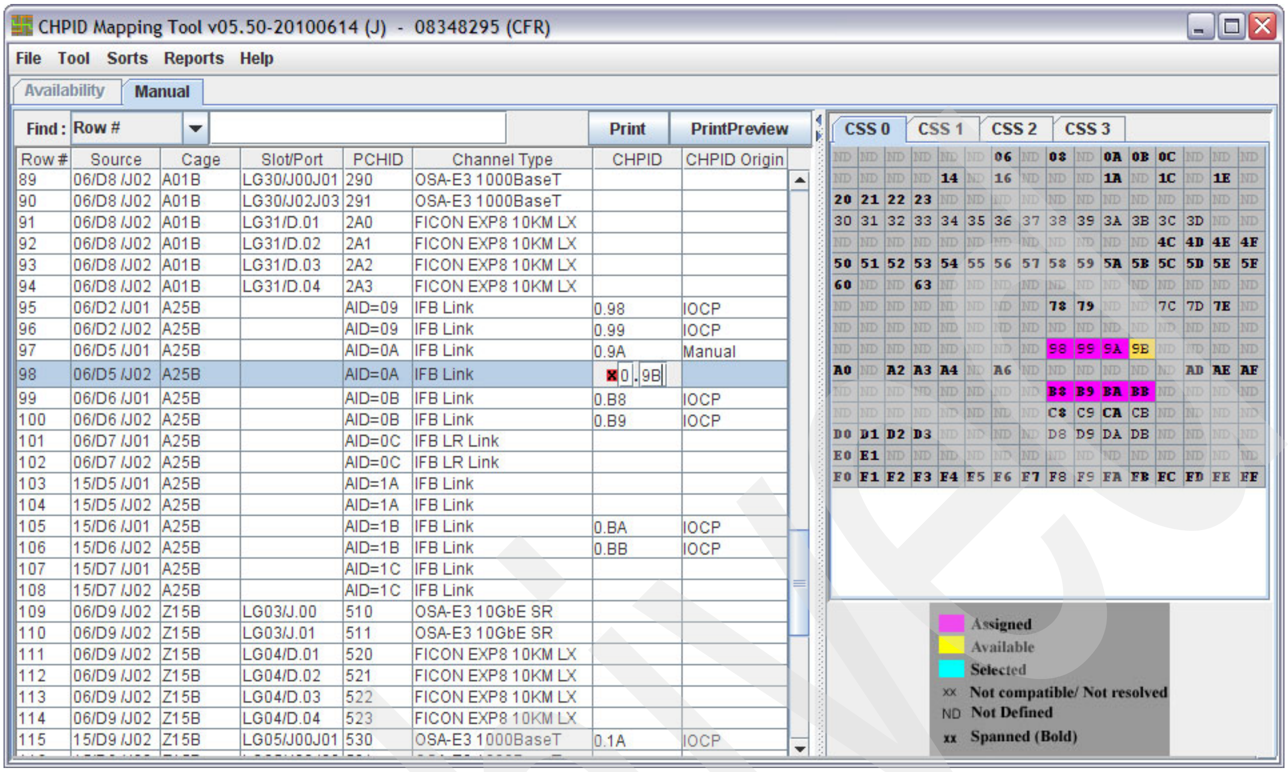
Auto saving session in C:\Program Files\IBM\CHPID\temp.~ch
IOCP File loaded; proceed with mapping

Figure 4-54 Manual tab

4.5.8 Manual mapping to resolve CIB CHPIDs

Observe that the Availability tab is disabled. You cannot use availability mapping until all CIB CHPIDs are resolved. You can use manual mapping to perform this task.

To resolve the CIB CHPIDS, you must assign all the available CHPIDs for these rows (Figure 4-55).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
89	06/D8 /J02	A01B	LG30/J00J01	290	OSA-E3 1000BaseT		
90	06/D8 /J02	A01B	LG30/J02J03	291	OSA-E3 1000BaseT		
91	06/D8 /J02	A01B	LG31/D.01	2A0	FICON EXP8 10KM LX		
92	06/D8 /J02	A01B	LG31/D.02	2A1	FICON EXP8 10KM LX		
93	06/D8 /J02	A01B	LG31/D.03	2A2	FICON EXP8 10KM LX		
94	06/D8 /J02	A01B	LG31/D.04	2A3	FICON EXP8 10KM LX		
95	06/D2 /J01	A25B		AID=09	IFB Link	0.98	IOCP
96	06/D2 /J02	A25B		AID=09	IFB Link	0.99	IOCP
97	06/D5 /J01	A25B		AID=0A	IFB Link	0.9A	Manual
98	06/D5 /J02	A25B		AID=0A	IFB Link	☒ 0.9B	
99	06/D6 /J01	A25B		AID=0B	IFB Link	0.B8	IOCP
100	06/D6 /J02	A25B		AID=0B	IFB Link	0.B9	IOCP
101	06/D7 /J01	A25B		AID=0C	IFB LR Link		
102	06/D7 /J02	A25B		AID=0C	IFB LR Link		
103	15/D5 /J01	A25B		AID=1A	IFB Link		
104	15/D5 /J02	A25B		AID=1A	IFB Link		
105	15/D6 /J01	A25B		AID=1B	IFB Link	0.BA	IOCP
106	15/D6 /J02	A25B		AID=1B	IFB Link	0.BB	IOCP
107	15/D7 /J01	A25B		AID=1C	IFB Link		
108	15/D7 /J02	A25B		AID=1C	IFB Link		
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR		
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR		
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX		
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX		
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX		
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX		
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT	0.1A	IOCP

ND	ND	ND	ND	ND	ND	**06**	ND	**08**	ND	**0A**	**0B**	**0C**	ND	ND	ND
ND	ND	ND	ND	**14**	ND	**16**	ND	ND	ND	**1A**	ND	**1C**	ND	**1E**	ND
20	**21**	**22**	**23**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**4C**	**4D**	**4E**	**4F**
50	**51**	**52**	**53**	**54**	55	56	57	58	59	**5A**	**5B**	**5C**	**5D**	**5E**	**5F**
60	ND	ND	**63**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	**78**	**79**	ND	ND	7C	7D	**7E**	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	**A2**	**A3**	**A4**	ND	A6	ND	ND	ND	ND	ND	ND	AD	**AE**	**AF**
ND	ND	ND	ND	ND	ND	ND	ND	**B8**	**B9**	**BA**	**BB**	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	C8	C9	**CA**	CB	ND	ND	ND	ND
D0	**D1**	**D2**	**D3**	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	**E1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	**F1**	**F2**	**F3**	**F4**	F5	F6	**F7**	F8	F9	FA	**FB**	**FC**	**FD**	FE	**FF**

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

Figure 4-55 Manual mapping to resolve CIB CHPIDs

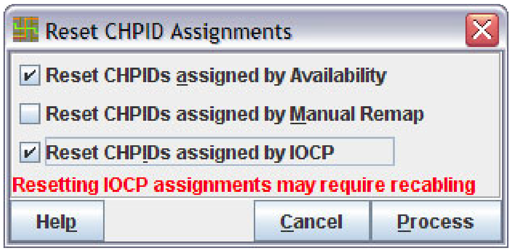
4.5.9 Processing the CU Priority values

If you are importing an IOCP statements file from a 2094 or 2097 that had CU Priority values defined, you may want to review the CU Priority values beforehand. The CHPID Mapping Tool can then perform the availability functions appropriately for a 2817.

Perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority**. The Reset CHPID Assignment window appears and allows you to reset previously assigned PCHIDs:
   - Reset CHPIDs assigned by Availability.
   - Reset CHPIDs assigned by Manual Remap.
   - Reset CHPIDs assigned by IOCP.

In our example, we selected **Reset CHPIDs assigned by Availability** and **Reset CHPIDs assigned by IOCP** (Figure 4-56).



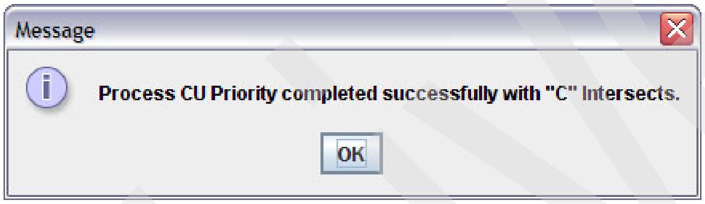
☑ Reset CHPIDs assigned by Availability
☐ Reset CHPIDs assigned by Manual Remap
☑ Reset CHPIDs assigned by IOCP

Resetting IOCP assignments may require recabling

Figure 4-56 Reset CHPID Assignments

The 2817 has different availability rules than the 2094 and 2097, so we need to remove all PCHIDs assignments that were still in the IOCP.

3. Click **Process**. After the CHPID Mapping Tool has reset the CHPIDs, it displays a message indicating the results of the process (Figure 4-57).



Process CU Priority completed successfully with "C" Intersects.

Figure 4-57 Process CU Priority completion message

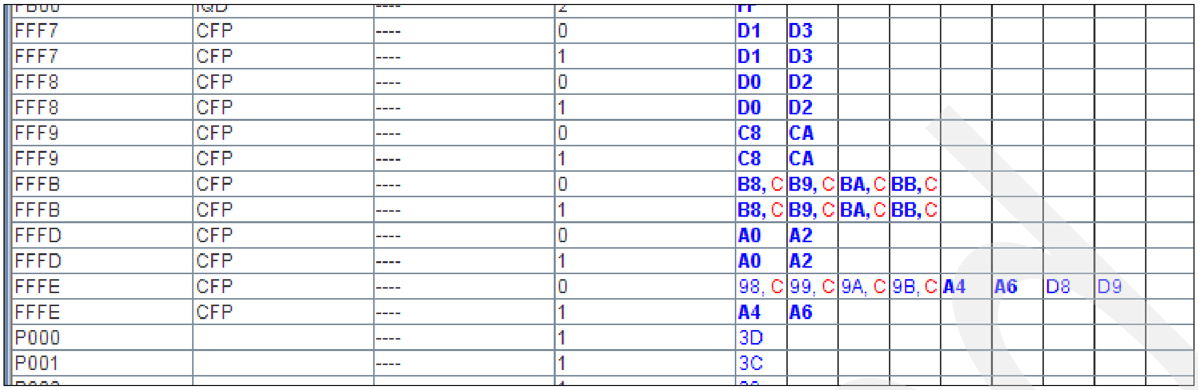
The following list defines the possible intersects:

C	Two or more assigned channels use the same channel card.
S	More than half the assigned channels use the same STI.
M	All assigned channels are supported by the same MBA group.
B	More than half the assigned channels are supported by the same book.
D	Assigned channels are on the same daughter card.

Our example returned the “C” intersect.

> **Note:** Intersect messages inform you of a potential availability problem detected by the CMT, but do not necessarily indicate an error. It is your responsibility to evaluate whether the condition should be corrected.

4. Click **OK**. Scroll through the CMT listing until you find the intersect warnings and decide whether they are acceptable or not (Figure 4-58).



FFF7	CFP	----	0	D1	D3							
FFF7	CFP	----	1	D1	D3							
FFF8	CFP	----	0	D0	D2							
FFF8	CFP	----	1	D0	D2							
FFF9	CFP	----	0	C8	CA							
FFF9	CFP	----	1	C8	CA							
FFFB	CFP	----	0	B8, C	B9, C	BA, C	BB, C					
FFFB	CFP	----	1	B8, C	B9, C	BA, C	BB, C					
FFFD	CFP	----	0	A0	A2							
FFFD	CFP	----	1	A0	A2							
FFFE	CFP	----	0	98, C	99, C	9A, C	9B, C	A4	A6	D8	D9	
FFFE	CFP	----	1	A4	A6							
P000		----	1	3D								
P001		----	1	3C								

Figure 4-58 C Intersect examples

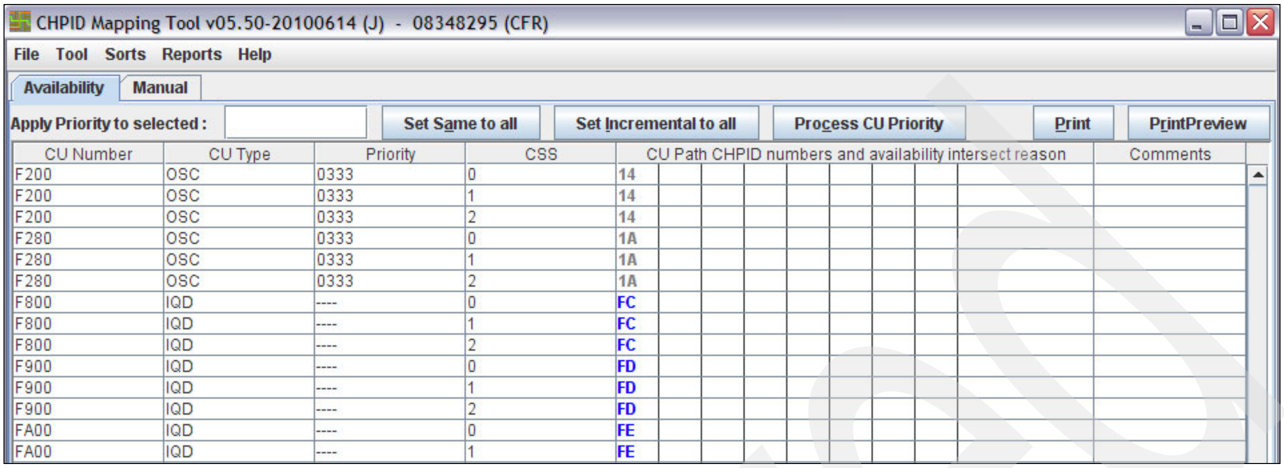
5. You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

> **Note:** The control unit priorities are stored in the IOCP output file created by the CMT that gets migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck.
>
> They are in the form of commented lines at the end of the IOCP deck, as shown here:
>
> ```
> *CMT* VERSION=000
> *CMT* CCN=27132026(CFR from ResourceLink)
> *CMT* 8000.0=0010,8000.1=0010,8000.2=0010,8100.0=0010,8100.1=0010
> *CMT* 8100.2=0010,8200.0=0010,8200.1=0010,8200.2=0010,8300.0=0010
> *CMT* 8300.1=0010,8300.2=0010,8400.0=0010,8400.1=0010,8400.2=0010
> *CMT* 8500.0=0010,8500.1=0010,8500.2=0010,8600.0=0010,8600.1=0010
> *CMT* 8600.2=0010,8700.0=0010,8700.1=0010,8700.2=0010,C400.0=0020
> *CMT* C400.1=0020,C400.2=0020,C500.0=0020,C500.1=0020,C500.2=0020
> *CMT* C600.0=0020,C600.1=0020,C600.2=0020,C700.0=0020,C700.1=0020
> *CMT* C700.2=0020
> ```

Our example does not contain any CU Priority values, but this example illustrates how CU Priority values are represented in the IOCP file.

6. You need to check and set values for items such as OSA-ICC CHPIDs and FCTC CHPIDs to ensure that the CHPID Mapping Tool allocates these CHPIDs with high PCHID availability.

Page through the listing and search through the column CU Number for any control units for which you want to set a priority. In our example, we set the OSC type CU Numbers to priority 333 (Figure 4-59).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason	Comments
F200	OSC	0333	0	14	
F200	OSC	0333	1	14	
F200	OSC	0333	2	14	
F280	OSC	0333	0	1A	
F280	OSC	0333	1	1A	
F280	OSC	0333	2	1A	
F800	IQD	----	0	FC	
F800	IQD	----	1	FC	
F800	IQD	----	2	FC	
F900	IQD	----	0	FD	
F900	IQD	----	1	FD	
F900	IQD	----	2	FD	
FA00	IQD	----	0	FE	
FA00	IQD	----	1	FE	

Figure 4-59 Set CU Priority

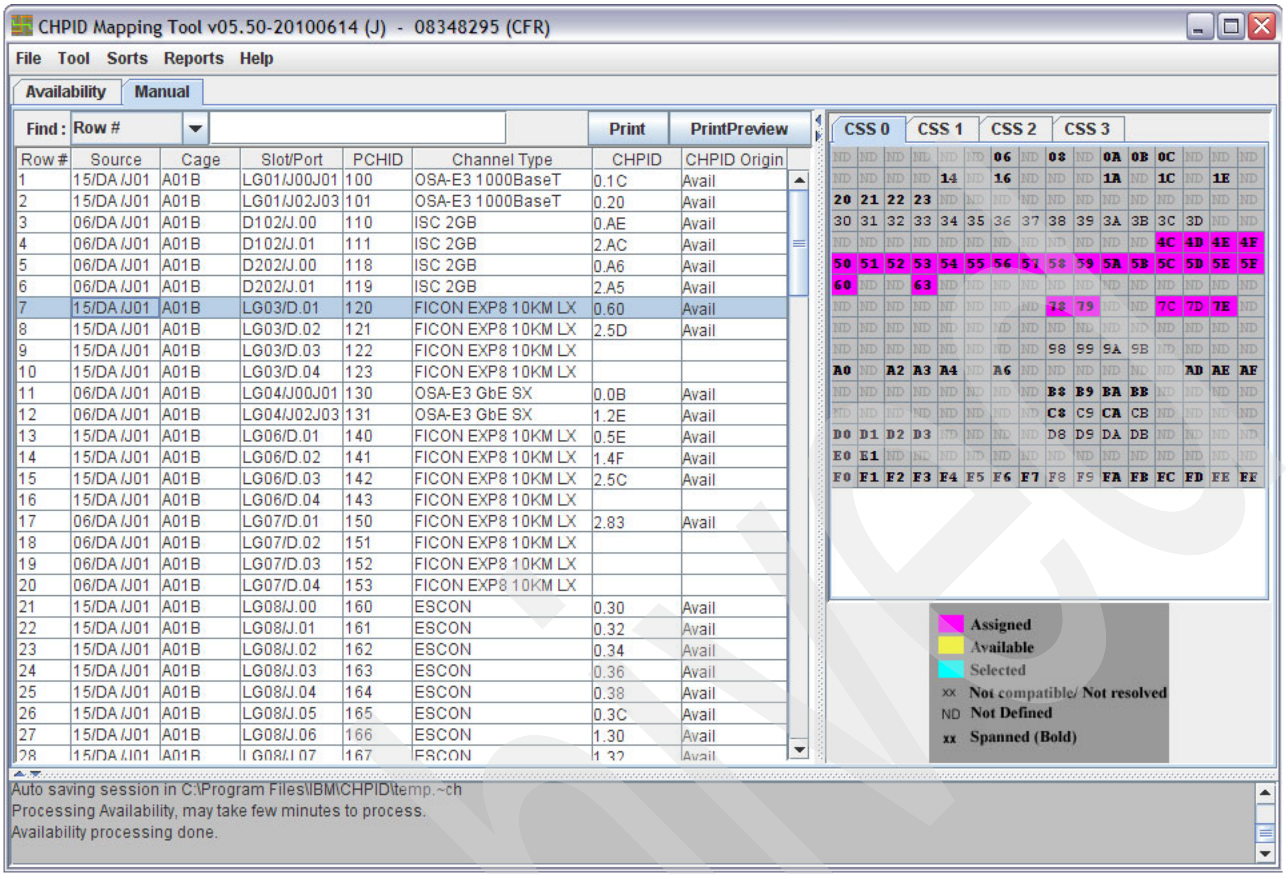
If there are coupling links used by a CF image, you should group these links.

Each set of CHPIDs going to a different CPC should be grouped with a common priority. For example, suppose the CF image has four links (CHPIDs 40, 41, 42, and 43) and that 40 and 41 go to one CPC, and 42 and 43 go to a different CPC. In this case, you should give CHPIDs 40 and 41 one priority and CHPIDs 42 and 43 a different priority. The concept is the same regardless of the number of connecting CPCs or the number of links to each CPC.

7. Under the File menu, click the **Availability** tab again.
8. Click **Process CU Priority** and a window opens. This window, the Reset CHPID Assignment window, allows you to change the CHPID values:
   - Reset CHPIDs assigned by Availability.
   - Reset CHPIDs assigned by Manual Remap.
   - Reset CHPIDs assigned by IOCP.

   In our example, we selected **Reset CHPIDs assigned by Availability**.
9. Click **Process** and then select **Sorts** → **By CU Priority**. Note that the OSC type control units with priority of 333 have been sorted to the top of the list.

10.Select the **Manual** tab. Figure 4-60 shows the results of mapping the CHPIDs.



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	1.4F	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	2.5C	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	2.83	Avail
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON	0.30	Avail
22	15/DA /J01	A01B	LG08/J.01	161	ESCON	0.32	Avail
23	15/DA /J01	A01B	LG08/J.02	162	ESCON	0.34	Avail
24	15/DA /J01	A01B	LG08/J.03	163	ESCON	0.36	Avail
25	15/DA /J01	A01B	LG08/J.04	164	ESCON	0.38	Avail
26	15/DA /J01	A01B	LG08/J.05	165	ESCON	0.3C	Avail
27	15/DA /J01	A01B	LG08/J.06	166	ESCON	1.30	Avail
28	15/DA /J01	A01B	LG08/J.07	167	ESCON	1.32	Avail

ND	ND	ND	ND	ND	ND	06	ND	08	ND	0A	0B	0C	ND	ND	ND
ND	ND	ND	ND	14	ND	16	ND	ND	ND	1A	ND	1C	ND	1E	ND
20	21	22	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	ND	ND	63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	78	79	ND	ND	7C	7D	7E	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	A2	A3	A4	ND	A6	ND	ND	ND	ND	ND	ND	AD	AE	AF
ND	ND	ND	ND	ND	ND	ND	ND	B8	B9	BA	BB	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	C8	C9	CA	CB	ND	ND	ND	ND
D0	D1	D2	D3	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	E1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

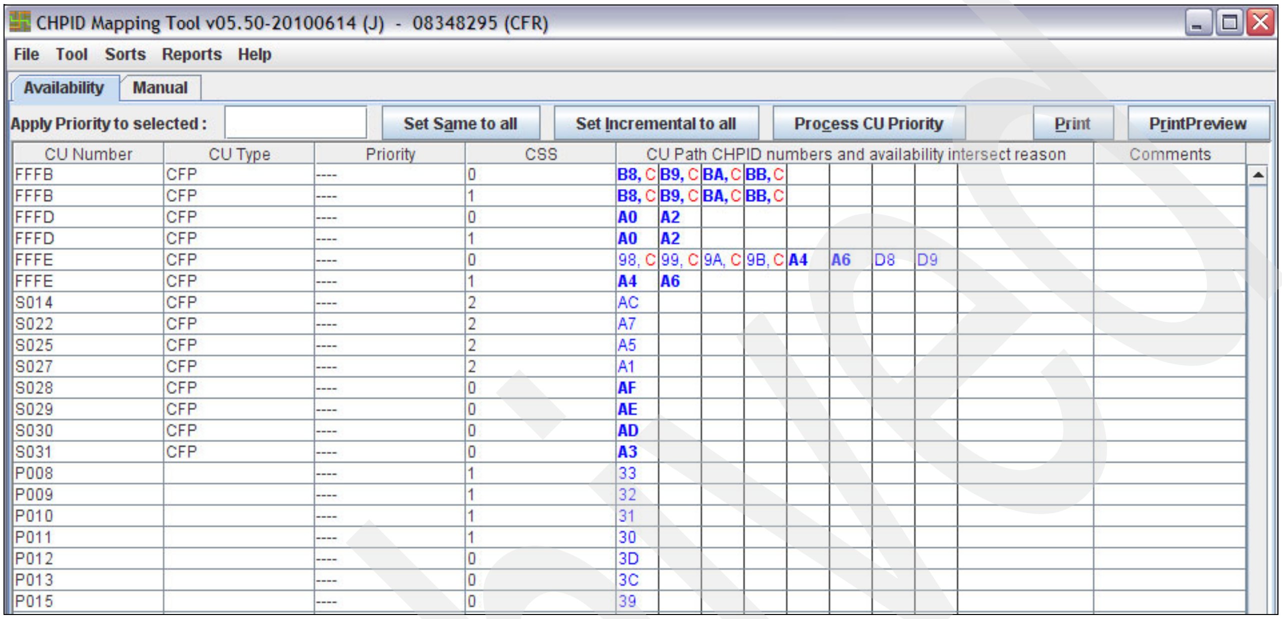
```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~ch
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 4-60 Manual (CHPIDs assigned)

As you can see, the CHPID and CHPID Origin columns are no longer blank. The CMT has assigned CHPIDs to PCHIDs and it has placed the Avail value in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

4.5.10 CHPIDs not connected to control units

Under the Availability tab, select **Sorts** → **By Control Unit**. The CHPID Mapping Tool displays, at the end of the list, all CHPIDs defined in the IOCP input that are not connected to control units. All coupling CHPIDs in this list are preceded with an “S” in the CU Number column (not shown in the following figure). All non-coupling CHPIDs are preceded with a “P” (Figure 4-61).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason									Comments
FFFB	CFP	----	0	B8, C	B9, C	BA, C	BB, C						
FFFB	CFP	----	1	B8, C	B9, C	BA, C	BB, C						
FFFD	CFP	----	0	A0	A2								
FFFD	CFP	----	1	A0	A2								
FFFE	CFP	----	0	98, C	99, C	9A, C	9B, C	A4	A6	D8	D9		
FFFE	CFP	----	1	A4	A6								
S014	CFP	----	2	AC									
S022	CFP	----	2	A7									
S025	CFP	----	2	A5									
S027	CFP	----	2	A1									
S028	CFP	----	0	AF									
S029	CFP	----	0	AE									
S030	CFP	----	0	AD									
S031	CFP	----	0	A3									
P008		----	1	33									
P009		----	1	32									
P010		----	1	31									
P011		----	1	30									
P012		----	0	3D									
P013		----	0	3C									
P015		----	0	39									

Figure 4-61 Sort by Control Unit

You should review the list because:

- You may have forgotten to add a CHPID to a control unit and may need to update the IOCP source before continuing in the CHPID Mapping Tool.
- The unconnected CHPIDs might be extra channels you are ordering in anticipation of new control units.
- The unconnected CHPIDs may be coupling links that are being used in coupling facility (CF) images (they do not require control units).

If there are extra CHPIDs for anticipated new control units, you may want to group these CHPIDs with a common priority, which allows the availability mapping function to pick PCHIDs that can afford your new control unit availability.

4.5.11 Creating reports

The CHPID Mapping Tool offers built-in reports, which are available from the Reports drop-down menu. You can also print the information from the Availability tab or the Manual tab by clicking **Print**. When in the Availability tab, you can enter information in the comments column that might be useful at a later date.

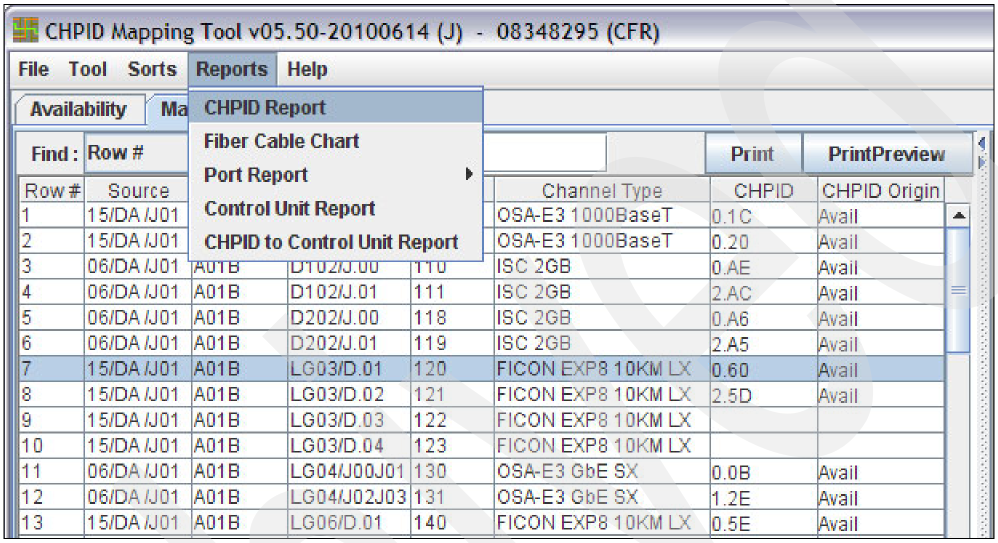
For simplicity, we only describe how to print three reports in this example (the CHPID Report, the Port Report, Sorted by Location, and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

The person who installs the I/O cables during system installation needs one of these reports. The Port Report, sorted by location, is recommended. The installer can use this report to help with labelling the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

CHPID Report

To create the CHPID report, perform the following steps:

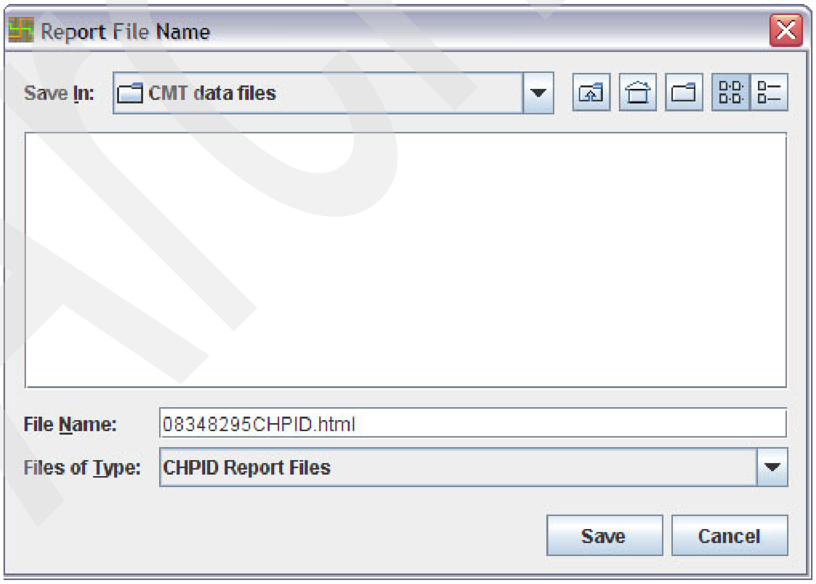
1. Select **Reports** → **CHPID Report** (Figure 4-62).



Row #	Source				Channel Type	CHPID	CHPID Origin
1	15/DA /J01				OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01				OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail

Figure 4-62 Select CHPID Report

2. Enter the Report File Name (or accept the default name offered by CMT) and click **Save** (Figure 4-63).



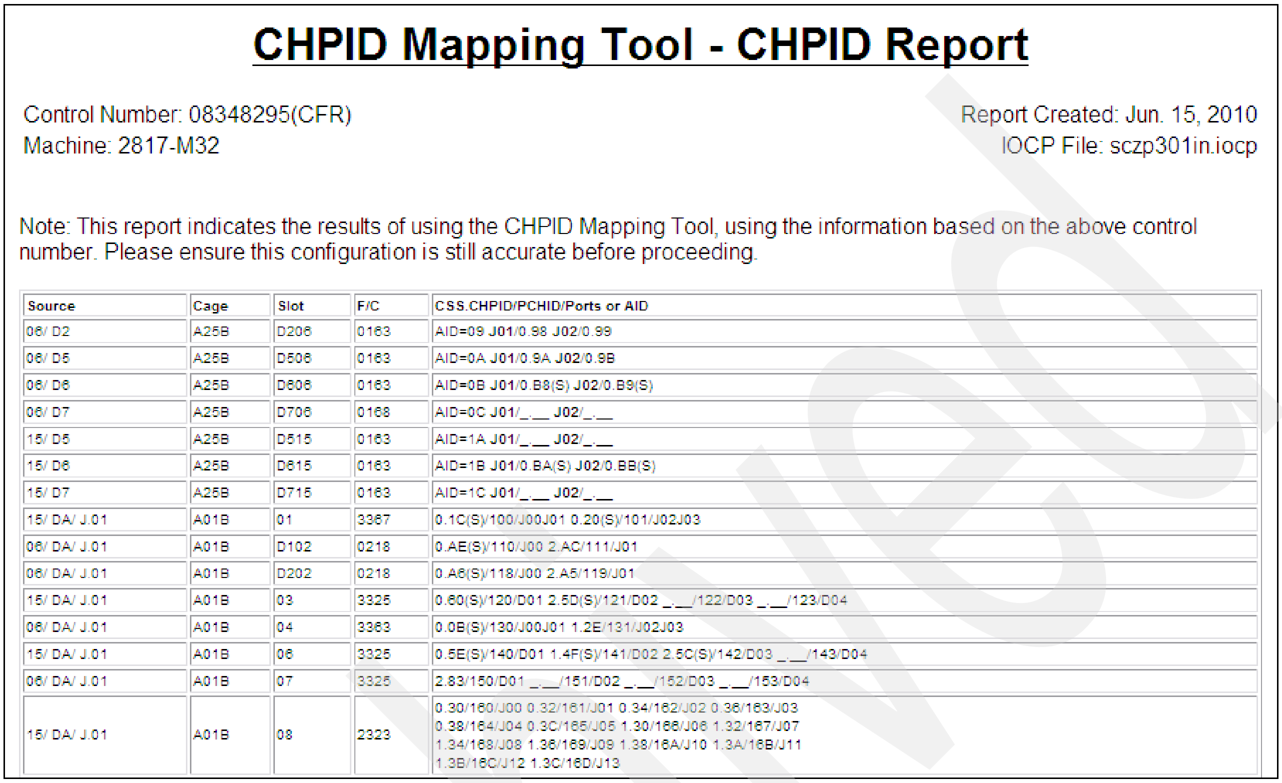
Save In: CMT data files

File Name: 08348295CHPID.html

Files of Type: CHPID Report Files

Figure 4-63 Report File Name

3. The CHPID Mapping Tool opens a browser window with the CHPID report (Figure 4-64). You might be prompted to accept active content; accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID Report

Control Number: 08348295(CFR)
Machine: 2817-M32

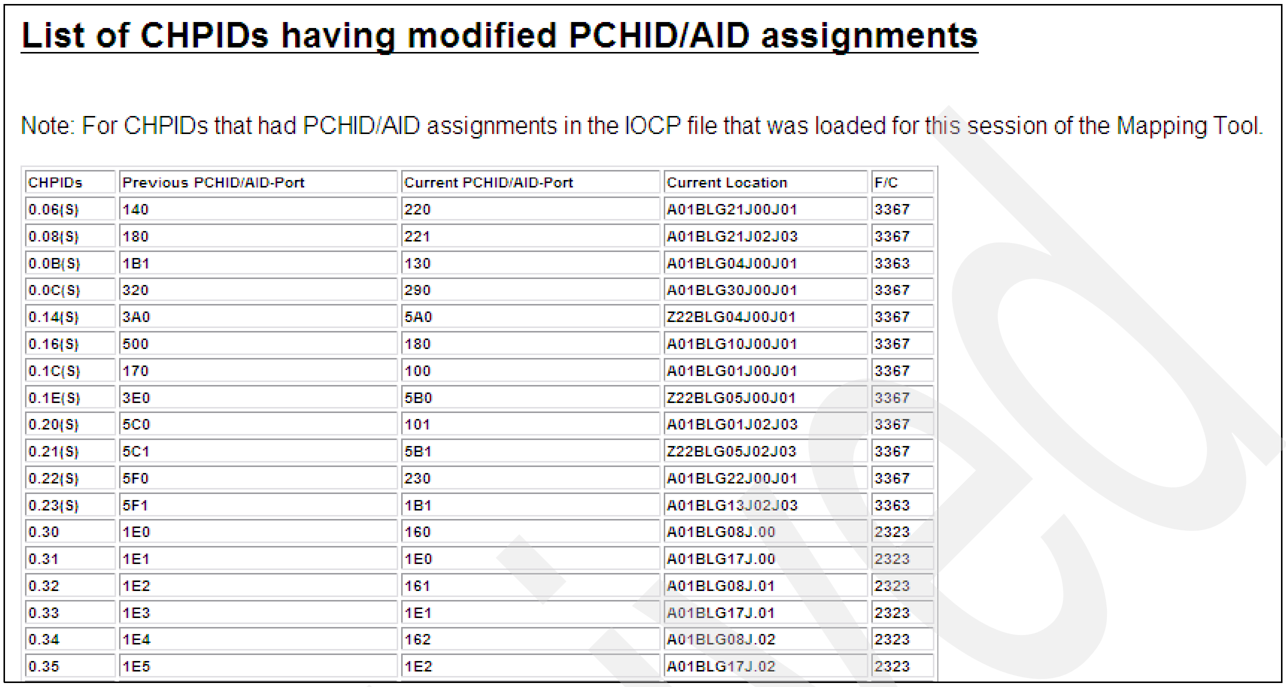
Report Created: Jun. 15, 2010
IOCP File: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Source	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports or AID
06/ D2	A25B	D206	0163	AID=09 **J01**/0.98 **J02**/0.99
06/ D5	A25B	D506	0163	AID=0A **J01**/0.9A **J02**/0.9B
06/ D6	A25B	D606	0163	AID=0B **J01**/0.B8(S) **J02**/0.B9(S)
06/ D7	A25B	D706	0168	AID=0C **J01**/_.__ **J02**/_.__
15/ D5	A25B	D515	0163	AID=1A **J01**/_.__ **J02**/_.__
15/ D6	A25B	D615	0163	AID=1B **J01**/0.BA(S) **J02**/0.BB(S)
15/ D7	A25B	D715	0163	AID=1C **J01**/_.__ **J02**/_.__
15/ DA/ J.01	A01B	01	3367	0.1C(S)/100/J00J01 0.20(S)/101/J02J03
06/ DA/ J.01	A01B	D102	0218	0.AE(S)/110/J00 2.AC/111/J01
06/ DA/ J.01	A01B	D202	0218	0.A6(S)/118/J00 2.A5/119/J01
15/ DA/ J.01	A01B	03	3325	0.60(S)/120/D01 2.5D(S)/121/D02 _.__/122/D03 _.__/123/D04
06/ DA/ J.01	A01B	04	3363	0.0B(S)/130/J00J01 1.2E/131/J02J03
15/ DA/ J.01	A01B	06	3325	0.5E(S)/140/D01 1.4F(S)/141/D02 2.5C(S)/142/D03 _.__/143/D04
06/ DA/ J.01	A01B	07	3325	2.83/150/D01 _.__/151/D02 _.__/152/D03 _.__/153/D04
15/ DA/ J.01	A01B	08	2323	0.30/160/J00 0.32/161/J01 0.34/162/J02 0.36/163/J03 0.38/164/J04 0.3C/165/J05 1.30/166/J06 1.32/167/J07 1.34/168/J08 1.36/169/J09 1.38/16A/J10 1.3A/16B/J11 1.3B/16C/J12 1.3C/16D/J13

Figure 4-64 CHPID Report

At the end of this CHPID report there is a list of CHPIDs with modified PCHID/AID assignments (Figure 4-65). This report is valuable for moving cables.



List of CHPIDs having modified PCHID/AID assignments

Note: For CHPIDs that had PCHID/AID assignments in the IOCP file that was loaded for this session of the Mapping Tool.

CHPIDs	Previous PCHID/AID-Port	Current PCHID/AID-Port	Current Location	F/C
0.06(S)	140	220	A01BLG21J00J01	3367
0.08(S)	180	221	A01BLG21J02J03	3367
0.0B(S)	1B1	130	A01BLG04J00J01	3363
0.0C(S)	320	290	A01BLG30J00J01	3367
0.14(S)	3A0	5A0	Z22BLG04J00J01	3367
0.16(S)	500	180	A01BLG10J00J01	3367
0.1C(S)	170	100	A01BLG01J00J01	3367
0.1E(S)	3E0	5B0	Z22BLG05J00J01	3367
0.20(S)	5C0	101	A01BLG01J02J03	3367
0.21(S)	5C1	5B1	Z22BLG05J02J03	3367
0.22(S)	5F0	230	A01BLG22J00J01	3367
0.23(S)	5F1	1B1	A01BLG13J02J03	3363
0.30	1E0	160	A01BLG08J.00	2323
0.31	1E1	1E0	A01BLG17J.00	2323
0.32	1E2	161	A01BLG08J.01	2323
0.33	1E3	1E1	A01BLG17J.01	2323
0.34	1E4	162	A01BLG08J.02	2323
0.35	1E5	1E2	A01BLG17J.02	2323

Figure 4-65 List of CHPIDs having modified PCHID/AID assignments

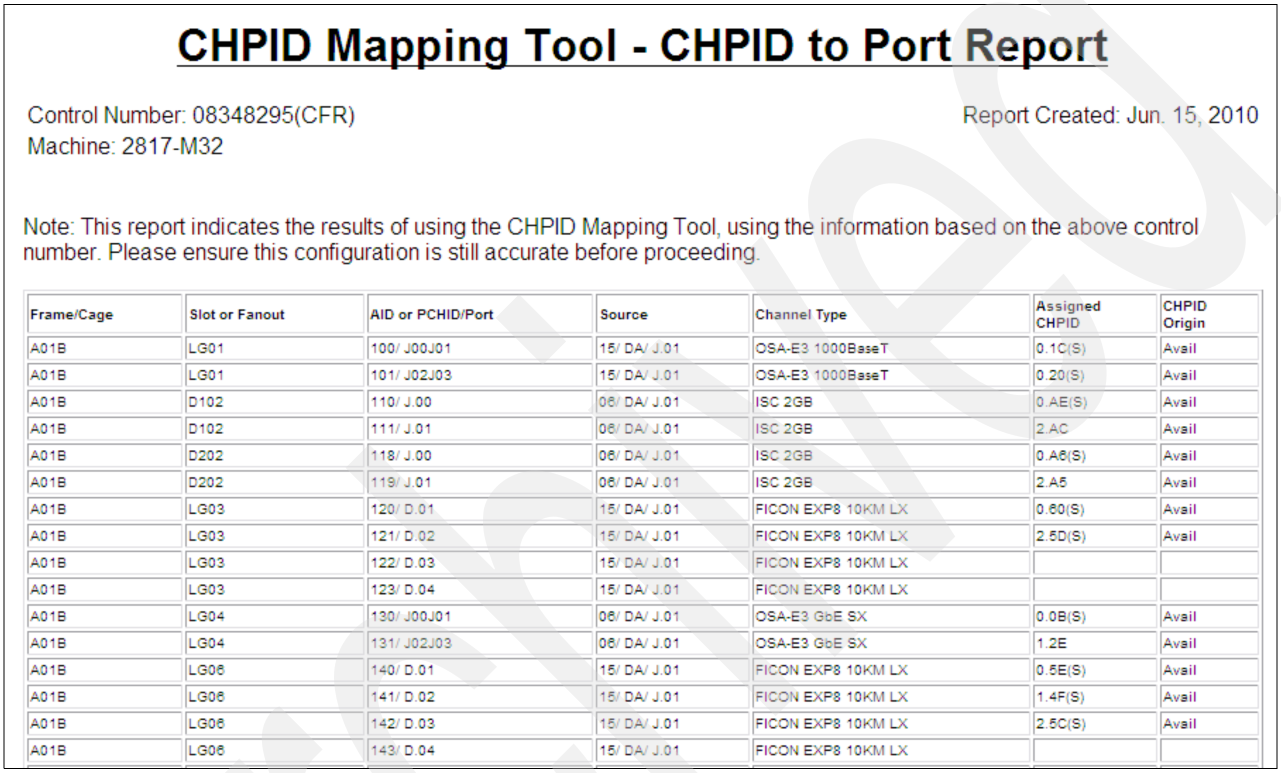
Port Report, Sorted by Location

To create the Port Report, Sorted by Location, perform the following steps:

1. Select **Reports** → **Port Report** → **Sorted by Location** and then click **Save** (assuming that you accept the CHPID Mapping Tool report name).

   The CHPID Mapping Tool opens a browser window with the CHPID to Port Report (Figure 4-66).

2. You may be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to Port Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 15, 2010

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Frame/Cage	Slot or Fanout	AID or PCHID/Port	Source	Channel Type	Assigned CHPID	CHPID Origin
A01B	LG01	100/ J00J01	15/ DA/ J.01	OSA-E3 1000BaseT	0.1C(S)	Avail
A01B	LG01	101/ J02J03	15/ DA/ J.01	OSA-E3 1000BaseT	0.20(S)	Avail
A01B	D102	110/ J.00	06/ DA/ J.01	ISC 2GB	0.AE(S)	Avail
A01B	D102	111/ J.01	06/ DA/ J.01	ISC 2GB	2.AC	Avail
A01B	D202	118/ J.00	06/ DA/ J.01	ISC 2GB	0.A6(S)	Avail
A01B	D202	119/ J.01	06/ DA/ J.01	ISC 2GB	2.A5	Avail
A01B	LG03	120/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.60(S)	Avail
A01B	LG03	121/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	2.5D(S)	Avail
A01B	LG03	122/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX		
A01B	LG03	123/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX		
A01B	LG04	130/ J00J01	06/ DA/ J.01	OSA-E3 GbE SX	0.0B(S)	Avail
A01B	LG04	131/ J02J03	06/ DA/ J.01	OSA-E3 GbE SX	1.2E	Avail
A01B	LG06	140/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.5E(S)	Avail
A01B	LG06	141/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	1.4F(S)	Avail
A01B	LG06	142/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	2.5C(S)	Avail
A01B	LG06	143/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX		

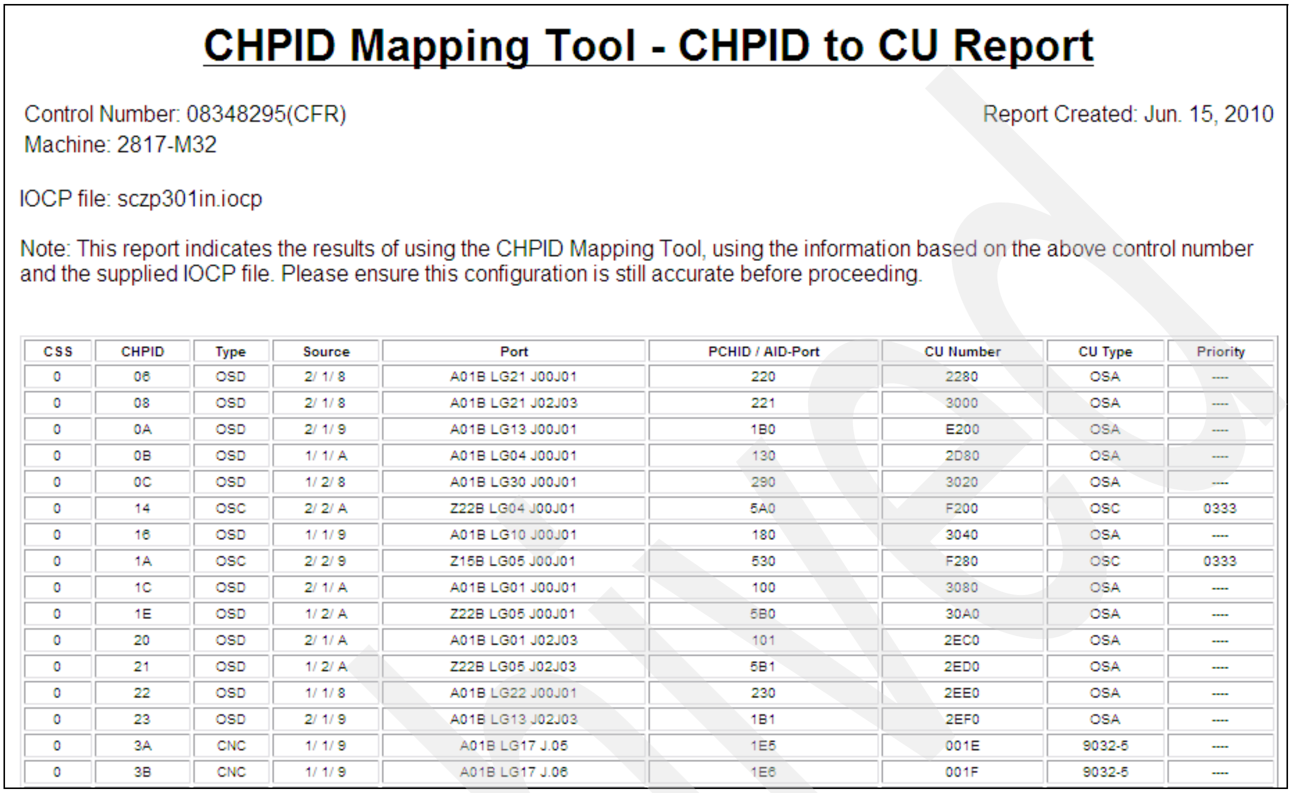
Figure 4-66 CHPID to Port Report, Sorted by Location

CHPID to Control Unit Report

This report is created in a similar way to the CHPID Report. Perform the following steps:

1. Select **Reports** → **CHPID to Control Unit Report**.
2. Click **Save**.

3. The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report (Figure 4-67). You may be prompted to accept active content; accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 15, 2010

IOCP file: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the supplied IOCP file. Please ensure this configuration is still accurate before proceeding.

CSS	CHPID	Type	Source	Port	PCHID / AID-Port	CU Number	CU Type	Priority
0	06	OSD	2/ 1/ 8	A01B LG21 J00J01	220	2280	OSA	----
0	08	OSD	2/ 1/ 8	A01B LG21 J02J03	221	3000	OSA	----
0	0A	OSD	2/ 1/ 9	A01B LG13 J00J01	1B0	E200	OSA	----
0	0B	OSD	1/ 1/ A	A01B LG04 J00J01	130	2D80	OSA	----
0	0C	OSD	1/ 2/ 8	A01B LG30 J00J01	290	3020	OSA	----
0	14	OSC	2/ 2/ A	Z22B LG04 J00J01	5A0	F200	OSC	0333
0	16	OSD	1/ 1/ 9	A01B LG10 J00J01	180	3040	OSA	----
0	1A	OSC	2/ 2/ 9	Z15B LG05 J00J01	530	F280	OSC	0333
0	1C	OSD	2/ 1/ A	A01B LG01 J00J01	100	3080	OSA	----
0	1E	OSD	1/ 2/ A	Z22B LG05 J00J01	5B0	30A0	OSA	----
0	20	OSD	2/ 1/ A	A01B LG01 J02J03	101	2EC0	OSA	----
0	21	OSD	1/ 2/ A	Z22B LG05 J02J03	5B1	2ED0	OSA	----
0	22	OSD	1/ 1/ 8	A01B LG22 J00J01	230	2EE0	OSA	----
0	23	OSD	2/ 1/ 9	A01B LG13 J02J03	1B1	2EF0	OSA	----
0	3A	CNC	1/ 1/ 9	A01B LG17 J.05	1E5	001E	9032-5	----
0	3B	CNC	1/ 1/ 9	A01B LG17 J.06	1E6	001F	9032-5	----

Figure 4-67 CHPID to CU Report

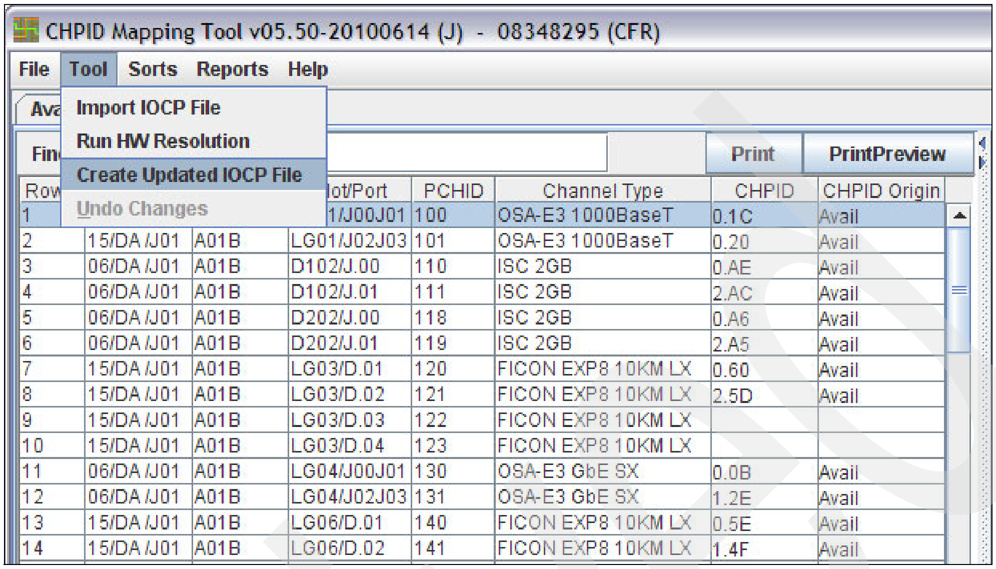
4.5.12 Creating an updated IOCP

> **Note:** You may prefer to use HCM to transfer the updated IOCP statements file back to the host. Before doing so, however, first run the next step in the CHPID Mapping Tool to create the updated IOCP file.

You need to create an IOCP statements file that you will import into the IODF using HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

Perform the following steps:

1. Select **Tool** → **Create Updated IOCP File** (Figure 4-68).

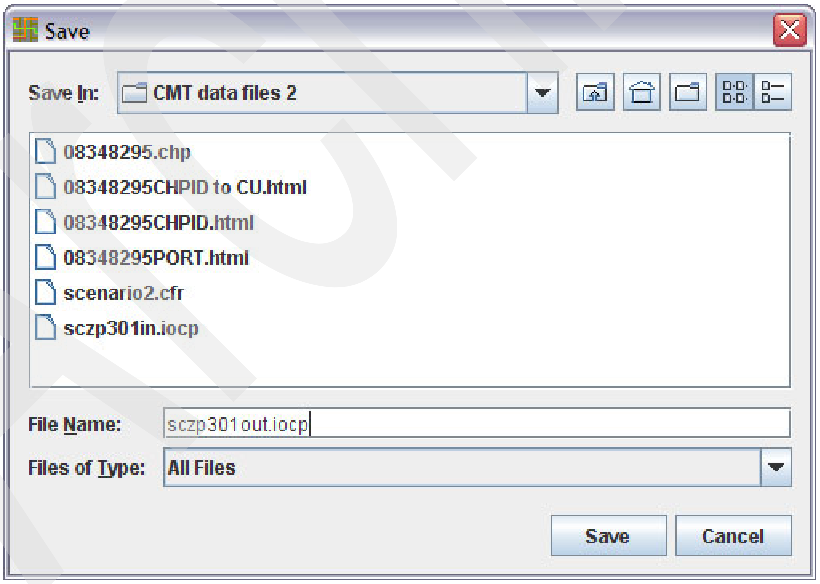


Row			lot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1			1/J00J01	100	OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	1.4F	Avail

Figure 4-68 Create Updated IOCP File

2. Enter the file name and location for the IOCP output file and click **Save** (Figure 4-69).

> **Note:** This file needs to be uploaded to the z/OS image on which you have the work IODF you used previously to create the IOCP input data set.



Save In: CMT data files 2

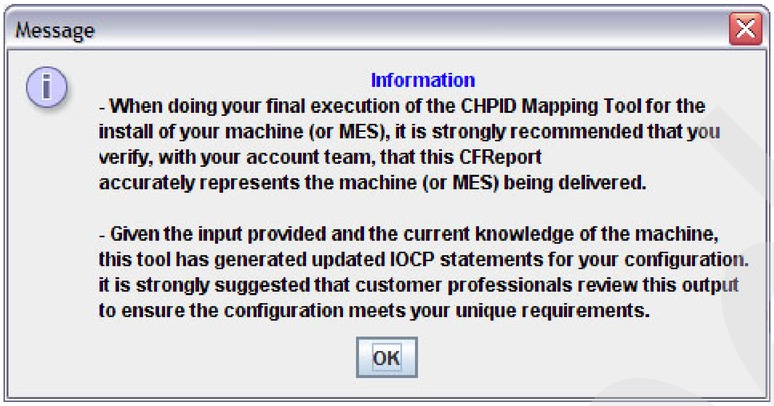
- 08348295.chp
- 08348295CHPID to CU.html
- 08348295CHPID.html
- 08348295PORT.html
- scenario2.cfr
- sczp301in.iocp

File Name: sczp301out.iocp

Files of Type: All Files

Figure 4-69 Save IOCP output file

3. The CMT displays an informational message, shown in Figure 4-70, about what to do for the final execution of the tool.



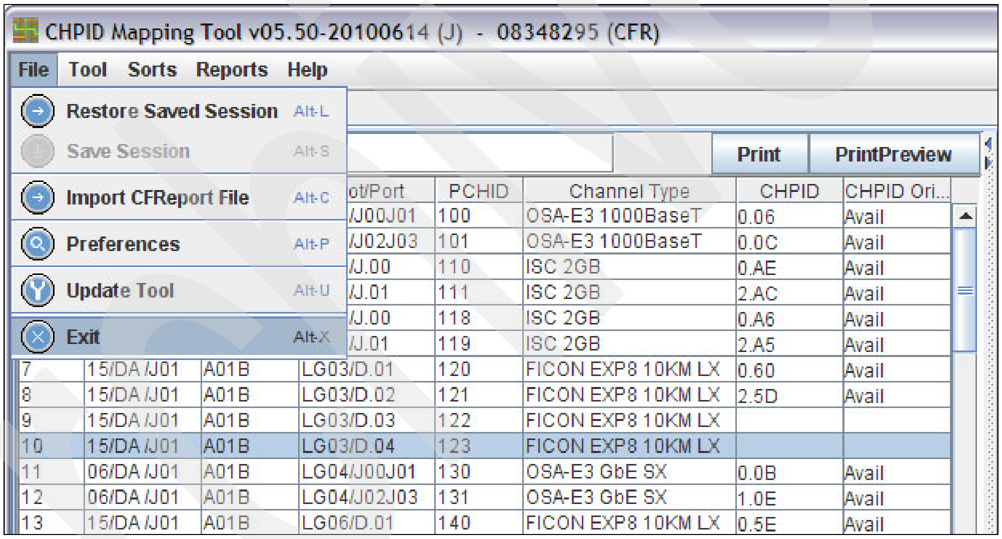
Information

- When doing your final execution of the CHPID Mapping Tool for the install of your machine (or MES), it is strongly recommended that you verify, with your account team, that this CFReport accurately represents the machine (or MES) being delivered.

- Given the input provided and the current knowledge of the machine, this tool has generated updated IOCP statements for your configuration. it is strongly suggested that customer professionals review this output to ensure the configuration meets your unique requirements.

Figure 4-70 Informational message

4. The CHPID Mapping Tool program now can be shut down. Select **File** → **Exit** (Figure 4-71).



			ot/Port	PCHID	Channel Type	CHPID	CHPID Ori...
			/J00J01	100	OSA-E3 1000BaseT	0.06	Avail
			/J02J03	101	OSA-E3 1000BaseT	0.0C	Avail
			/J.00	110	ISC 2GB	0.AE	Avail
			/J.01	111	ISC 2GB	2.AC	Avail
			/J.00	118	ISC 2GB	0.A6	Avail
			/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.0E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail

Figure 4-71 Exit program

4.6 HCD: Updating the 2817 work IODF with PCHIDs

After mapping the CHPIDs to PCHIDs using the CHPID Mapping Tool, the information needs to be transferred back into HCD, which you can do by performing the following steps:

1. Upload the IOCP file created by the CMT (`sczp301out.iocp`, in our example) to the z/OS image. Use a file transfer facility, such as the one in IBM Personal Communications or an equivalent FTP program. Be sure to use TEXT as the transfer type.

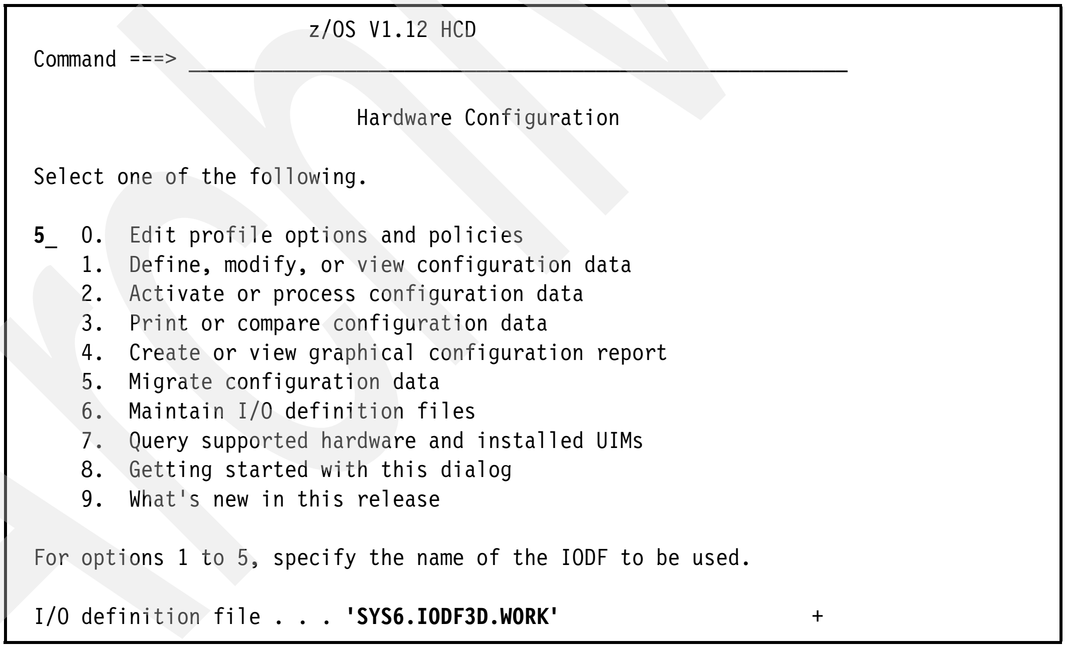
   Looking at the updated IOCP statements file, note that the CMT has left a reference to the CCN. Also note the CU Priority values added for the OSC control units.

> **Note:** Control unit priorities are stored in the IOCP output file created by CMT that is migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck. They are in the form of commented lines at the end of the IOCP deck (Example 4-3).

Example 4-3 Updated IOCP statements file (with CMT statements)

```
IODEVICE ADDRESS=(FF38,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFC8,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFD6,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFE4,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=08348295(CFR)
*CMT* 21E0.2=0333,F200.0=0333,F200.1=0333,F200.2=0333,F280.0=0333
*CMT* F280.1=0333,F280.2=0333
******************************** Bottom of Data **********************
```

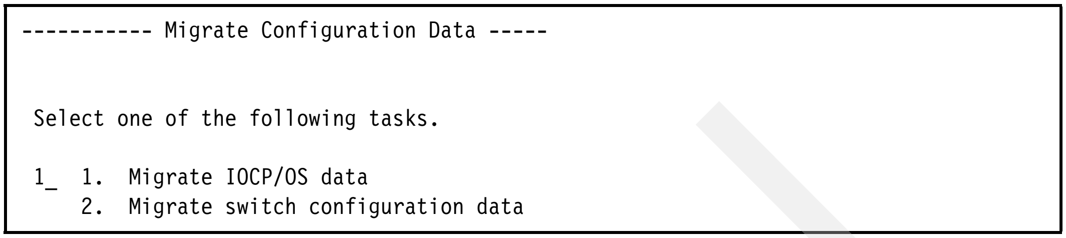
2. From the HCD main panel (Figure 4-72), enter the work IODF name used. Select Option 5. Migrate configuration data.



```
                          z/OS V1.12 HCD
Command ===> _______________________________________________________

                              Hardware Configuration

Select one of the following.

5_  0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3D.WORK'                    +
```

Figure 4-72 Main menu: Migrate configuration data

3. From the Migrate Configuration Data panel (Figure 4-73), select Option 1. Migrate IOCP/OS data and press Enter.

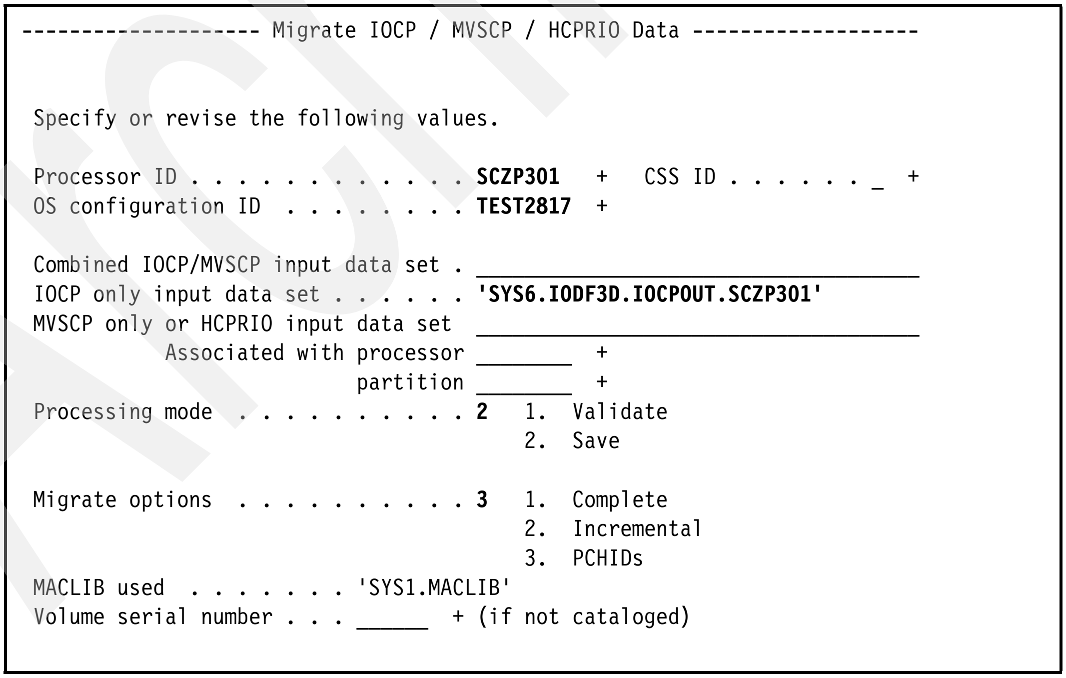


```
----------- Migrate Configuration Data -----


 Select one of the following tasks.

 1_  1.  Migrate IOCP/OS data
     2.  Migrate switch configuration data
```

Figure 4-73 Migrate Configuration Data

4. On the Migrate IOCP Data panel (Figure 4-74), competed the following fields and then press Enter:

Processor ID	Use the same ID used to create the IOCP input deck.
OS configuration ID	This is the OS configuration associated with the processor.
IOCP only input data set	This is the data set name specified when the `iocpout.txt` file was uploaded to z/OS (see 4.6, "HCD: Updating the 2817 work IODF with PCHIDs" on page 195).
Processing mode	Select Option 2 to save the results of the migration. (Prior to using Option 2, however, try to migrate using Option 1, to validate the operation.)
Migrate options	Select Option 3 for PCHIDS. Only the PCHIDs are migrated into the work IODF.

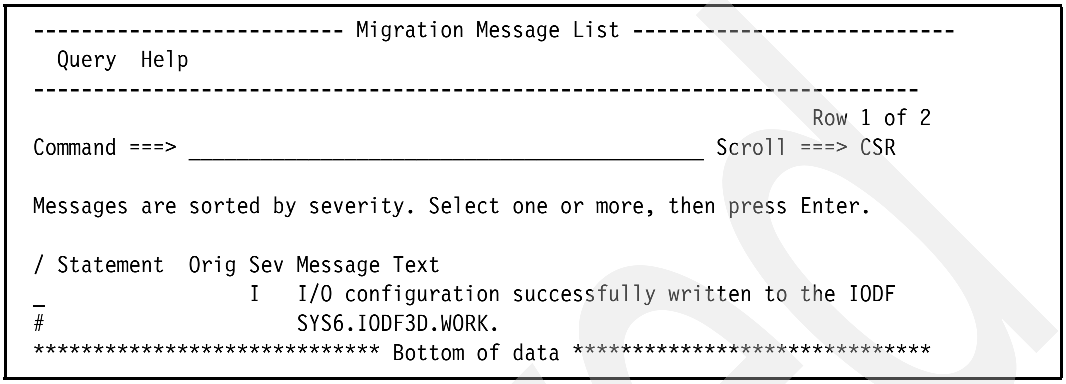


```
-------------------- Migrate IOCP / MVSCP / HCPRIO Data -------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . SCZP301   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2817  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF3D.IOCPOUT.SCZP301'
 MVSCP only or HCPRIO input data set  _____________________________________
            Associated with processor ________  +
                            partition ________  +
 Processing mode  . . . . . . . . . . 2   1.  Validate
                                          2.  Save

 Migrate options  . . . . . . . . . . 3   1.  Complete
                                          2.  Incremental
                                          3.  PCHIDs
 MACLIB used  . . . . . . . 'SYS1.MACLIB'
 Volume serial number . . . ______  + (if not cataloged)
```

Figure 4-74 Migrate IOCP / MVSCP / HCPRIO Data

5. HCD displays any errors or warning messages as a result of the migration action. In our example, we did not receive any messages other than the one indicating that the migration was successful (Figure 4-75).

   At this point, the work IODF contains both the CHPID definitions and the mapping to PCHIDs that was done using the CHPID Mapping Tool.



```
-------------------------- Migration Message List ---------------------------
  Query  Help
---------------------------------------------------------------------------
                                                                  Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Statement  Orig Sev Message Text
_                  I   I/O configuration successfully written to the IODF
#                      SYS6.IODF3D.WORK.
**************************** Bottom of data *****************************
```

Figure 4-75 Migration Message List

6. Press PF3 and you should receive the following message:

   `IOCP/Operating system deck migration processing complete, return code = 0.`

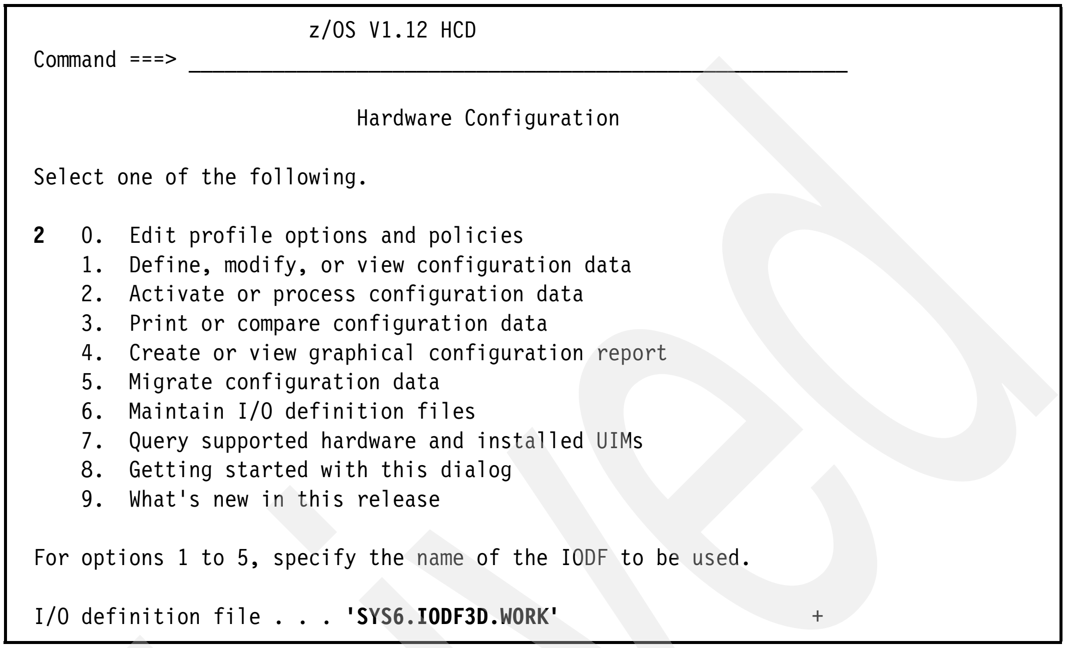
7. Press PF3 again to continue.

4.7 HCD: Building the 2817 production IODF

To make use of the definitions that we updated in HCD, we need to create a 2817 production IODF from our work IODF and remotely or locally write the IODF to the 2817 IOCDS using Write IOCDS in preparation of upgrade.

Perform the following steps:

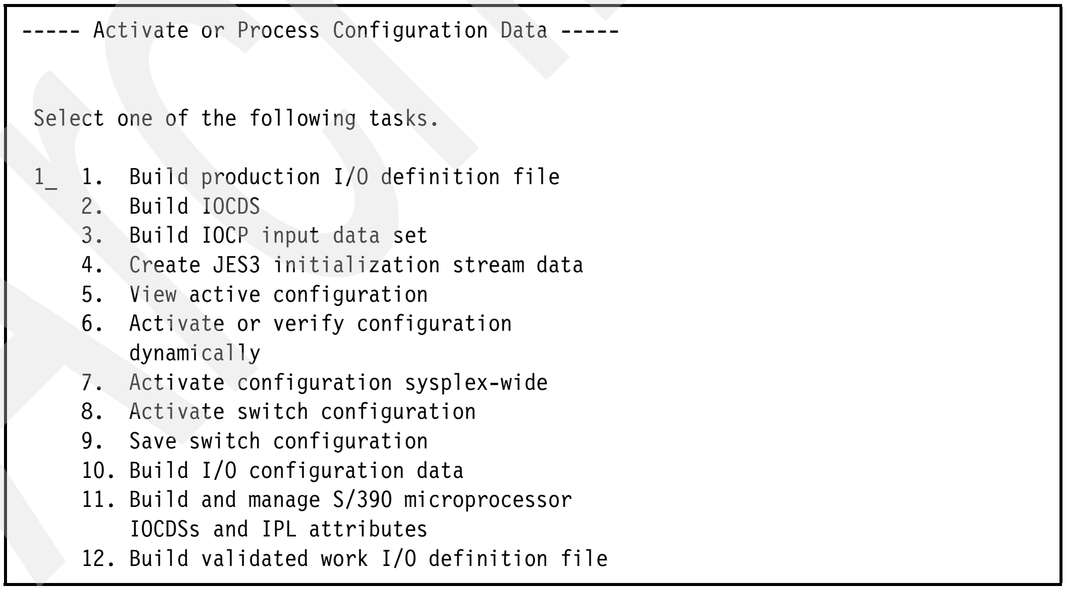
1. From the HCD main panel, select Option 2. Activate or process configuration data (Figure 4-76).



```
                          z/OS V1.12 HCD
Command ===> _______________________________________________________

                              Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3D.WORK'                +
```

Figure 4-76 Main menu: Select activate or process configuration data

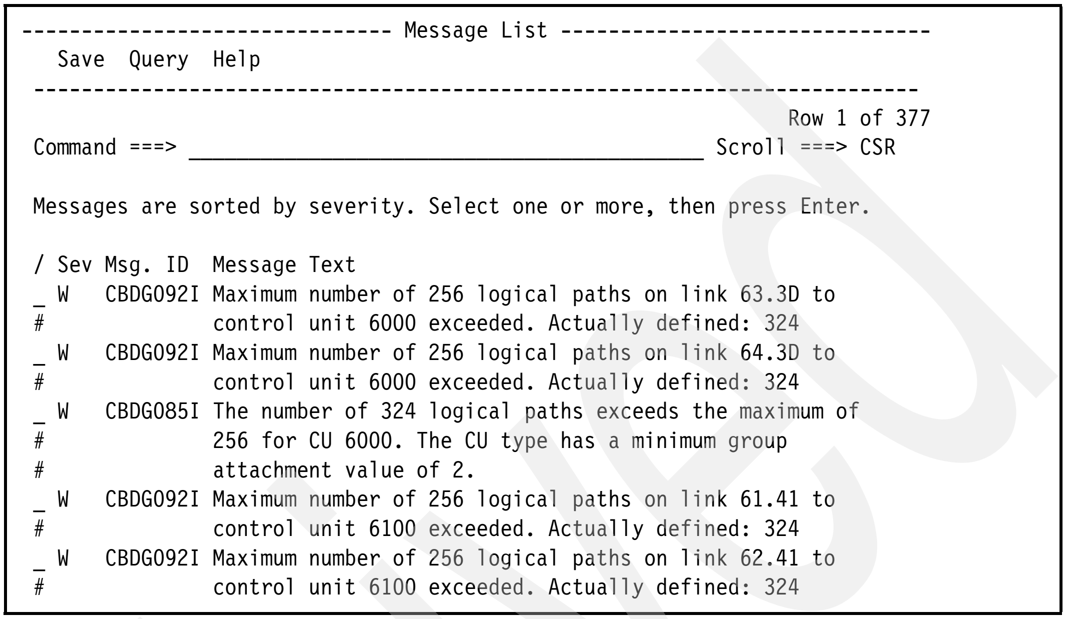
2. HCD displays the Activate or Process Configuration Data panel. Select Option 1. Build production I/O definition file and press Enter (Figure 4-77).



```
----- Activate or Process Configuration Data -----


 Select one of the following tasks.

 1_  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

Figure 4-77 Activate or Process Configuration Data: Select Build production IODF

3. HCD displays the Message List panel (Figure 4-78). Verify that you have only severity W warning messages and that they are normal for the configuration. Correct any messages that should not occur and try to build the production IODF again. Continue this process until you have no messages that indicate problems.

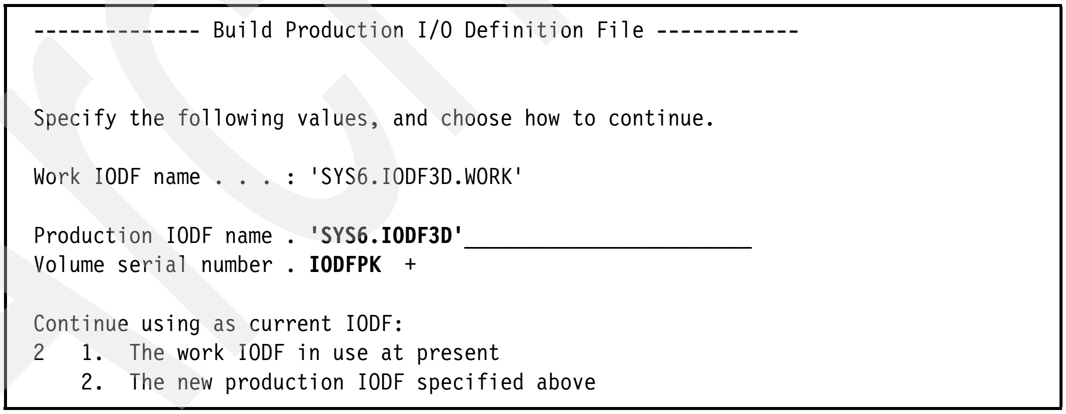


```
------------------------------- Message List -------------------------------
   Save  Query  Help
 ---------------------------------------------------------------------------
                                                              Row 1 of 377
 Command ===> ___________________________________________ Scroll ===> CSR

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 _ W   CBDG092I Maximum number of 256 logical paths on link 63.3D to
 #              control unit 6000 exceeded. Actually defined: 324
 _ W   CBDG092I Maximum number of 256 logical paths on link 64.3D to
 #              control unit 6000 exceeded. Actually defined: 324
 _ W   CBDG085I The number of 324 logical paths exceeds the maximum of
 #              256 for CU 6000. The CU type has a minimum group
 #              attachment value of 2.
 _ W   CBDG092I Maximum number of 256 logical paths on link 61.41 to
 #              control unit 6100 exceeded. Actually defined: 324
 _ W   CBDG092I Maximum number of 256 logical paths on link 62.41 to
 #              control unit 6100 exceeded. Actually defined: 324
```

Figure 4-78 Message List (building Production IODF)

Press PF3 to continue.

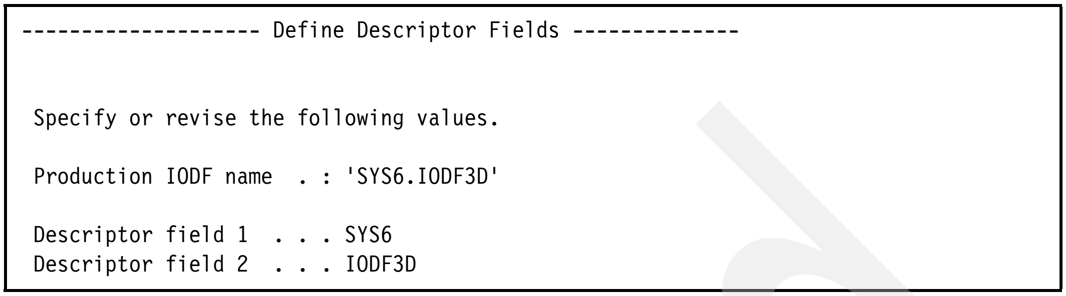
4. HCD displays the Build Production I/O Definition File panel. Complete the Production IODF name and Volume serial number fields and press Enter (Figure 4-79).



```
 -------------- Build Production I/O Definition File ------------


 Specify the following values, and choose how to continue.

 Work IODF name . . . : 'SYS6.IODF3D.WORK'

 Production IODF name . 'SYS6.IODF3D'________________________
 Volume serial number . IODFPK  +

 Continue using as current IODF:
 2   1.  The work IODF in use at present
     2.  The new production IODF specified above
```

Figure 4-79 Build Production I/O Definition File

5. HCD displays the Define Descriptor Fields panel (Figure 4-80). Press Enter to accept the descriptor fields selected by HCD, or enter your selection and then press Enter.



```
-------------------- Define Descriptor Fields --------------


 Specify or revise the following values.

 Production IODF name  . : 'SYS6.IODF3D'

 Descriptor field 1  . . . SYS6
 Descriptor field 2  . . . IODF3D
```

Figure 4-80 Define Descriptor Fields

6. HCD displays the following message, indicating that the production IODF was successfully created:

   `Production IODF SYS6.IODF3D created.`

Proceed to the next section to implement the configuration on the 2097 in preparation for its upgrade to a 2817.

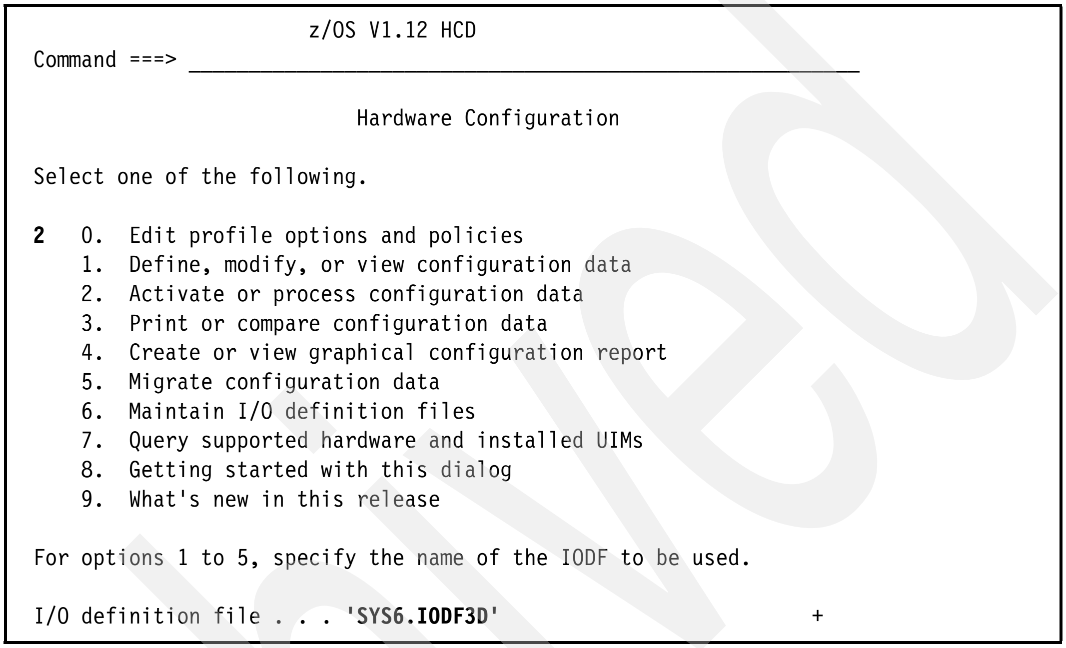
4.8 HCD: Loading the 2817 processor IOCDS

At this point, we have a production IODF, which is SYS6.IODF3D. Now we need to update the IOCDS on the server that will be upgraded (for example, SCZP201 to SCZP301). The IOCDS will be available for power-on reset after the processor has been upgraded.

4.8.1 Updating the IOCDS using HCD Option 2.11

To update the IOCDS using HCD Option 2.11, perform the following steps:

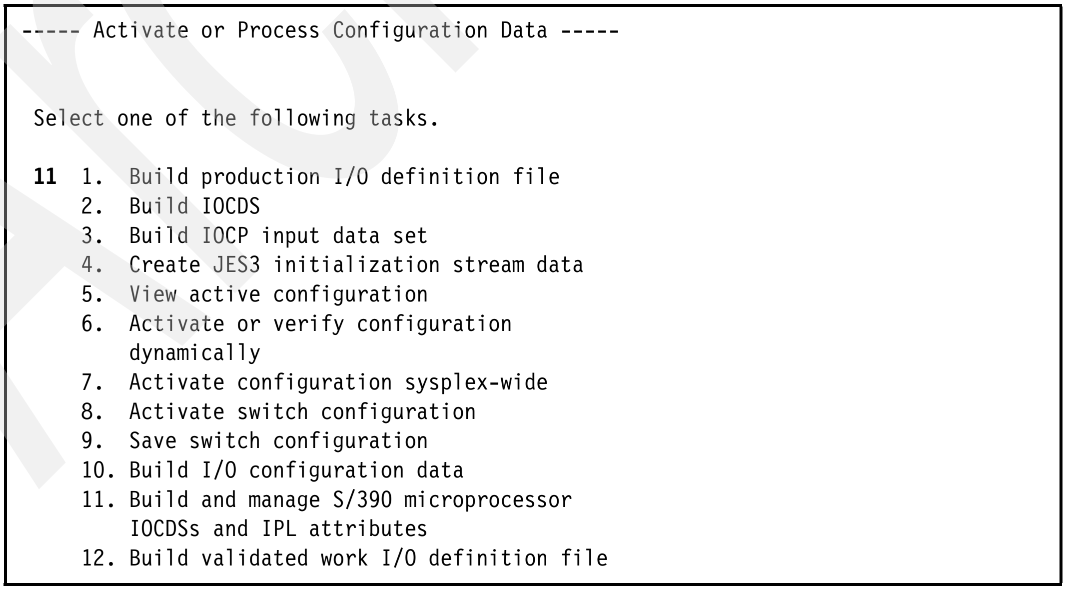
1. From the HCD main panel, select Option 2. Activate or process configuration data (Figure 4-81). Verify that the IODF is the production one created in 4.7, “HCD: Building the 2817 production IODF” on page 198 and press Enter.



```
                       z/OS V1.12 HCD
Command ===> ________________________________________________________

                           Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3D'                     +
```

Figure 4-81 Main menu: Select Activate or Process Configuration Data

2. The Activate or Process Configuration Data panel opens (Figure 4-82). Select Option 11. Build and manage S/390 microprocessor IOCDSs and IPL attributes, and press Enter.



```
----- Activate or Process Configuration Data -----


 Select one of the following tasks.

 11  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

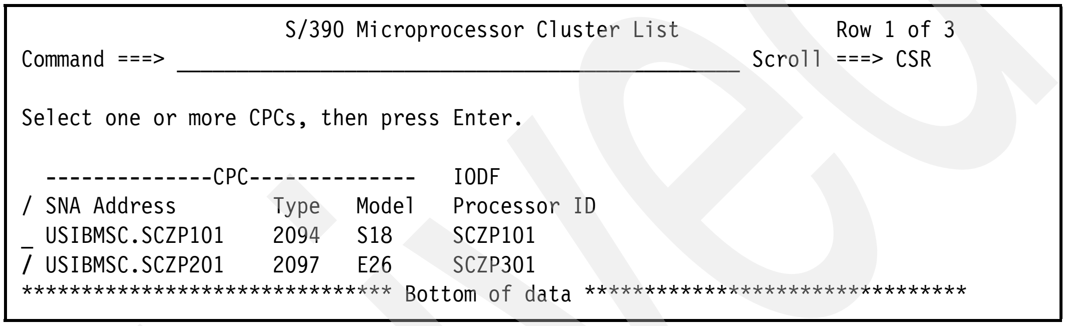
Figure 4-82 Activate or Process Configuration Data: Select Build IOCDSs

Note that in this example, we are assuming that we have connectivity to the 2094 or 2097 that is being upgraded over the HMC local network to create an IOCDS.

In the case where the server being upgraded is not accessible from the HMC LAN, we need to create an IOCP file from HCD and then create a stand-alone IOCP, which is done using the same process we used to create an IOCP file for the CHPID Mapping Tool.

> **Tip:** The Support Element can now read an IOCP file that has been written in ZIP format.

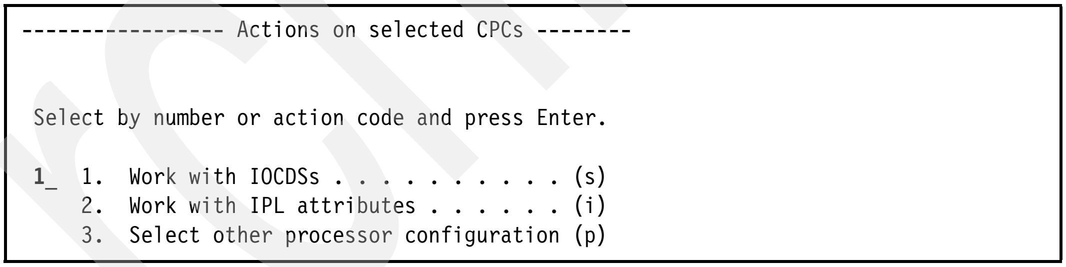
3. The S/390 Microprocessor Cluster List panel opens (Figure 4-83). Select the 2094 or 2097 being upgraded from the list by typing a forward slash (/) to update one of its IOCDSs and then press Enter.



```
                      S/390 Microprocessor Cluster List             Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
/ USIBMSC.SCZP201    2097   E26     SCZP301
***************************** Bottom of data *******************************
```

Figure 4-83 S/390 Microprocessor Cluster List

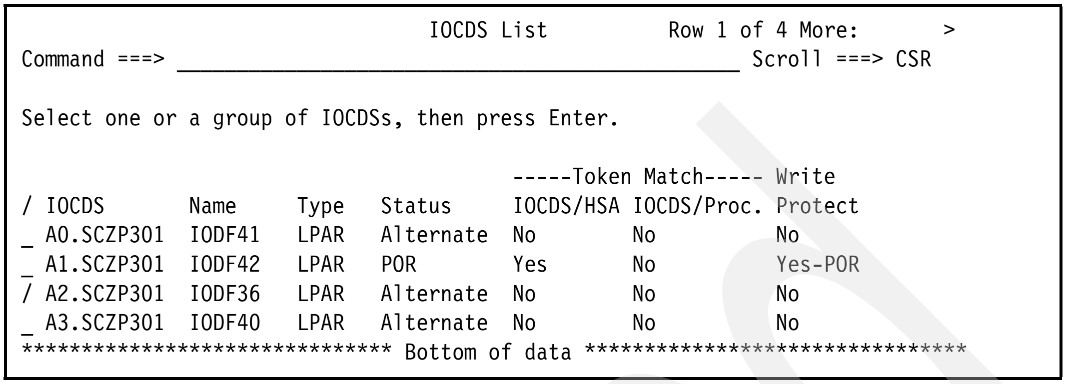
4. The Actions on selected CPCs panel opens (Figure 4-84). Select Option 1. Work with IOCDSs and press Enter.



```
----------------- Actions on selected CPCs --------


 Select by number or action code and press Enter.

 1_  1.  Work with IOCDSs . . . . . . . . . . (s)
     2.  Work with IPL attributes . . . . . . (i)
     3.  Select other processor configuration (p)
```

Figure 4-84 Actions on selected CPCs: Work with IOCDSs

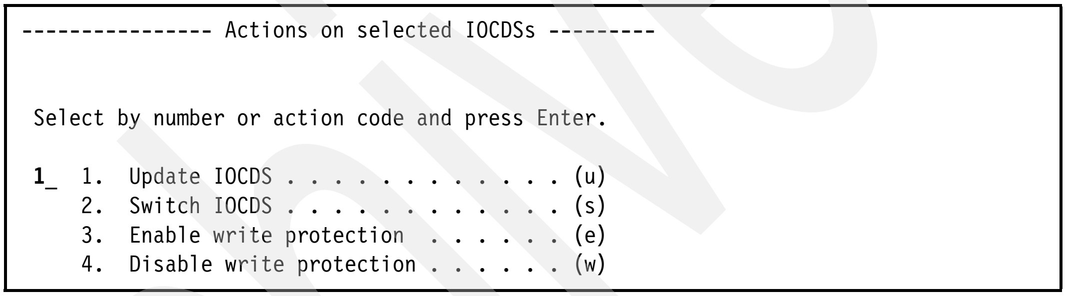
5. The IOCDS List panel opens (Figure 4-85). Select the IOCDS that you want to update for the 2094 or 2097 upgrade by typing a forward slash (/) and press Enter.



```
                                  IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                         -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP301  IODF41   LPAR   Alternate  No        No          No
_ A1.SCZP301  IODF42   LPAR   POR        Yes       No          Yes-POR
/ A2.SCZP301  IODF36   LPAR   Alternate  No        No          No
_ A3.SCZP301  IODF40   LPAR   Alternate  No        No          No
****************************** Bottom of data *******************************
```

Figure 4-85 IOCDS List

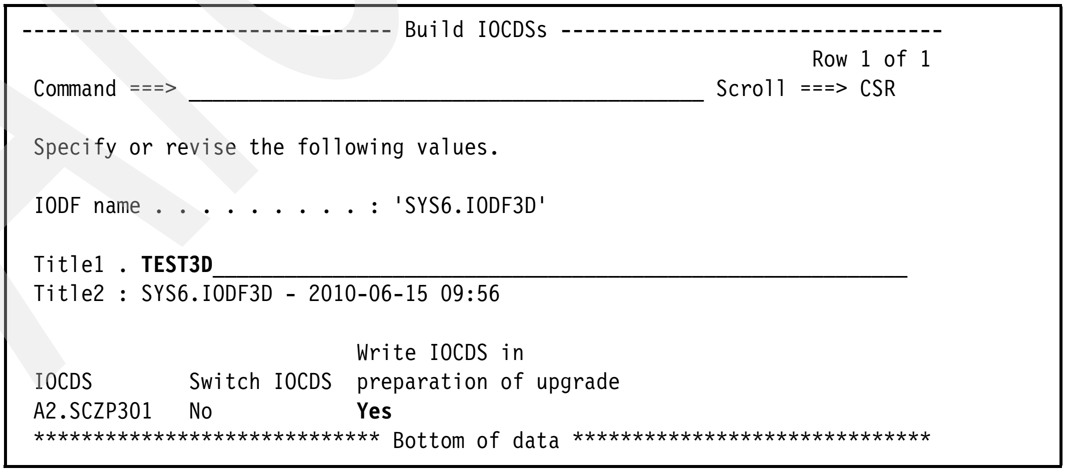
6. The Actions on selected IOCDSs panel opens (Figure 4-86). Select Option 1. Update IOCDS and press Enter.



```
---------------- Actions on selected IOCDSs ---------


 Select by number or action code and press Enter.

 1_  1.  Update IOCDS . . . . . . . . . . . . (u)
     2.  Switch IOCDS . . . . . . . . . . . . (s)
     3.  Enable write protection  . . . . . . (e)
     4.  Disable write protection . . . . . . (w)
```

Figure 4-86 Actions on selected IOCDSs

7. The Build IOCDSs panel opens (Figure 4-87). Verify that all the information is correct. Complete the Title1 field, set Write IOCDS in preparation of upgrade to `Yes`, and press Enter.

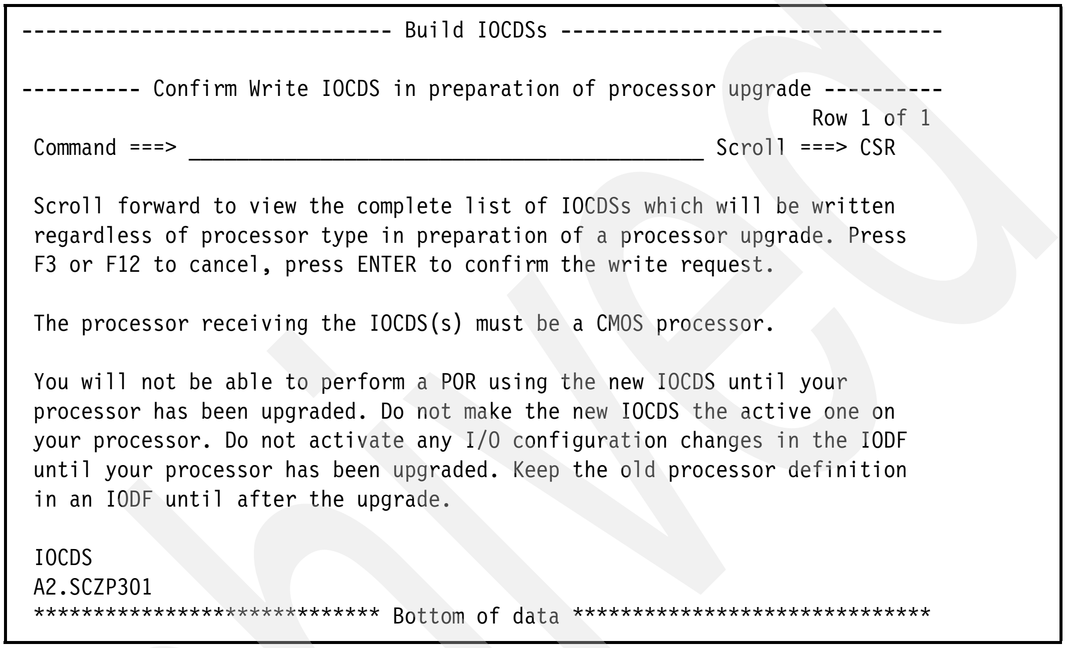


```
------------------------------- Build IOCDSs --------------------------------
                                                                  Row 1 of 1
 Command ===> ___________________________________________ Scroll ===> CSR

 Specify or revise the following values.

 IODF name . . . . . . . . . : 'SYS6.IODF3D'

 Title1 . TEST3D__________________________________________________________
 Title2 : SYS6.IODF3D - 2010-06-15 09:56

                            Write IOCDS in
 IOCDS        Switch IOCDS  preparation of upgrade
 A2.SCZP301   No            Yes
**************************** Bottom of data ******************************
```

Figure 4-87 Build IOCDSs

> **Note:** Specifying `Yes` in the Write IOCDS in preparation of upgrade field is only required when you are upgrading the existing hardware and you want to write the IOCDS for a 2817 from the existing hardware. The Yes value permits the writing of an IOCDS that contains information that the current hardware does not recognize.

8. Because `Yes` was specified for the Write IOCDS in preparation of upgrade field, HCD now displays a confirmation panel (Figure 4-88). Press Enter to continue.

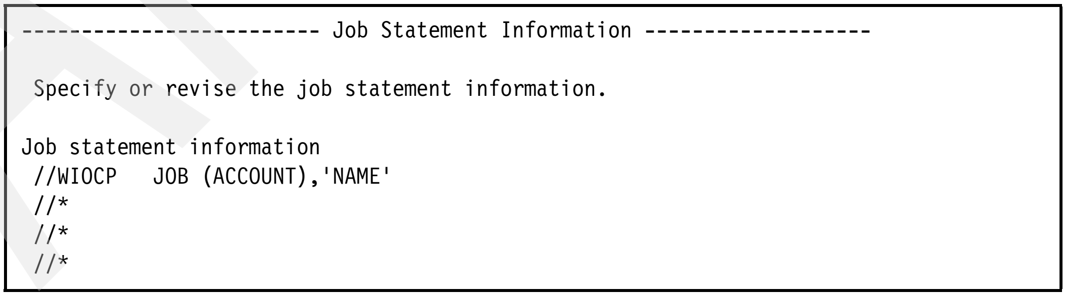


```
------------------------------- Build IOCDSs --------------------------------

---------- Confirm Write IOCDS in preparation of processor upgrade ----------
                                                                  Row 1 of 1
 Command ===> ___________________________________________ Scroll ===> CSR

 Scroll forward to view the complete list of IOCDSs which will be written
 regardless of processor type in preparation of a processor upgrade. Press
 F3 or F12 to cancel, press ENTER to confirm the write request.

 The processor receiving the IOCDS(s) must be a CMOS processor.

 You will not be able to perform a POR using the new IOCDS until your
 processor has been upgraded. Do not make the new IOCDS the active one on
 your processor. Do not activate any I/O configuration changes in the IODF
 until your processor has been upgraded. Keep the old processor definition
 in an IODF until after the upgrade.

 IOCDS
 A2.SCZP301
 *************************** Bottom of data ******************************
```

Figure 4-88 Build IOCDS (Confirm Write IOCDS)

9. The Job Statement Information panel opens (Figure 4-89). Enter the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.

> **Note:** Route the job to execute on the image to which you are logged on. In that way, you know that the image can "see" the new 2817 to update its IOCDS.



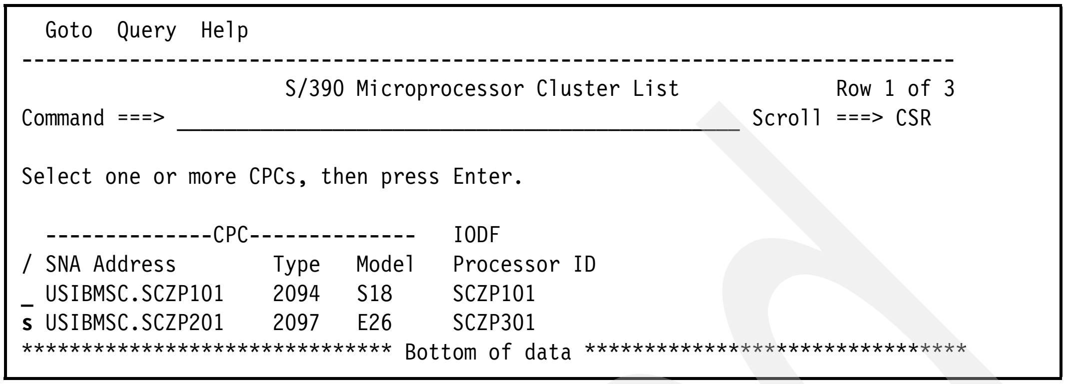
```
------------------------- Job Statement Information -------------------

 Specify or revise the job statement information.

Job statement information
 //WIOCP   JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
```

Figure 4-89 Job Statement Information

10. Verify the job output to ensure that the IOCDS was written without error and to the correct IOCDS. You should receive the following message:

```
ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A2 IOCDS REPLACED.
```

11. Now if you return to HCD Option 2.11 and view the IOCDS, you note that the SNA Address remains at USIBMSC.SCZP201 (Figure 4-90).



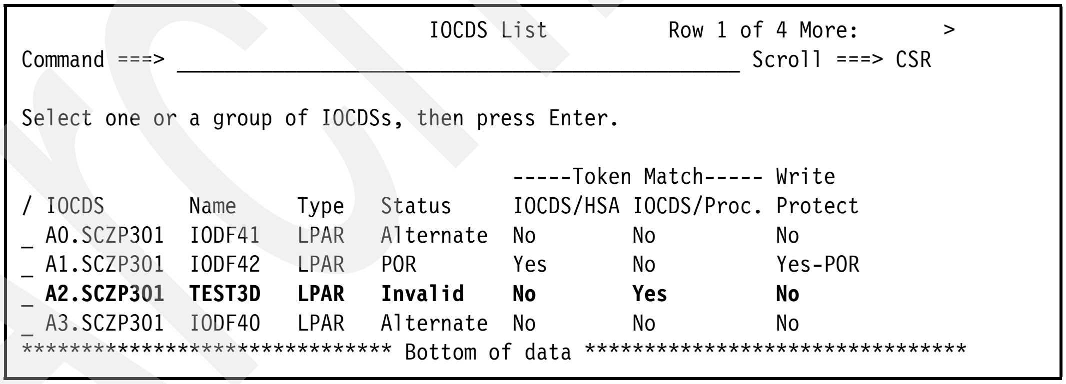
```
  Goto  Query  Help
------------------------------------------------------------------------------
                      S/390 Microprocessor Cluster List            Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
s USIBMSC.SCZP201    2097   E26     SCZP301
******************************* Bottom of data ********************************
```

Figure 4-90 IOCDS with upgrade IODF

12. Also, when you select USIBMSC.SCZP201, notice that IOCDS A2 (which we wrote the upgrade IODF to) has a status of Invalid (Figure 4-91). This error occurs because we specified `Yes` for the Write IOCDS in preparation for upgrade field, and the IOCDS contains IOCP statements and code relevant only for a 2817 processor.

    The status switches when this processor is upgraded to a 2817. The 2817 IOCDS status changes to Alternate and the 2094 or 2097 IOCDSs changes to Invalid.

> **Note:** We recommend that the IOCDS written in preparation for the upgrade be rewritten at your earliest convenience. Subsequent MESs may cause an IOCDS written in preparation for an upgrade to become invalid.



```
                                  IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                           -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP301  IODF41   LPAR   Alternate  No        No          No
_ A1.SCZP301  IODF42   LPAR   POR        Yes       No          Yes-POR
_ A2.SCZP301  TEST3D   LPAR   Invalid    No        Yes         No
_ A3.SCZP301  IODF40   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 4-91 IOCDS showing Invalid Status

4.9 HMC: Steps for profile activation

In this section, we show the steps for activating profiles.

4.9.1 Building the Reset Profile and pointing to required IOCDS

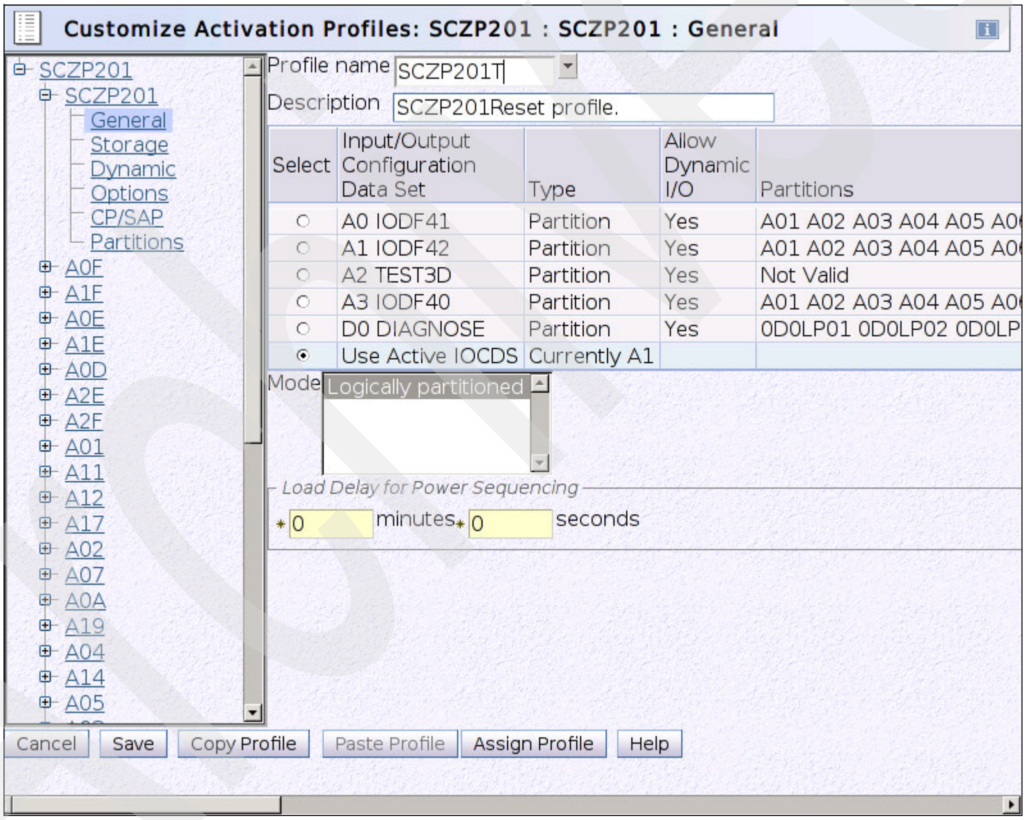
Now that the IODF has been written to an IOCDS, a Reset (power-on reset) Profile needs to be built to point to that IOCDS. This Reset Profile is used to power-on reset the 2817 after it has been upgraded.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817 or use a remote web browser and select the 2094 or 2097 that you are upgrading.

> **Note:** We us HMC V2.11.0 because we expect that your HMC will be upgraded prior to the upgrade of the 2094 or 2097.

2. Under Systems Management, click **Systems** to expand the list.
3. Under Systems, click the system to select it (in this example, SCZP201).
4. On the Tasks pad, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles**.
5. Select the **"Last Used" Reset Profile** and choose **Customize profile**.
6. Save this "Last Used" profile with a new Profile name to be referred to when the power-on reset is required (for example, SCZP201T) (Figure 4-92).



Profile name SCZP201T

Description SCZP201Reset profile.

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
○	A0 IODF41	Partition	Yes	A01 A02 A03 A04 A05 A0
○	A1 IODF42	Partition	Yes	A01 A02 A03 A04 A05 A0
○	A2 TEST3D	Partition	Yes	Not Valid
○	A3 IODF40	Partition	Yes	A01 A02 A03 A04 A05 A0
○	D0 DIAGNOSE	Partition	Yes	0D0LP01 0D0LP02 0D0LP
●	Use Active IOCDS	Currently A1		

Mode Logically partitioned

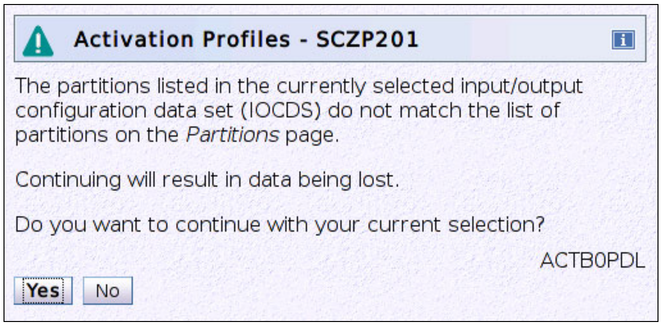
Load Delay for Power Sequencing

* 0 minutes * 0 seconds

Figure 4-92 Activation Profiles (Saving current reset profile with a different name)

7. Select the new Profile (SCZP201T) and click **Customize profile**.

8. Click the IOCDS that you just updated in the previous step (for example, IOCDS-A2). The window shown in Figure 4-93 opens.



Activation Profiles - SCZP201

The partitions listed in the currently selected input/output configuration data set (IOCDS) do not match the list of partitions on the *Partitions* page.

Continuing will result in data being lost.

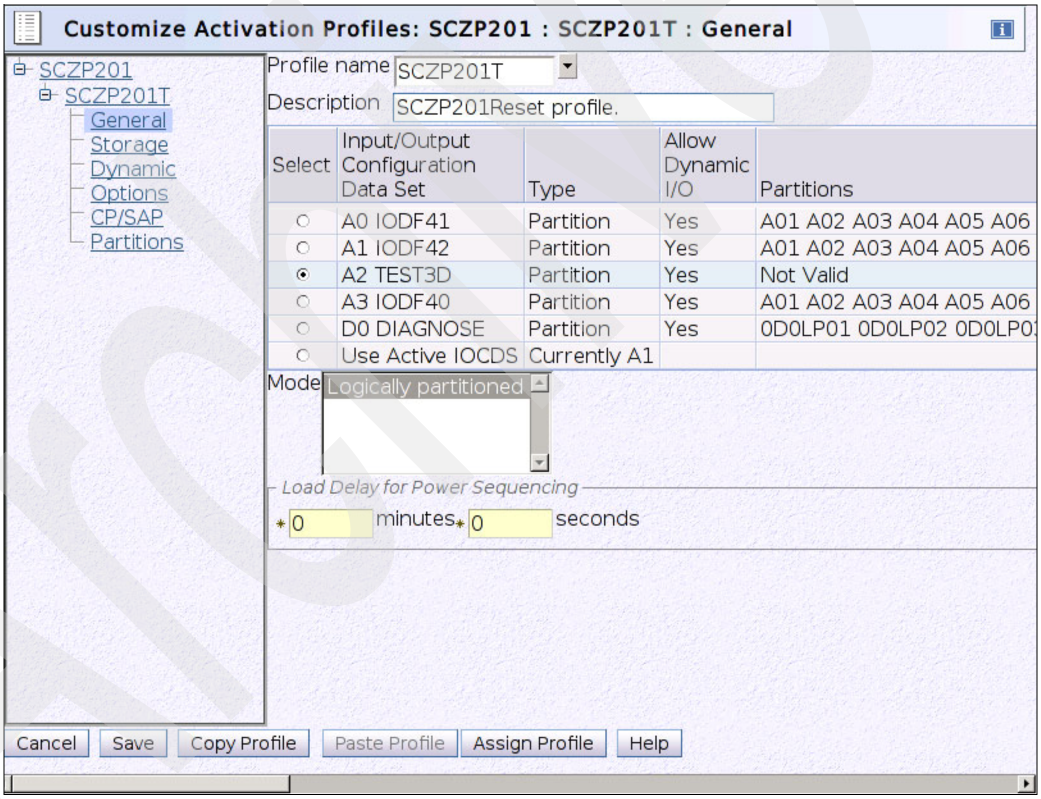
Do you want to continue with your current selection?

ACTB0PDL

Figure 4-93 Activation Profiles: Message ACTB0PDL

Depending on the circumstances, you might want to select **Yes** or **No**. At this point, you might want to review the Partition Activation List.

9. Click **Yes** and note the Reset Profile now (Figure 4-94).



Customize Activation Profiles: SCZP201 : SCZP201T : General

Profile name SCZP201T

Description SCZP201Reset profile.

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
○	A0 IODF41	Partition	Yes	A01 A02 A03 A04 A05 A06
○	A1 IODF42	Partition	Yes	A01 A02 A03 A04 A05 A06
●	A2 TEST3D	Partition	Yes	Not Valid
○	A3 IODF40	Partition	Yes	A01 A02 A03 A04 A05 A06
○	D0 DIAGNOSE	Partition	Yes	0D0LP01 0D0LP02 0D0LP0
○	Use Active IOCDS	Currently A1		

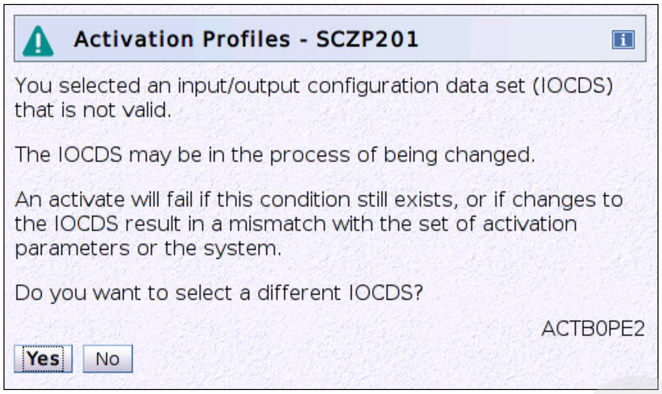
Mode Logically partitioned

Load Delay for Power Sequencing

0 minutes 0 seconds

Figure 4-94 Activation Profiles (New 'Not Valid' IOCDS selected)

10. Now if you click any of the profile tabs (General or Storage, for example), the ACTB0PE2 message opens (Figure 4-95).



You selected an input/output configuration data set (IOCDS) that is not valid.

The IOCDS may be in the process of being changed.

An activate will fail if this condition still exists, or if changes to the IOCDS result in a mismatch with the set of activation parameters or the system.

Do you want to select a different IOCDS?

ACTB0PE2

Figure 4-95 Activation Profiles (IOCDS not valid warning message)

11. Click **No** to continue working with the new IOCDS or **Yes** to return to the previous window.
12. Click **Save.**
13. Click **OK.** Review the items in the following sections.

Building/Verifying the Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

Building/Verifying the Load Profiles

Go through the Load (IPL) Profiles for this 2094 or 2097 and verify that you are satisfied with all the IPL and LOADPARM parameters that have been defined for the Images that will run on the 2817.

Building/Verifying the Load Members in SYS#.IPLPARM

You might require additional Load Members defined in SYS#.IPLPARM after the processor has been upgraded to the 2817.

Additionally, if you used the HWNAME parameter to point to the Processor ID, then this should be updated to point to the new Processor ID (in this example, from SCZP201 to SCZP301).

Server Time Protocol configuration

The Server Time Protocol (STP) configuration should be reviewed to ensure that the correct External Time Source has been configured and that you are connected to the correct Coordinated Time Network.

Refer to Chapter 8, “Server Time Protocol setup” on page 415 for more detailed information about setting up your STP environment.

4.9.2 Performing a power-on reset of the 2817

When the 2094 or 2097 processor has been upgraded to a 2817, the IBM service representative performs a power-on reset (POR) with a Diagnostic IOCDS.

After this POR has been completed and the IBM service representative is satisfied with the state of the processor, the service representative hands the processor over to you. You then perform another power-on reset using the Reset Profile created in 4.9.1, “Building the Reset Profile and pointing to required IOCDS” on page 206.

5

Replacing an IBM System z9 EC/z10 EC with an IBM zEnterprise 196

In this chapter, we describe how to replace an existing z10 EC with a z196.

You can also upgrade from a z9 EC to a z196; however, only examples of upgrading or replacing a z10 EC are shown in this book. An upgrade includes all frames, cages, support cards, and new I/O features.

Because a wide variety of environments exists, the results achieved in your environment might differ from those described here. Nevertheless, the step-by-step process we explain in this chapter should provide enough information for you to replicate the approach in your own environment.

We discuss the following topics:

- Scenario overview
- HCD: Migrating the existing 2097 IODF
- OSA: Saving and restoring configuration files
- HCD: Validating the 2817 work IODF
- CMT: Assigning PCHIDs to CHPIDs
- HCD: Updating the 2817 work IODF with PCHIDs
- HCD: Building the 2817 production IODF
- HCD/HMC: Loading the 2817 processor IOCDS
- HMC: Steps for profile activation

5.1 Scenario overview

Here is a description of the replacement scenario.

5.1.1 The configuration process

Figure 5-1 shows the general process flow that we follow in our example. The numbered steps are described after the figure.

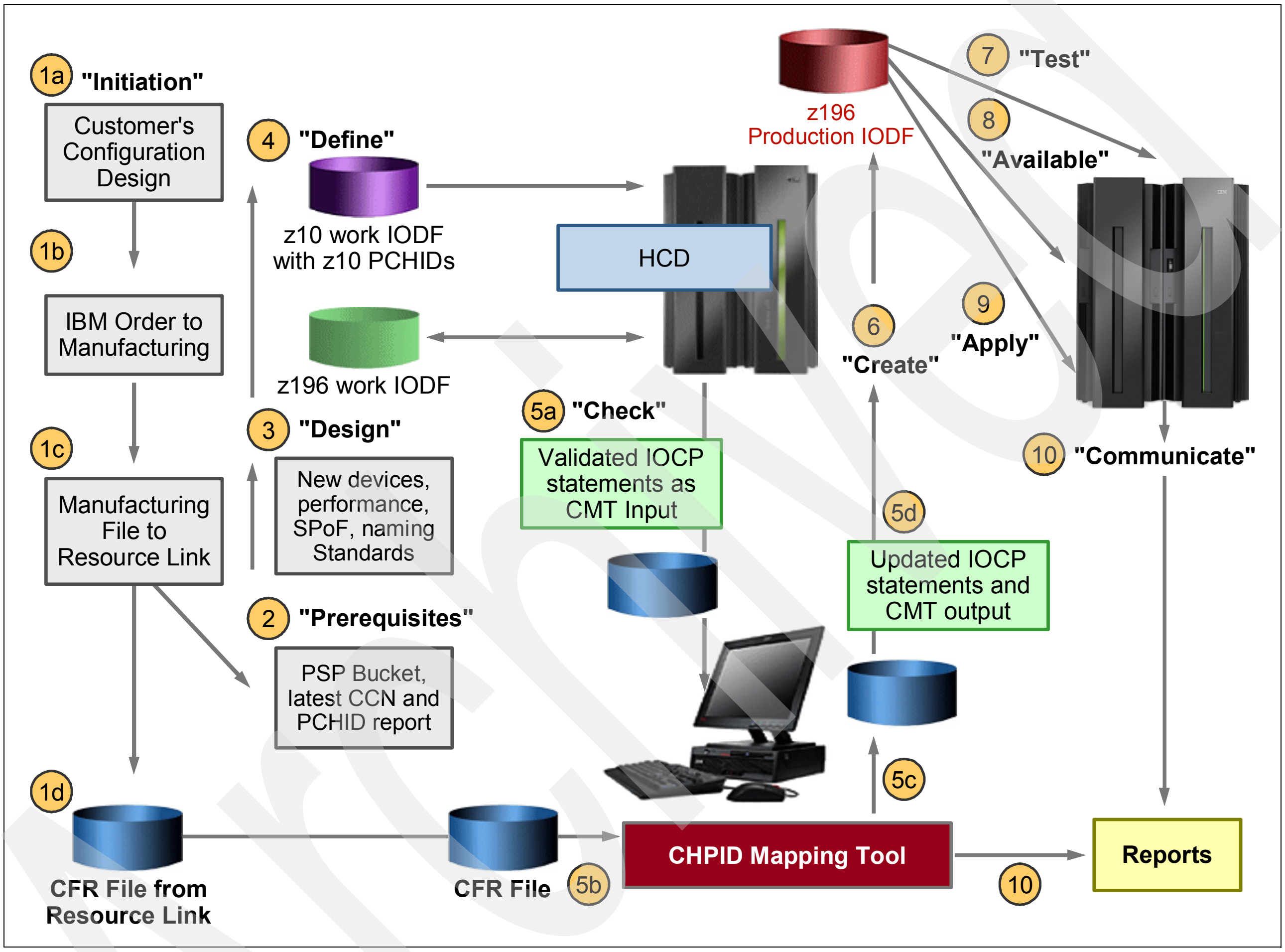


Figure 5-1 CMT: Overall process flow

1. Initiation
   a. When planning to migrate to a z196, the IBM Technical Support team can help you define a configuration design that meets your needs. The configuration is then used in the ordering process.
   b. The IBM order for the configuration is created and passed to the manufacturing process.
   c. The manufacturing process creates a configuration file that is stored at the IBM Resource Link website. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.

   d. A New Order report is created and shows the configuration summary of what is being ordered along with the Customer Control Number (CCN), which can be used to retrieve, from Resource Link the, `CFReport` (a data file that contains a listing of hardware configuration and changes for a CPC).

2. Prerequisites

   It is important that you check, for example, that you have the current PSP Bucket installed. You should also run the SMP/E report with fixcat exceptions to determine if any PTFs need to be applied. Also, ensure that you have the most current PCHID report and CCN from your IBM service representative.

3. Design

   When you plan your configuration, consider naming standards, FICON switch and port redundancy, adequate I/O paths to your devices for performance, OSA CHPID configuration for network and console communications, and coupling facility connections internally and to other machines.

   Additional changes to the way your sysplex receives its time source now that External Time Reference (ETR) is no longer supported and only Server Time Protocol (STP) can be used on the z196 may be required. The z196 can be run at Stratum 3 or Stratum 2 when in a mixed Coordinated Timing Network (CTN) or Stratum 1 when in a non-mixed CTN.

4. Define

   The existing System z9 EC or System z10 EC I/O configuration is used as a starting point for using HCD. The System z9 EC or System z10 EC production IODF is used as input to HCD to create a work IODF that will be the base of the new z196 configuration.

   When the new z196 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2817 validated work IODF.

5. Check

   a. From the validated work IODF, create a file containing the z196 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT). HCM may also be used here to transfer the IOCP deck to and from the CMT.

   b. The configuration file created by the IBM Manufacturing process in step 1d is downloaded from Resource Link to the CMT workstation.

      The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z196 hardware.

      You might have to make decisions in response to situations that might arise, such as:

      i. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware to resolve some SPoF situations.

      ii. Prioritizing certain hardware items over others.

   c. After the CHPID Mapping Tool processing finishes, the IOCP statements contain the physical channels assignment to logical channels, based on the actual purchased hardware configuration.

      The CHPID Mapping Tool also creates configuration reports to be used by the IBM service representative and the installation team.

      The file containing the updated IOCP statements created by the CHPID Mapping Tool, which now contains the physical channels assignment, is transferred to the host system.

   d. Using HCD again, and using the validated work IODF file created in step 5a and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments created by the CMT to the configuration data in the work IODF.

6. Create

   After the physical channel data has been migrated into the work IODF, a 2817 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2817 production IODF when the final power-on reset is done, yielding a z196 with an I/O configuration ready to be used.

7. Test

   IODFs that are modifying existing configurations may be tested in most cases to verify that the IODF is changing what is intended.

8. Available

   a. If you are upgrading an existing 2094 or 2097, you may be able to use HCD to write an IOCDS to your current 2094 or 2097 in preparation for the upgrade. If you can write an IOCDS to your current 2094 or 2097 in preparation for upgrading it to a 2817, do so and let the IBM service representative know which IOCDS to use.

      > **Note:** Using the HCD option Write IOCDS in preparation of an upgrade is the preferred method for writing the initial IOCDS when upgrading from a 2094 or a 2097 to a 2817. This scenario will use the HCD option Write IOCDS process.

   b. If the 2817 is not network connected to the CPC where HCD is running, or if you are not upgrading or cannot write an IOCDS in preparation for the upgrade, use HCD to produce an IOCP input file and download the input file to a USB memory stick.

9. Apply

   The new production IODF can be applied to the z196 in two ways:

   – Using the Power-on Reset process

   – Using the Dynamic IODF Activate process

10. Communicate

    It is important to communicate new and changed configurations to operations and the appropriate users and departments.

5.1.2 Migration path considerations

The migration path from a z9 EC or z10 EC to a z196 can be either in the form of a field upgrade to the existing z9 EC or z10 EC, or a replacement (push/pull) of an existing z9 EC or z10 EC with a new z196. Note the following points:

1. A *field upgrade* means that the existing z9 EC or z10 EC processor serial number is retained during the upgrade.
2. A *replacement* of the existing z9 EC or z10 EC by a new z196 implies physically removing (push) the z9 EC or z10 EC and bringing in a new z196 (pull) to take its place. The replacement z196 has a new serial number that is different from that of the existing z9 EC or z10 EC.

In this chapter, we document the *push/pull* scenario.

5.1.3 Planning considerations

The following I/O features can be ordered for a new z196:

- ESCON
- FICON Express8 LX (long wavelength - 10 km)
- FICON Express8 SX (short wavelength)
- OSA-Express3 10 GbE LR (long reach)
- OSA-Express3 10 GbE SR (short reach)
- OSA-Express3 GbE LX (long wavelength)
- OSA-Express3 GbE SX (short wavelength)
- OSA-Express3 1000BASE-T Ethernet
- Crypto Express3
- ISC-3 (peer mode only)

The following features may not be ordered for a z196, but if they are present in a z9 EC server or z10 EC server, may be carried forward when upgrading to a z196:

- FICON Express4 LX (4 km and 10 km)
- FICON Express4 SX
- OSA-Express2 LX (long wavelength)
- OSA-Express2 SX (short wavelength)
- OSA-Express2 1000BASE-T Ethernet

The following features are *not* supported on a z196:

- FICON Express2 (LX and SX)
- FICON Express (LX and SX)
- FICON (pre-FICON Express)
- OSA-Express2 10 GbE Long Reach
- OSA-Express
- ICB-2
- ICB-3
- ICB-4
- ISC-3 Links in Compatibility Mode
- Crypto Express2
- PCIXCC and PCICA
- Parallel channels (use an ESCON converter)

Table 5-1 lists the channel types as described in an IOCDS that are supported with the z9 EC, z10 EC, and z196.

Table 5-1 Channels, links, and adapters with CHPID type and support

Channels	**CHPID type**	**2094 support**	**2097 support**	**2817 support**
ESCON channels:				
Connection Channel (ESCON architecture)	CNC	Yes	Yes	Up to 240
Channel to Channel (connects to CNC)	CTC	Yes	Yes	Up to 240
Converter Channel Path (for BL types)	CVC	Yes	Yes	Up to 240
Converter Channel Path (for BY types)	CBY	Yes	Yes	Up to 240
FICON bridge. A FICON channel that attaches to an ESCON Director Model 5.	FCV	Yes	Yes	No
FICON native channels that attach to FICON directors or directly to FICON control units:				
FICON Express 1 GbE SX and LX	FC	Yes	Yes	No
FICON Express 2 GbE SX and LX	FC	Yes	Yes	No
FICON Express 4 GbE SX and LX	FC	Yes	Yes	Carried forward
FICON Express 8 GbE SX and LX	FC	No	No	up to 288

Channels	CHPID type	2094 support	2097 support	2817 support
FICON channels that attach to Fibre Channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges	FCP	Yes	Yes	Yes
ISC-3 peer mode channels (connects to another CFP)	CFP	Yes	Yes	Up to 48
ICB-4 peer channels (connects to another ICB-4)	CBP	Yes	Yes	No
IC peer channels (connects to another ICP)	ICP	Yes	Yes	Up to 32
PSIFB InfiniBand host channel adapters (HCA)	CIB	Yes	Yes	Up to 32
HiperSocket (IQDIO) channels	IQD	Yes	Yes	Up to 32
OSA- Express2 GbE LX/SX	OSD and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 GbE LX/SX	OSD and OSN	No	Yes	Up to 96 ports
OSA- Express2 1000BASE-T	OSE, OSD, OSC, and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 1000BASE-T	OSE, OSD, OSC, OSN, and OSM	No	OSC, OSD, OSE, and OSN: Yes OSM: No	Up to 96 ports
OSA- Express2 10 GbE LR	OSD	Yes	Yes	No
OSA- Express3 10 GbE LR/SR	OSD and OSX	No	OSD: Yes OSX: No	Up to 48 ports

Keep the following considerations in mind when planning your configuration.

Coupling links

Only the following Coupling Facility CHPIDs are supported:

- CHPID Type=CFP: ISC-3 links in peer mode
- CHPID Type=CIB: PSIFB links connecting to an HCA2-O (Optical) card
- CHPID Type=ICP: Internal Coupling links.

Note: Coupling links can be defined as both Coupling and STP links or STP-only links.

HMC

The HMC can appear either as the current HMC does, or as a HMC that can run code to manage an Ensemble. The current HMC is used to manage, monitor, and operate one or more IBM System z servers and their associated logical partitions. A HMC that has Ensemble code running is a HMC attached to one or more zEnterprise System(s) configured as Ensemble member(s). A particular Ensemble is managed by a pair of HMCs in primary and alternate roles.

The HMC has a global (Ensemble) management function, whereas the SE has local node management responsibility. When tasks are performed on the HMC, the commands are sent to one or more SEs, which then issue commands to their CPCs.

The z196 requires HMC Application V2.11.0 (driver level 86) or higher and only uses Ethernet for its network connection. The HMC and the Service Elements do not contain a floppy disc drive, requiring the use of a USB flash memory drive to input and back up customer configuration data.

Software support

HCD V1.12 (or HCD V1.7 and later with the Preventive Service Planning (PSP) bucket for 2817DEVICE and PTFs) is required to define and support some of the new features of the z196.

Open Systems Adapter - Integrated Console Controller

As support has now been withdrawn for the 2074 console controllers, you might consider using OSA-Express2 1000BASE-T or OSA-Express3 1000BASE-T CHPIDs defined as TYPE=OSC. These OSA cards allow you to set up console function supported by a configuration file defined on the Support Element for that processor.

Fibre Channel Protocol

When using CHPIDs defined as TYPE=FCP, you may want to consider N Port ID Virtualization (NPIV).

Refer to 2.1.6, “Worldwide Port Name tool” on page 32 for more information about FCP CHPIDs and the new WWPN prediction tool to manage them.

CPC name versus Processor ID

HCD allows you to define different processors (logical) to the same CPC (physical). The Processor ID needs to be unique within the same IODF, but the CPC name does not. Therefore, the CPC name does not need to match the Processor ID, which is useful when you might have several processor/logical partition/control unit setups that share the same physical CPC within the same IODF. Furthermore, the Processor ID is what is defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC name is coded in HCD Option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. It is the CPC name, and not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC over the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP301). These values are defined in the Support Element for the CPC and they need to match the values set in the IODF so that HCD Option 2.11 can find the CPC to write an IOCDS in the S/390 Microprocessor Cluster List.

Local system name

An additional system name, LSYSTEM, is used to identify the local system name of a server when defining PSIFB type=CIB coupling links.

This data field can be found when changing a CIB-capable processor under HCD Option 1.3.

The LSYSTEM field can be set or changed to any one to eight alphanumeric characters and also can begin with either an alpha or numeric character. All characters are upper case.

Here are the rules that will determine whether, and where, HCD will set the LSYSTEM keyword automatically:

1. If a CIB-capable processor is defined and the CPC name is set but the local system name is not set, HCD defaults the local system name to the CPC name.
2. If a CIB-capable processor that has not yet defined a CPC name is changed to obtain a CPC name but no local system name, HCD defaults the CPC name to the local system name.
3. If a non-CIB capable processor is changed to a support level that is CIB capable, and the processor has a CPC name set but no local system name, the local system name defaults to the CPC name.
4. If the processor definition is changed such that the local system name is explicitly removed, HCD does not do any defaulting.
5. If a processor has a local system name set (whether it has a CPC name or not), any change to the local system name has to be done explicitly. There is no implicit name if the CPC name or the support level is changed.
6. During Build Production IODF, it is verified that a local system name has to be set for the processor if the processor has a CIB channel path defined. If this verification fails, an error message is given and the production IODF is not built.

We do, however, recommend that the local system name be the same as the CPC name.

Additional keywords for the ID statement in an IOCP deck include:

AID	Adapter ID.
Port	HCA port.
CPATH	Specifies the CCSID and CHPID on the connecting system.

5.1.4 Replacement scenario (push/pull)

This scenario describes the configuration steps needed to replace an existing 2097 processor with a new 2817 processor. Key factors and procedures are as follows:

- HCD requires a new Processor ID for the 2817.
- HCD requires a new CPC name for the 2817.
- The 2817 processor channels connect to the same switch ports and access the same control unit interfaces.
- The control unit interfaces connect to the same switch ports.
- The starting IODF is the current 2097 production IODF.
- The target IODF is a new 2817 work IODF.
- HCD actions:
  - Migrate updated IOCP statements.
  - Build production IODF.
  - Remote write IODF to IOCDS.
- HMC actions:
  - Build Reset Profile and point to required IOCDS.
  - Build/Verify Image Profiles.
  - Build/Verify Load Profiles.
  - Performing a power-on reset.

The example here uses a 2097-E26 with a Processor ID of SCZP201 and four CSSs (CSS ID=0, CSS ID=1, CSS=2, and CSS ID=3) and replaces it with a 2817-M32 with a Processor ID of SCZP301.

The CPC name SCZP201 and serial number 01DE50 change to the CPC name of SCZP301 and serial number of 0B3BD5.

The following CHPID types are migrated:

- OSD and OSC
- CTC and CNC
- FC and FCP
- CFP and ICP
- IQD

The following hardware/CHPID types are not supported and not migrated to the 2817:

- PCIXCC and PCICA
- ICB-4 links
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

Table 5-2 summarizes the migration options and tool requirements. The step-by-step process is documented later in this chapter.

Table 5-2 2097 I/O configuration migrated to a 2817

2094 or 2097 to 2817	**Replace existing 2094 or 2097 with a 2817 (push/pull)**
Processor ID	Required to change the processor ID to a new ID.
CPC name	New CPC name.
Channel to switch port connections	Same ports.
Control Unit to switch port connections	Same ports.
Starting IODF	Current active production IODF.
Target IODF	Creates a new work IODF.
HCD action	Repeat and change (see step 5 on page 220).
CHPID Mapping Tool Program (CMT) (needed or not)	Optional, but recommended.
`CFReport` file (CCN) (needed or not)	Required.
IOCP (import from validated work IODF)	Yes.
CMT PCHID reset	Yes.
CMT IOCP Output	Yes.
CMT Reports	Yes, CHPID and CHPID to CU Report

5.2 HCD: Migrating the existing 2097 IODF

The following steps explain how to define the existing I/O configuration to the new 2817 IODF, and then migrate the channel subsystem and logical partitions from the 2094 or 2097 to the 2817 server. Using HCD, the sequence of operations is as follows:

1. Create a work IODF from the current 2097 production IODF.
2. Repeat the 2097 processor being replaced.
3. Observe Coupling Link messages for later reference.
4. Delete unsupported items from the repeated 2097.
5. Change the repeated 2097 to a 2817, and then delete the 2097.
6. Redefine all required CF connections to other processors and any Internal CF connections required.
7. Define any additional CHPIDs, control units, and devices you may be adding in the replacement.
8. When necessary, overdefine channel paths.
9. Save OSA configuration information.
10. Build a validated 2817 work IODF.
11. Create an IOCP statements file and transfer it to the workstation running the CHPID Mapping Tool. This step can also be performed with HCM.
12. Create an IOCP statements file and transfer it to your workstation. This step can be performed with HCM.
13. Import CFReport and IOCP statements into the CMT.
14. Perform hardware resolution and PCHID/CHPID availability.
15. Create configuration reports for yourself and the IBM service representative.
16. Import IOCP statements updated with PCHIDs back into the validated work IODF.
17. Build the production IODF.
18. Remote write the IOCP to an IOCDS on the processor; if this action is not possible, copy the IOCP statements to a USB memory flash drive.
19. Run the Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2817 Service Element IOCDS.
20. Build the Reset, Image, and Load Profiles, if required.
21. Perform a power-on reset (activate) of 2817.

In the following sections, we describe these steps in more detail.

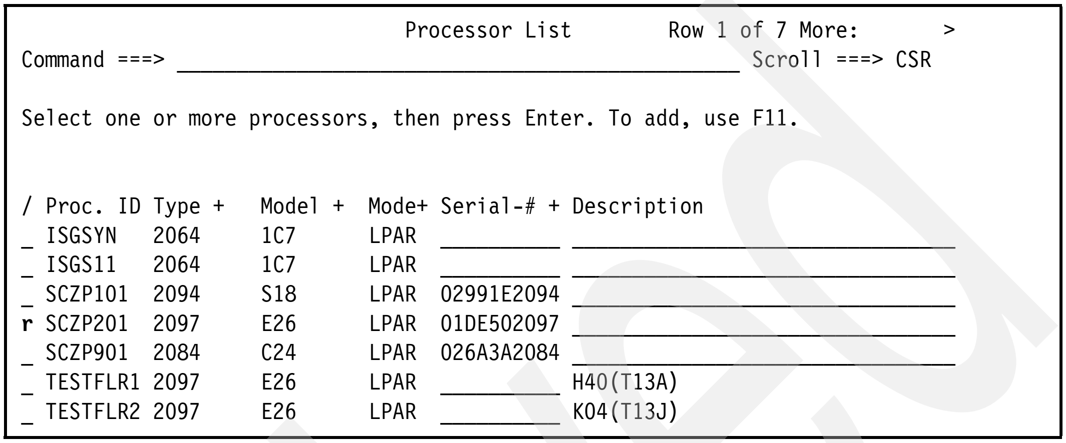
5.2.1 Creating the work IODF from the current 2097 production IODF

In HCD, select the current production IODF that contains the 2097 processor that you are replacing (for example, SYS6.IODF3C).

5.2.2 Repeating the 2097 processor being replaced

To repeat the 2097 processor being replaced, perform the following steps:

1. From the main HCD panel, select Option 1.3. Processor List. Enter `r` (for repeat) next to the 2097 you want to replace and press Enter (Figure 5-2).

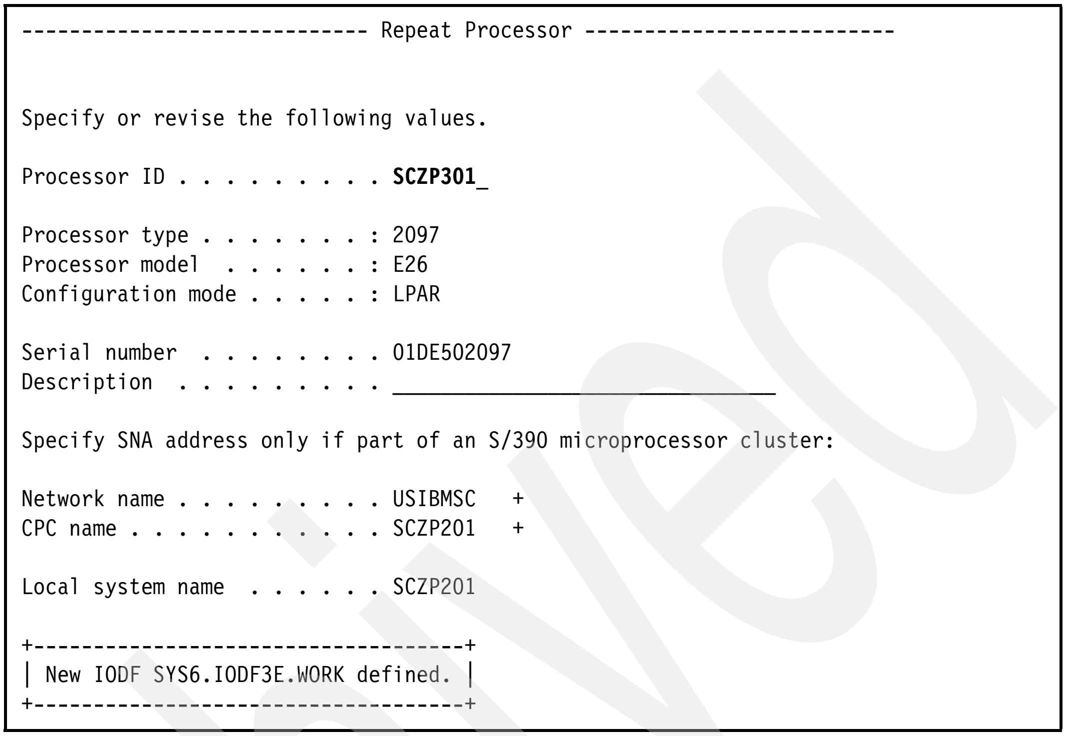


```
                                Processor List        Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
r SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 5-2 Processor List (repeating processor)

2. The Identify Target IODF panel opens. Perform one of the following actions:
   - To retain all the other processor definitions in the IODF, press Enter.
   - Otherwise, type in a Target IODF data set name. In this case, only the processor you are repeating is retained in the target IODF.
3. The Create Work I/O Definition File panel prompts you to enter the data set name of the target IODF (for example, `SYS6.IODF3E.WORK`).

4. The Repeat Processor panel opens (Figure 5-3). Enter the Processor ID of the new 2817 (in this example, `SCZP301`), leave all the other fields unchanged, and press Enter to continue.

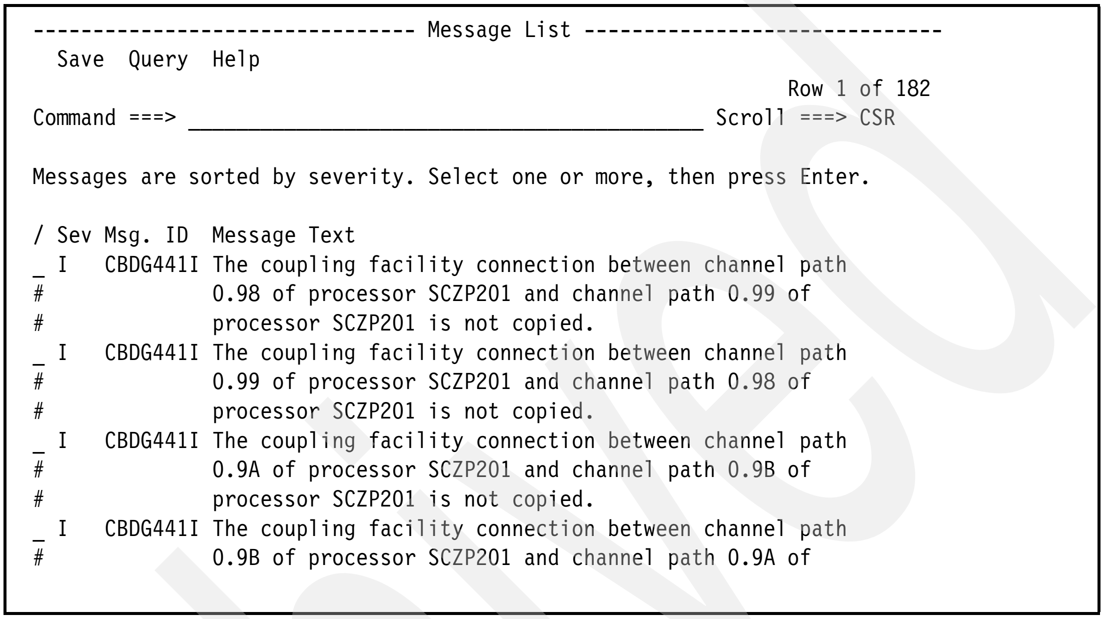


```
----------------------------- Repeat Processor --------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . SCZP301_

Processor type . . . . . . . : 2097
Processor model  . . . . . . : E26
Configuration mode . . . . . : LPAR

Serial number  . . . . . . . . 01DE502097
Description  . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . SCZP201   +

Local system name  . . . . . . SCZP201

+------------------------------------+
| New IODF SYS6.IODF3E.WORK defined. |
+------------------------------------+
```

Figure 5-3 Repeat Processor (defining new processor ID)

5.2.3 Coupling Link information messages

At this point, you may be presented with severity E, I, or W messages. As shown in Figure 5-4, in our example CBDG441I messages were mentioned in the introduction; these messages were received due to the Coupling Link CHPIDs not being copied over to the 2817 definition.

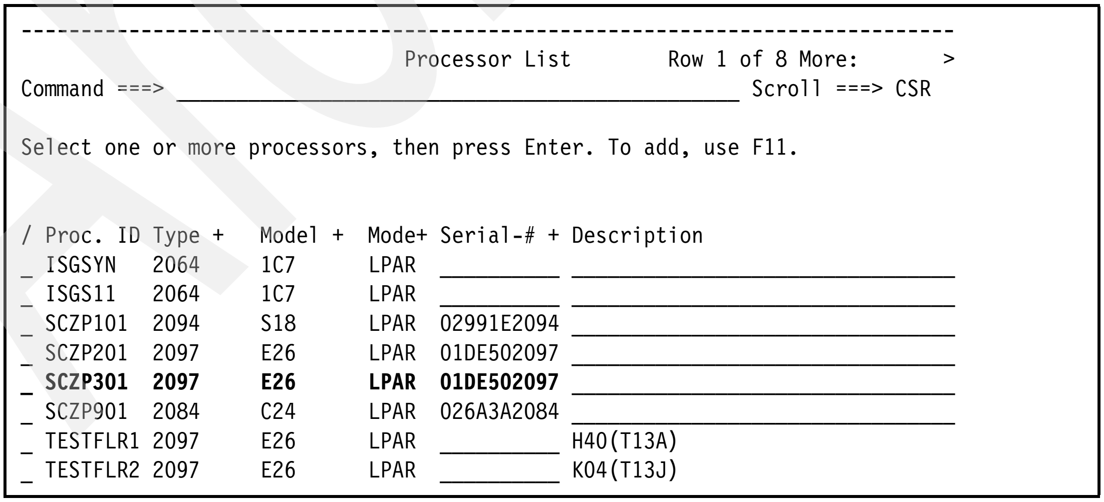


```
-------------------------------- Message List ------------------------------
  Save  Query  Help
                                                               Row 1 of 182
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ I   CBDG441I The coupling facility connection between channel path
#              0.98 of processor SCZP201 and channel path 0.99 of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.99 of processor SCZP201 and channel path 0.98 of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.9A of processor SCZP201 and channel path 0.9B of
#              processor SCZP201 is not copied.
_ I   CBDG441I The coupling facility connection between channel path
#              0.9B of processor SCZP201 and channel path 0.9A of
```

Figure 5-4 Message List (CBDG441I)

Scroll down until you reach the end of the messages and see the `CBDG271I requested action on object SCZP201 successfully processed` message.

Press PF3 or PF12 to continue. As shown in Figure 5-5, there is now an additional 2097 processor named SCZP301.



```
------------------------------------------------------------------------------
                                Processor List       Row 1 of 8 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

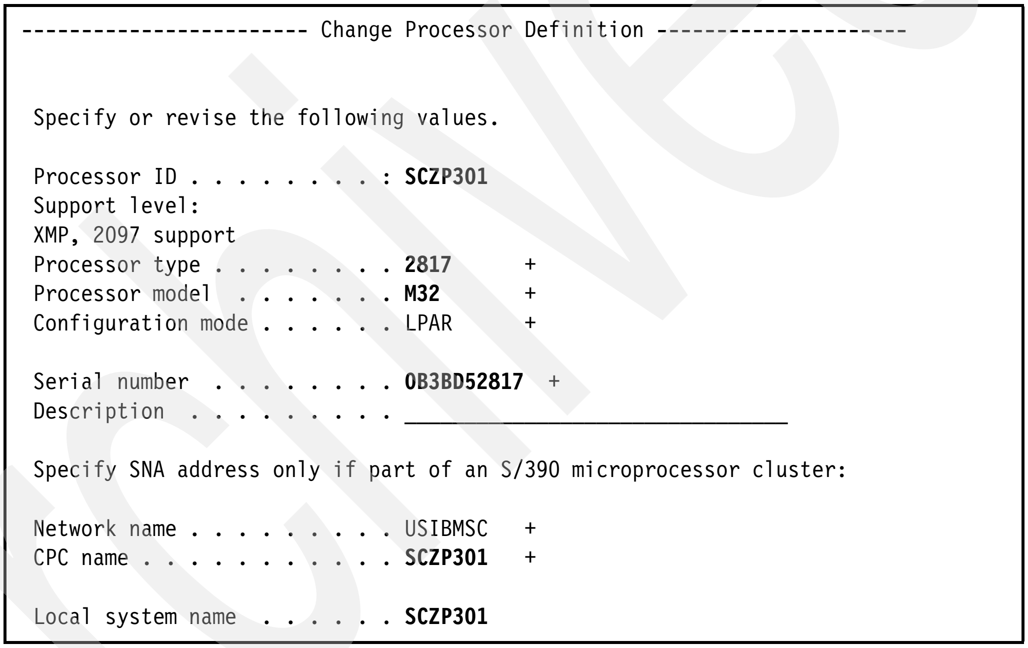
Figure 5-5 Processor List (repeated processor)

5.2.4 Changing the 2097 to a 2817 and deleting the 2097

At this point, you can either leave the original copy of the 2097 (SCZP201) or delete it from the IODF. In our example, we left it in the IODF for now.

Perform the following steps:

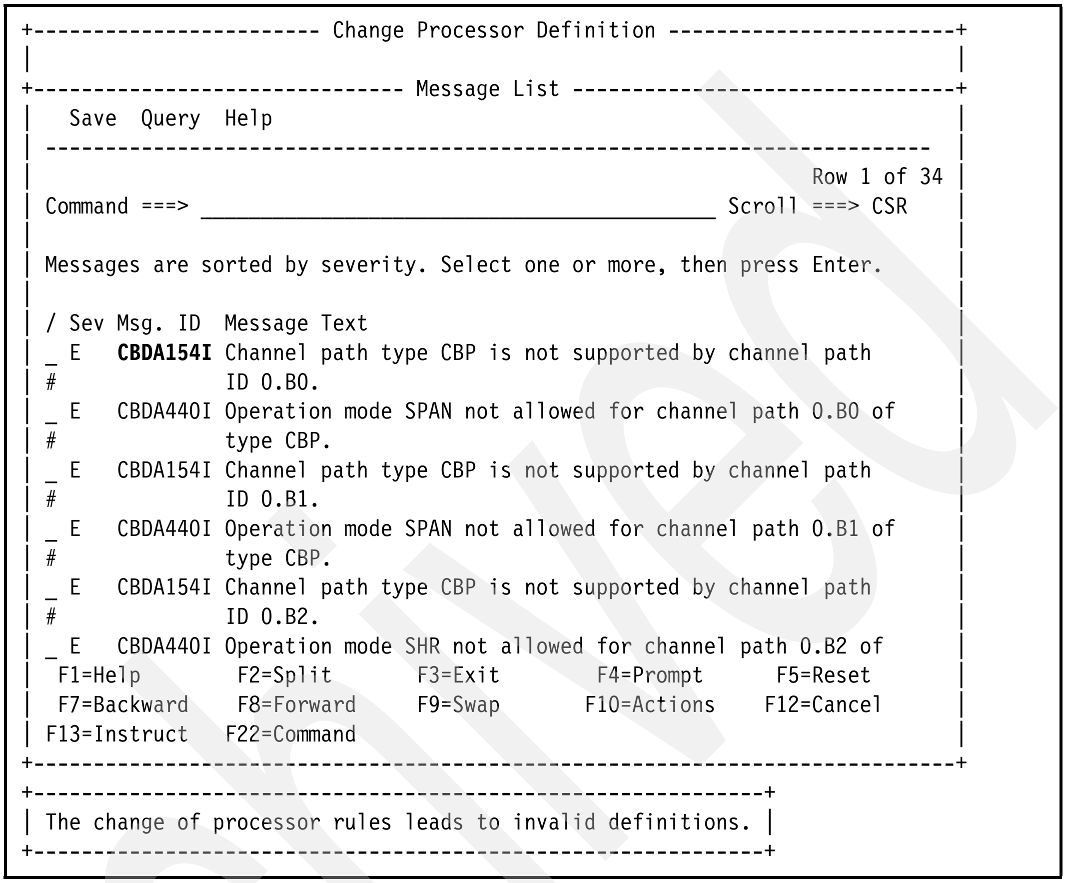
1. Enter `c` (change) next to SCZP301 to change the 2097 to a 2817 and press Enter. The Change Processor Definition panel opens (Figure 5-6).
2. Make the following updates and press Enter:
   - Update `Processor type` to `2817`.
   - Update `Processor Model` to `M32`.
   - Update `Serial Number` to `0B3BD52817`.
   - Update `CPC name` to `SCZP301`.
   - Update `Local system name` to `SCZP301`.



```
------------------------ Change Processor Definition ---------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP301
 Support level:
 XMP, 2097 support
 Processor type . . . . . . . . 2817      +
 Processor model  . . . . . . . M32       +
 Configuration mode . . . . . . LPAR      +

 Serial number  . . . . . . . . 0B3BD52817  +
 Description  . . . . . . . . . ________________________________

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP301   +

 Local system name  . . . . . . SCZP301
```

Figure 5-6 Change Processor Definition (changing repeated processor)

3. Press Enter. In our example, we deliberately left CBP type CHPIDs defined in the processor we are replacing to demonstrate the error message received when replacing a processor definition with unsupported CHPID types (Figure 5-7).

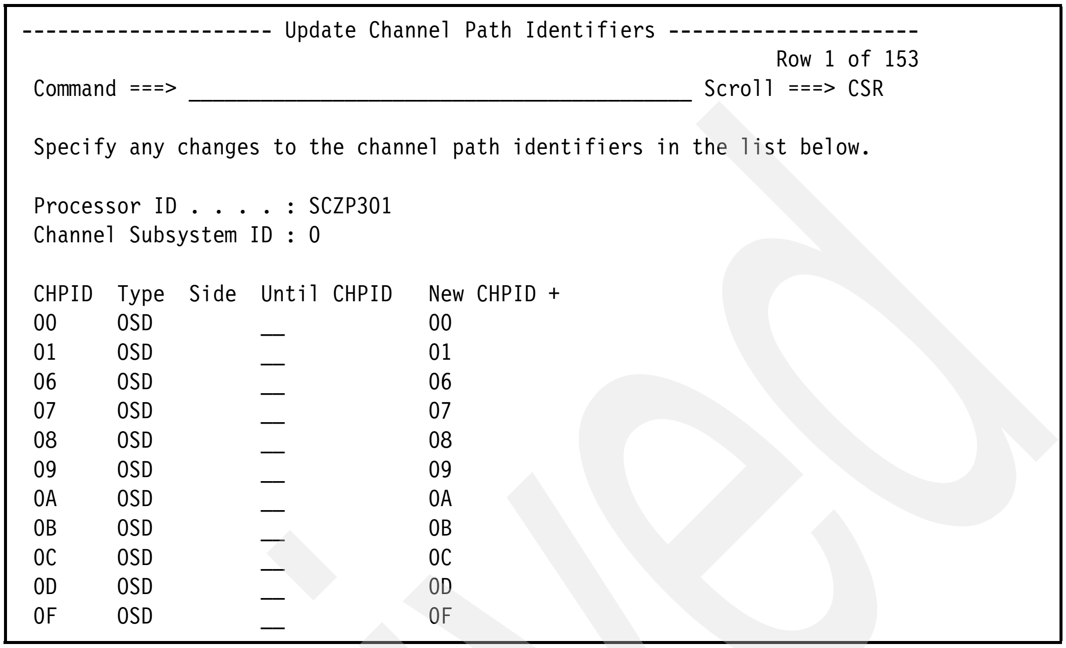


```
+------------------------ Change Processor Definition -------------------------+
|                                                                              |
+------------------------------- Message List ---------------------------------+
|   Save  Query  Help                                                          |
| ---------------------------------------------------------------------------  |
|                                                                  Row 1 of 34 |
| Command ===> ___________________________________________ Scroll ===> CSR     |
|                                                                              |
| Messages are sorted by severity. Select one or more, then press Enter.       |
|                                                                              |
| / Sev Msg. ID  Message Text                                                  |
| _ E   CBDA154I Channel path type CBP is not supported by channel path        |
| #             ID 0.B0.                                                       |
| _ E   CBDA440I Operation mode SPAN not allowed for channel path 0.B0 of      |
| #             type CBP.                                                      |
| _ E   CBDA154I Channel path type CBP is not supported by channel path        |
| #             ID 0.B1.                                                       |
| _ E   CBDA440I Operation mode SPAN not allowed for channel path 0.B1 of      |
| #             type CBP.                                                      |
| _ E   CBDA154I Channel path type CBP is not supported by channel path        |
| #             ID 0.B2.                                                       |
| _ E   CBDA440I Operation mode SHR not allowed for channel path 0.B2 of       |
|  F1=Help        F2=Split       F3=Exit        F4=Prompt      F5=Reset        |
|  F7=Backward    F8=Forward     F9=Swap       F10=Actions    F12=Cancel       |
| F13=Instruct   F22=Command                                                   |
+------------------------------------------------------------------------------+
+-------------------------------------------------------------+
| The change of processor rules leads to invalid definitions. |
+-------------------------------------------------------------+
```

Figure 5-7 CBDA154I error message when changing a model with CBP definitions

4. Press PF12 twice to return to the processor list and delete all unsupported CHPID types and then perform the change processor type step once more.

5. Press Enter. The Update Channel Path Identifiers panel opens (Figure 5-8). In our example, we made no changes.

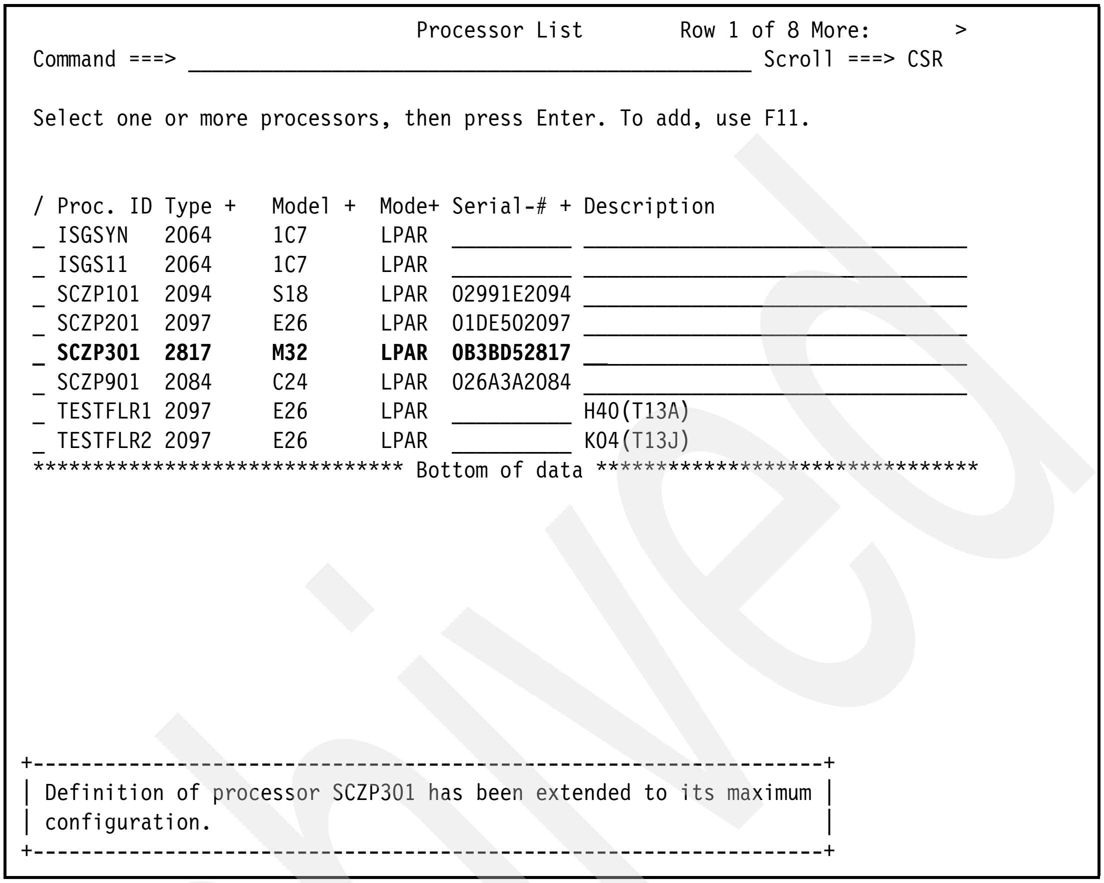


```
--------------------- Update Channel Path Identifiers ---------------------
                                                               Row 1 of 153
 Command ===> __________________________________________ Scroll ===> CSR

 Specify any changes to the channel path identifiers in the list below.

 Processor ID . . . . : SCZP301
 Channel Subsystem ID : 0

 CHPID  Type  Side  Until CHPID   New CHPID +
 00     OSD         __            00
 01     OSD         __            01
 06     OSD         __            06
 07     OSD         __            07
 08     OSD         __            08
 09     OSD         __            09
 0A     OSD         __            0A
 0B     OSD         __            0B
 0C     OSD         __            0C
 0D     OSD         __            0D
 0F     OSD         __            0F
```

Figure 5-8 Update Channel Path Identifiers (not changed)

6. Press Enter *for each of the Channel Subsystem IDs*.

The repeated 2097 processor has been successfully changed to a 2817-M32 (Figure 5-9).



```
                                 Processor List       Row 1 of 8 More:       >
 Command ===> _______________________________________________ Scroll ===> CSR

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


 / Proc. ID Type +   Model +  Mode+ Serial-# + Description
 _ ISGSYN   2064     1C7      LPAR  __________ ________________________________
 _ ISGS11   2064     1C7      LPAR  __________ ________________________________
 _ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
 _ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
 _ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
 _ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
 _ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
 _ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
 ******************************* Bottom of data ********************************








+------------------------------------------------------------------+
| Definition of processor SCZP301 has been extended to its maximum |
| configuration.                                                   |
+------------------------------------------------------------------+
```

Figure 5-9 Processor List (changed processor)

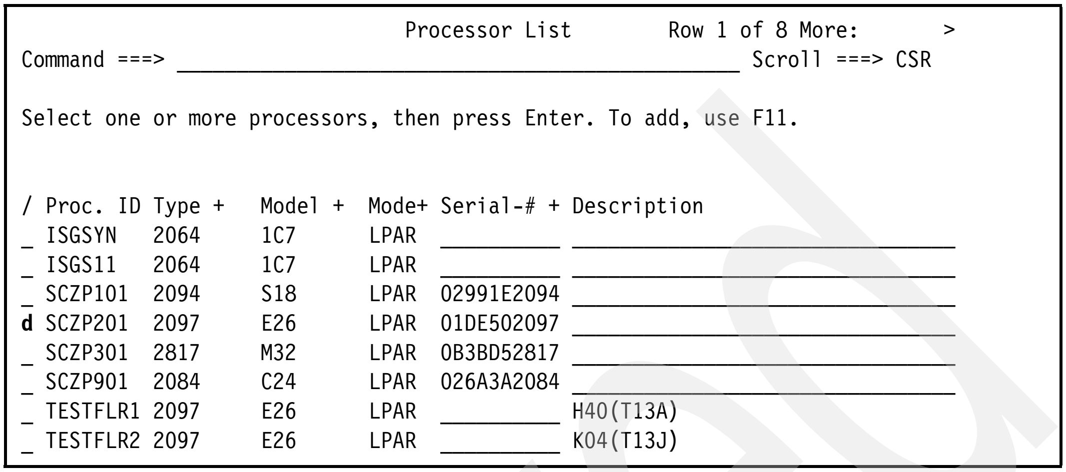
Note the message displayed at the bottom of the panel that indicates that the processor definition has been extended to its maximum configuration. This extension occurs because part of the Central Storage is allocated as a fixed-sized Hardware System Area that is not addressable by application programs. In HCD, when you define as new or redefine a processor as 2097 or 2817, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

5.2.5 Deleting the 2097 processor definition

Now that the 2097 has been repeated and changed to become a 2817, the original 2097 definition (SCZP201) must now be deleted so that the required Coupling Links can be restored.

Perform the following steps:

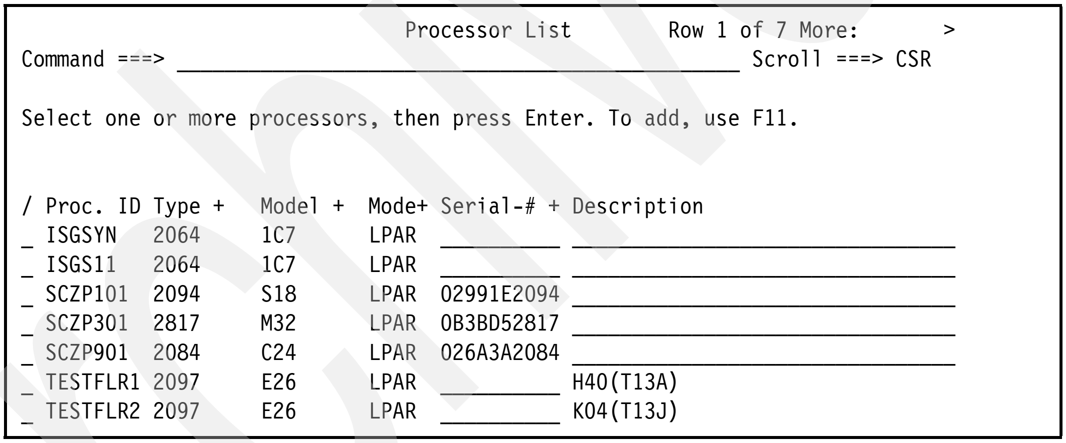
1. Enter `d` (for delete) next to the SCZP201 processor in the Processor List (Figure 5-10).



```
                                Processor List       Row 1 of 8 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
d SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 5-10 Processor List (deleting processor)

2. Press Enter to confirm the deletion of the processor (Figure 5-11).



```
                                Processor List       Row 1 of 7 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 5-11 Processor List (processor deleted)

5.2.6 Reconnecting the Coupling Link channel paths not migrated

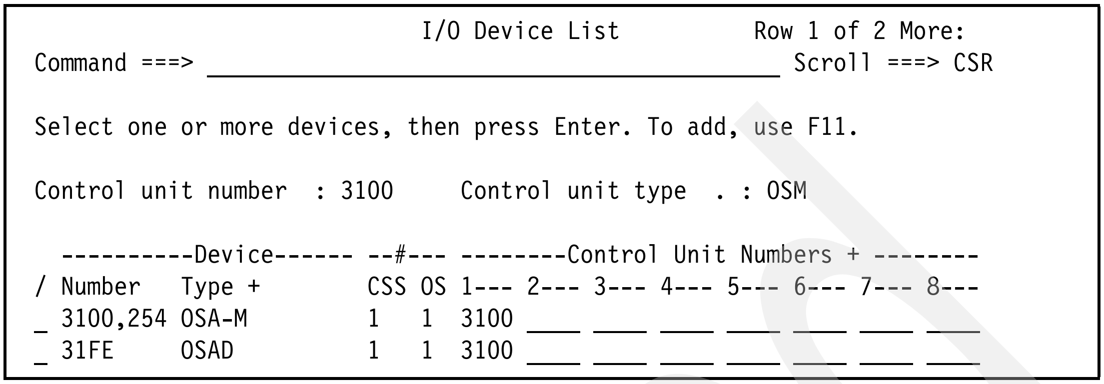
Next, you need to manually redefine the Coupling Links you want from the SCZP301 processor to any other processor, along with any desired Internal Coupling Facility links. To help in this effort, you can get a CF connection report from the previous production IODF containing the 2097. Alternatively, you can make a note of all CBDG441I error messages received in 5.2.5, “Deleting the 2097 processor definition” on page 227.

5.2.7 Defining additional I/O

At this point, define any additional CHPIDs, control units and devices, CTCs, and so on that you might be adding into the 2817 during the replacement.

As we plan to connect the z196 to a zEnterprise BladeCenter® Extension (zBX) in the future, we define the new OSA type CHPIDs OSM and OSX.

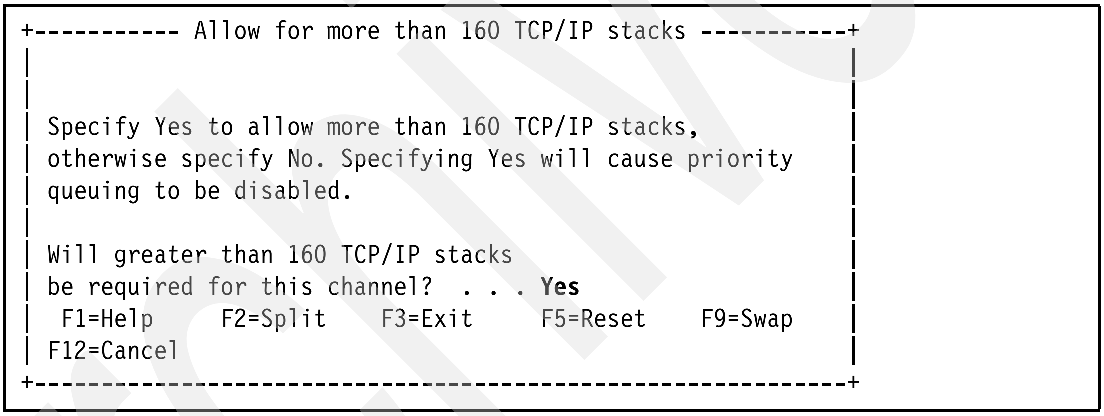
Figure 5-12 shows the new device type=OSA-M connected to control unit type=OSM, which is connect to new CHPID type=OSM.



```
                             I/O Device List         Row 1 of 2 More:
Command ===> ___________________________________________ Scroll ===> CSR

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

Control unit number  : 3100     Control unit type  . : OSM

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +       CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 3100,254 OSA-M        1   1  3100 ____ ____ ____ ____ ____ ____ ____
_ 31FE     OSAD         1   1  3100 ____ ____ ____ ____ ____ ____ ____
```

Figure 5-12 OSM I/O Device List sample definition

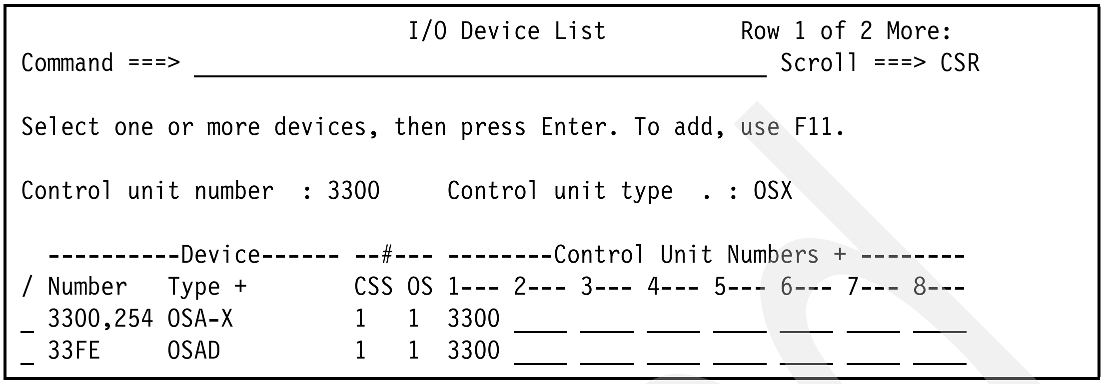
When defining CHPID type=OSM, priority queuing must be disabled, which is achieved by specifying `Yes` in the “Will greater than 160 TCP/IP stacks be required for this channel” field in the HCD dialog box when defining or modifying the CHPID definition (Figure 5-13).



```
+----------- 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?  . . . Yes                    |
|  F1=Help     F2=Split    F3=Exit     F5=Reset    F9=Swap    |
| F12=Cancel                                                  |
+-------------------------------------------------------------+
```

Figure 5-13 OSM Allowing more than 160 TCP/IP stacks

Figure 5-14 shows the new device type=OSA-X connected to control unit type=OSX, which is connected to new CHPID type=OSX.



```
                             I/O Device List         Row 1 of 2 More:
Command ===> ___________________________________________ Scroll ===> CSR

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

Control unit number  : 3300     Control unit type  . : OSX

  ----------Device------ --#--- --------Control Unit Numbers + --------
/ Number   Type +       CSS OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8---
_ 3300,254 OSA-X        1   1  3300 ____ ____ ____ ____ ____ ____ ____
_ 33FE     OSAD         1   1  3300 ____ ____ ____ ____ ____ ____ ____
```

Figure 5-14 OSX I/O Device List sample definition

5.2.8 Overdefining channel paths on an XMP processor

Sometimes you need to define a channel path that is not physically installed on the processor. This definition might be useful if you are planning to add additional channel cards to the processor in the future and want to have the definitions in the IODF before the hardware is installed.

HCD allows you to overdefine CHPIDs by using an asterisk (*) for the PCHID value. An overdefined CHPID must adhere to all validation rules, but it is not taken into account by an IOCDS download. Also, it is not included in the IOCP statements, in a CONFIGxx member, or during dynamic activation.

If a control unit contains only CHPIDs with a PCHID value of an asterisk (*), then 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 * with its valid PCHID.

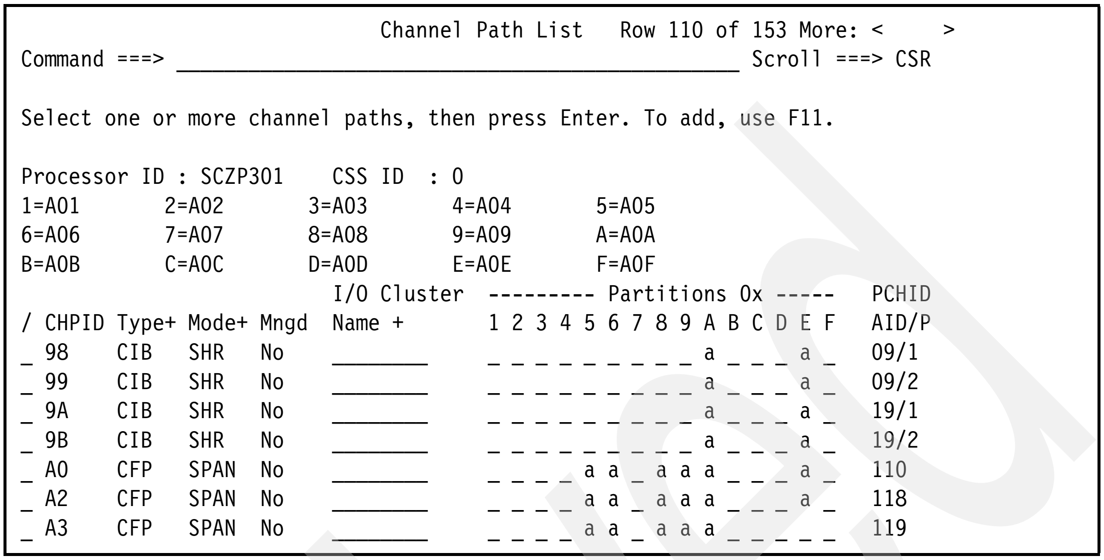
Note: This is not the case for CFP type CHPIDs, where these CHPIDs have connections to other CFP type CHPIDs.

Therefore, HCD only allows you to define CFP type CHPIDs as overdefined if they are unconnected.

Overdefining is now supported for CIB type CHPID definitions.

The 2817 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

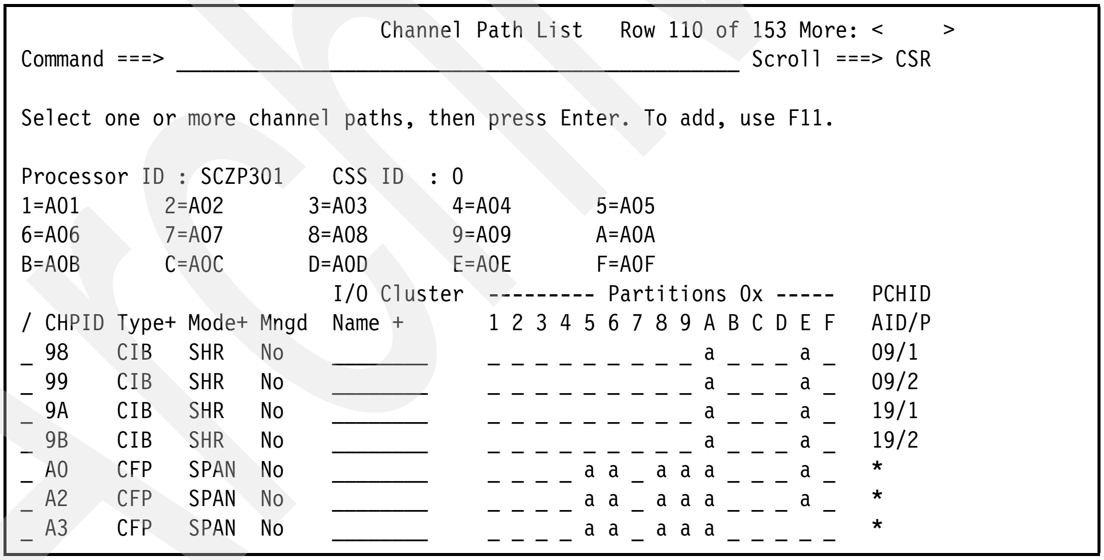
Figure 5-15 shows what the CHPID/PCHID definitions look like before being defined as overdefined. Press PF20 (right) in the Channel Path List.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   110
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   118
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   119
```

Figure 5-15 Channel Path List (Reserving CHPIDs)

Figure 5-16 shows what the CHPID/PCHID definitions look like after being defined as overdefined.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   *
```

Figure 5-16 Channel Path List (overdefined CHPIDs)

5.3 OSA: Saving and restoring configuration files

On the z9 EC and z10 EC, customization information for certain channel types is stored in files on the Support Element (SE). The files are called *configuration files*, and they are named based on the physical location (PCHID value) of the feature.

Table 5-3 lists CHPID types that have configuration files on a z9 EC and z10 EC.

Table 5-3 Channel or CHPID type information in configuration files

Feature or CHPID type	**Information stored in configuration files**
OSA-Express2 types OSD/OSE	Any user-specified MAC addresses and OAT tables
OSA-Express3 types OSD/OSE	Any user-specified MAC addresses and OAT tables
OSA- Express2 1000BASE-T defined as CHPID type OSC	Console session information
OSA- Express3 1000BASE-T defined as CHPID type OSC	Console session information

If channels or CHPIDs have associated configuration files, the CHPID Mapping Tool can assign PCHIDs to the logical CHPID definitions or move a CHPID definition to a new location. These actions can occur regardless of whether channels are moving.

The CHPID Mapping Tool can override PCHID assignments for:

- FICON channels supporting FCP
- OSA-Express2 and OSA- Express3 channels supporting OSC

The field upgrade process preserves configuration files on an upgrade from a z9 EC and z10 EC to a z196. However, it is your responsibility to keep a backup of the customization data stored in the configuration files.

During an field upgrade, the following actions occur:

- The channel cards are moved as part of the normal rebalancing of all I/Os.
- The configuration files are copied from your old system, restored to the new z196, and renamed to match their new PCHIDs of the new physical locations of the channel cards.
- The CHPID Mapping Tool forces the logical CHPID previously assigned to the old PCHID location to be assigned to the new PCHID location.

  The CHPID Mapping Tool can only perform this function if the initial IOCP input contains the PCHID assignments from the old system.

For more information about configuration files, refer to Appendix A, “An explanation of configuration files” *in CHPID Mapping Tool User’s Guide,* GC28-6825.

In this book, we show examples of backing up the configuration data with OSA/SF for OSA-Express2 and Express3 features, and with the HMC for OSA-ICC (OSC).

5.3.1 Saving OSA configuration information with OSA/SF

The Open Systems Adapter Support Facility (OSA/SF) is an application that helps you to customize and manage your OSA-2 and OSA-Express features. It also allows you to obtain status and operational information.

OSA/SF includes a graphical user interface (GUI) and a REXX interface. The OSA/SF GUI runs on Windows and Linux software that have graphics and Java 1.4 support. From a single OSA/SF GUI, you can establish connections to all server images that have OSA/SF running. This potentially allows you to have centralized control of OSA-2 and OSA-Express features that span server boundaries (Figure 5-17).

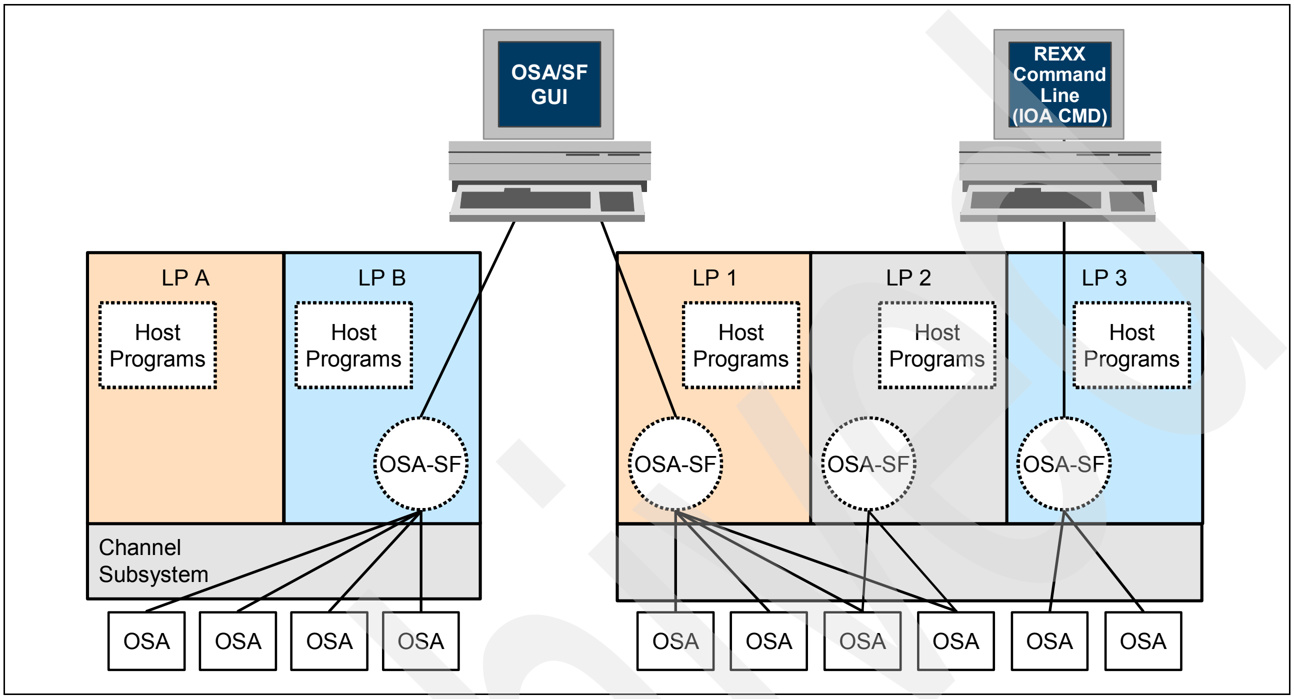


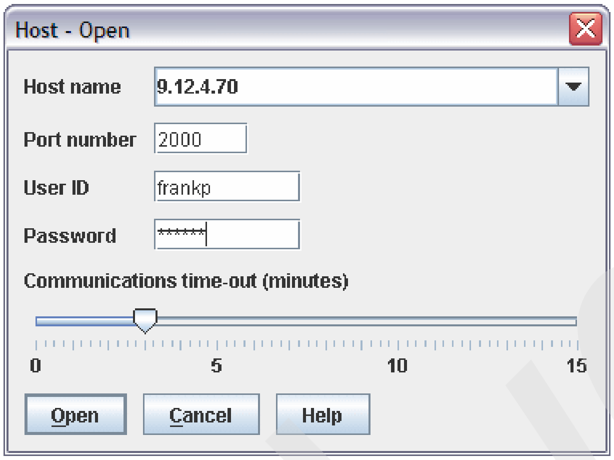
Figure 5-17 OSA/SF

Using OSA/SF, you can save the OSA-Express2 definitions for user-specified MAC addresses and OAT tables. For information about setting up OSA/SF, refer to *Open Systems Adapter-Express Customer's Guide and Reference*, SA22-7935 and *OSA-Express Implementation Guide,* SG24-5948.

Saving the current OSA-Express configuration

To customize, manage, and save the configurations of your OSA-Express features with the OSA/SF, perform the following steps:

1. From a Windows workstation, start a DOS session and issue the **`java ioajava`** command to start the OSA/SF GUI. Log on to OSA/SF (Figure 5-18).



Host name 9.12.4.70

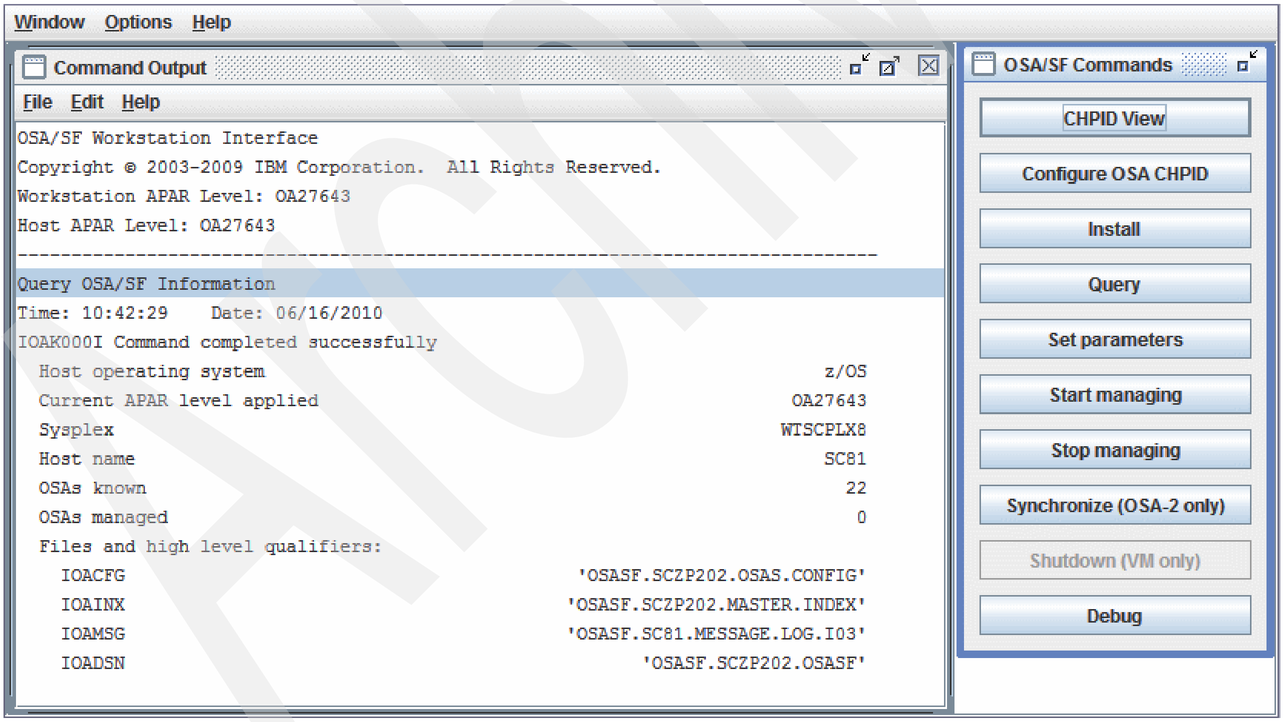
Port number 2000

User ID frankp

Password ******

Figure 5-18 OSA/SF Workstation Interface Logon

The OSA/SF main windows open (Figure 5-19).



```
OSA/SF Workstation Interface
Copyright © 2003-2009 IBM Corporation.  All Rights Reserved.
Workstation APAR Level: OA27643
Host APAR Level: OA27643
--------------------------------------------------------------------------------
Query OSA/SF Information
Time: 10:42:29    Date: 06/16/2010
IOAK000I Command completed successfully
  Host operating system                                                  z/OS
  Current APAR level applied                                          OA27643
  Sysplex                                                             WTSCPLX8
  Host name                                                              SC81
  OSAs known                                                               22
  OSAs managed                                                              0
  Files and high level qualifiers:
    IOACFG                                         'OSASF.SCZP202.OSAS.CONFIG'
    IOAINX                                        'OSASF.SCZP202.MASTER.INDEX'
    IOAMSG                                        'OSASF.SC81.MESSAGE.LOG.I03'
    IOADSN                                               'OSASF.SCZP202.OSASF'
```

Figure 5-19 OSA/SF Workstation Interface

2. In the OSA/SF Commands window, click **CHPID View**. The CHPID View window opens and lists all OSA features in the configuration.

3. From the CHPID list shown in the CHPID View window, select the CHPID with which you want to work. Select **Selected** → **Configurations** → **Configuration...** (Figure 5-20).

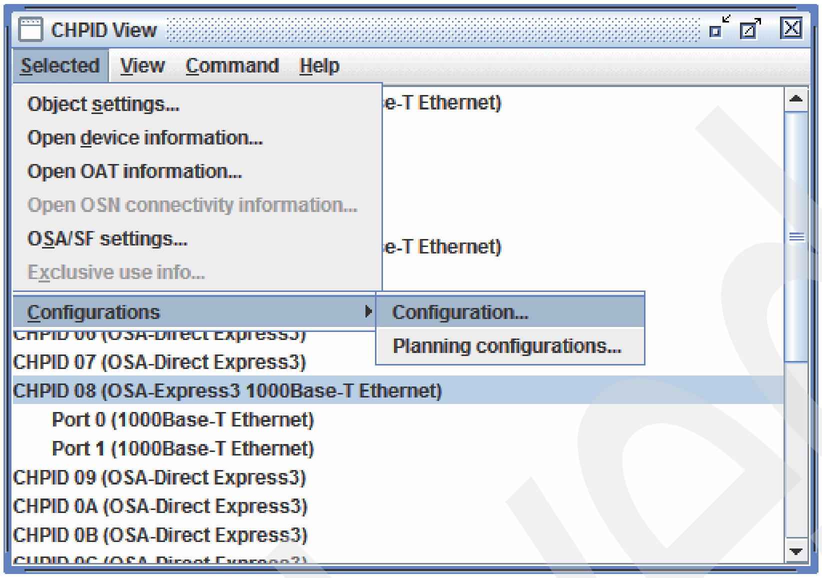
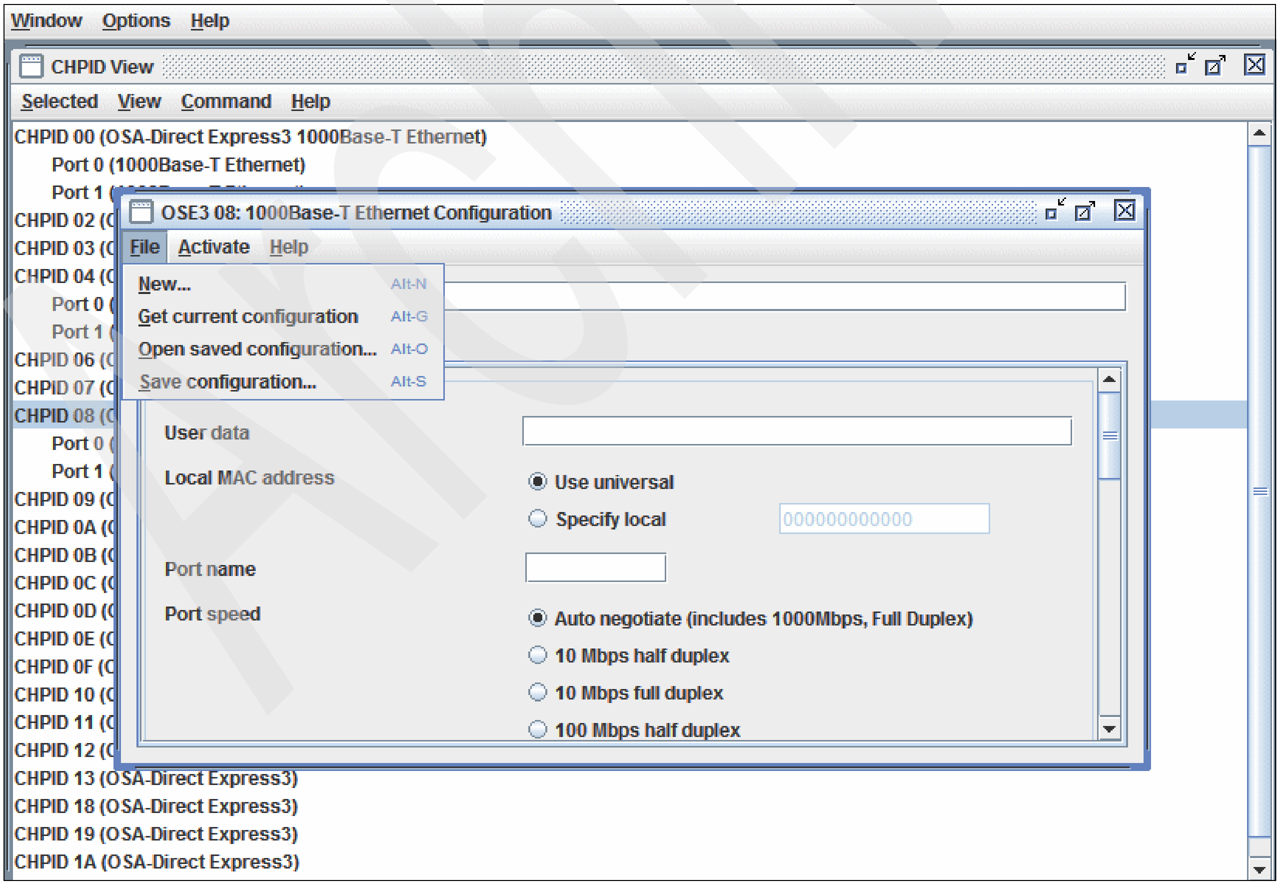


Figure 5-20 OSA/SF Workstation Interface: Selected Configurations

4. A CHPID configuration window opens with blank fields. Select **File** → **Get current configuration** (Figure 5-21).



User data

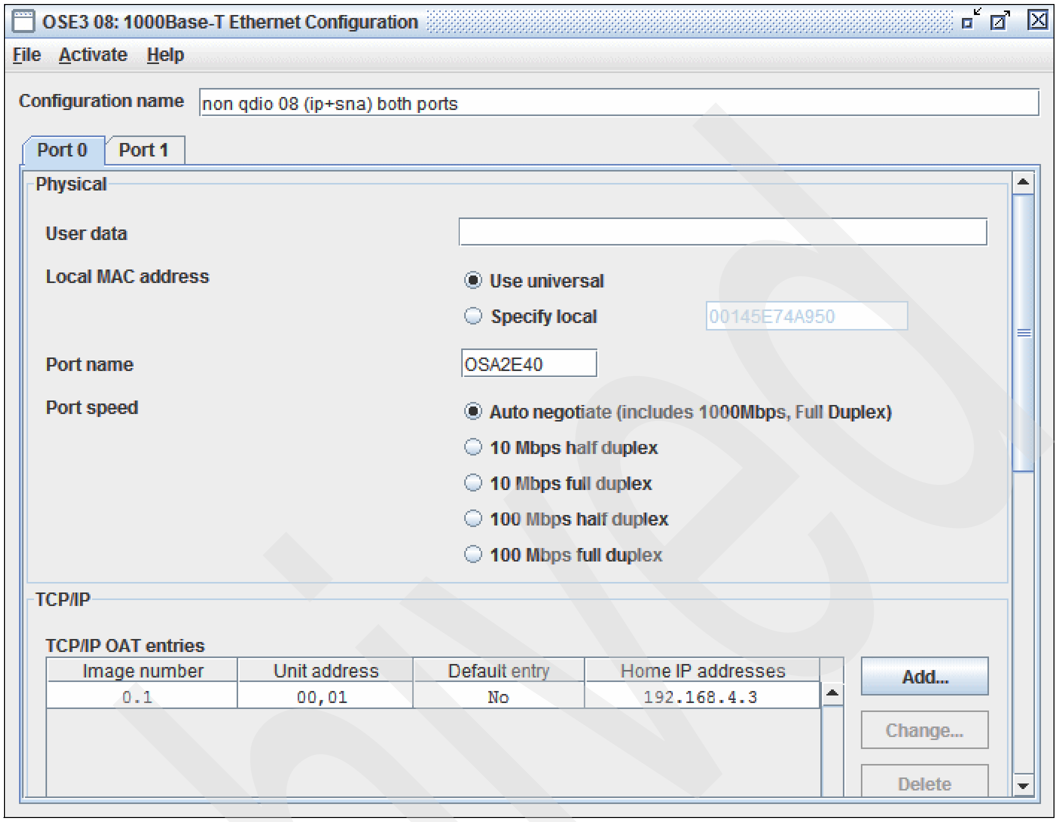
Local MAC address
● Use universal
○ Specify local 000000000000

Port name

Port speed
● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex
○ 100 Mbps half duplex

Figure 5-21 OSA/SF Workstation Interface: Get current configuration

5. The CHPID configuration window opens again, and now has the current OSA CHPID configuration information. Enter the Configuration name (Figure 5-22).



Configuration name: non qdio 08 (ip+sna) both ports

User data:

Local MAC address:
● Use universal
○ Specify local 00145E74A950

Port name: OSA2E40

Port speed:
● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex
○ 100 Mbps half duplex
○ 100 Mbps full duplex

TCP/IP OAT entries

Image number	Unit address	Default entry	Home IP addresses
0.1	00,01	No	192.168.4.3

Figure 5-22 OSA/SF Workstation Interface: Current configuration

6. Select **File** → **Save configuration...** (Figure 5-23). The configuration file is saved by OSA/SF and can be reused later.

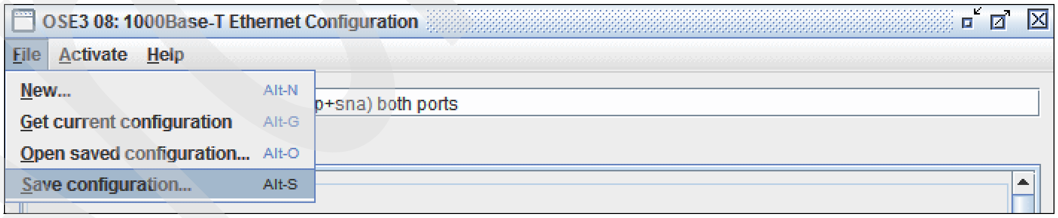


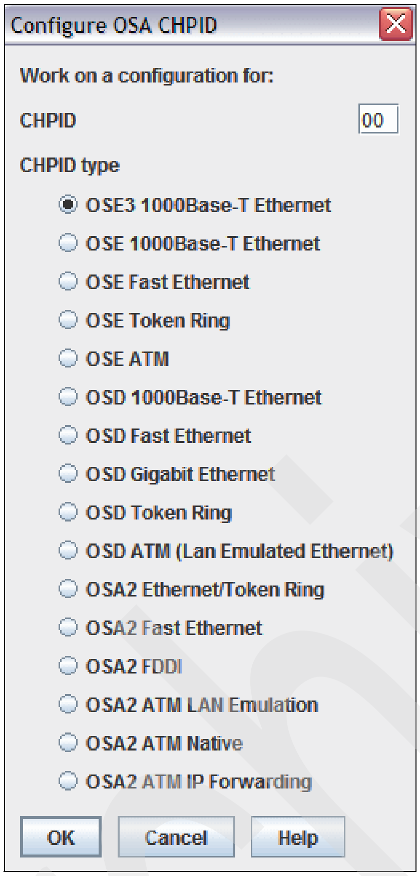
Figure 5-23 OSA/SF Workstation Interface: Save current configuration

Restoring a saved OSA-Express configuration

You can use OSA/SF to install previously saved configuration information using the install and activate functions. Note that to use the GUI, you need to manually install and activate at least one OSA feature to enable communication between the GUI and the OSA/SF application.

Perform the following steps:

1. In the OSA/SF main view, initialize the CHPID view. Select **Configurations** → **Planning configurations...** or click **Configure OSA CHPID** in the OSA/SF Commands window. The Configure OSA CHPID window opens (Figure 5-24).



Work on a configuration for:

CHPID 00

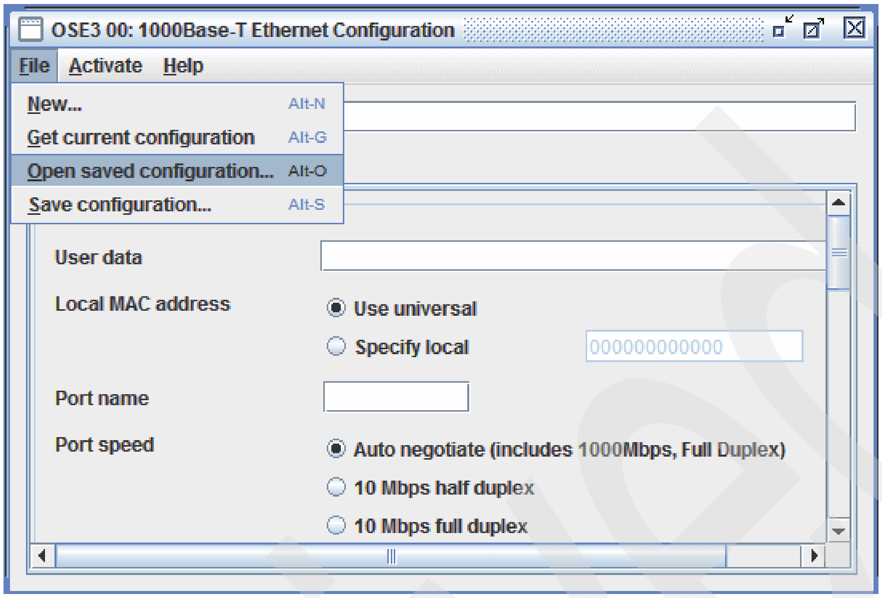
CHPID type

- ● OSE3 1000Base-T Ethernet
- ○ OSE 1000Base-T Ethernet
- ○ OSE Fast Ethernet
- ○ OSE Token Ring
- ○ OSE ATM
- ○ OSD 1000Base-T Ethernet
- ○ OSD Fast Ethernet
- ○ OSD Gigabit Ethernet
- ○ OSD Token Ring
- ○ OSD ATM (Lan Emulated Ethernet)
- ○ OSA2 Ethernet/Token Ring
- ○ OSA2 Fast Ethernet
- ○ OSA2 FDDI
- ○ OSA2 ATM LAN Emulation
- ○ OSA2 ATM Native
- ○ OSA2 ATM IP Forwarding

Figure 5-24 OSA/SF Workstation Interface: Configure OSA CHPID

2. Select the CHPID number and the CHPID Type that you want to define and click **OK**.

3. OSA/SF displays a default window for the type of feature selected. Select **File** → **Open saved configuration...** (Figure 5-25).



User data

Local MAC address ● Use universal
○ Specify local 000000000000

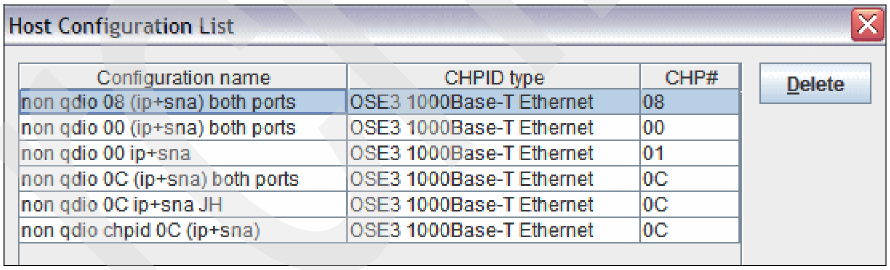
Port name

Port speed ● Auto negotiate (includes 1000Mbps, Full Duplex)
○ 10 Mbps half duplex
○ 10 Mbps full duplex

Figure 5-25 OSA/SF Workstation Interface: Open saved configuration

OSA/SF displays a Host Configuration List window containing the names of previously saved configuration files that match the feature type (Figure 5-26).

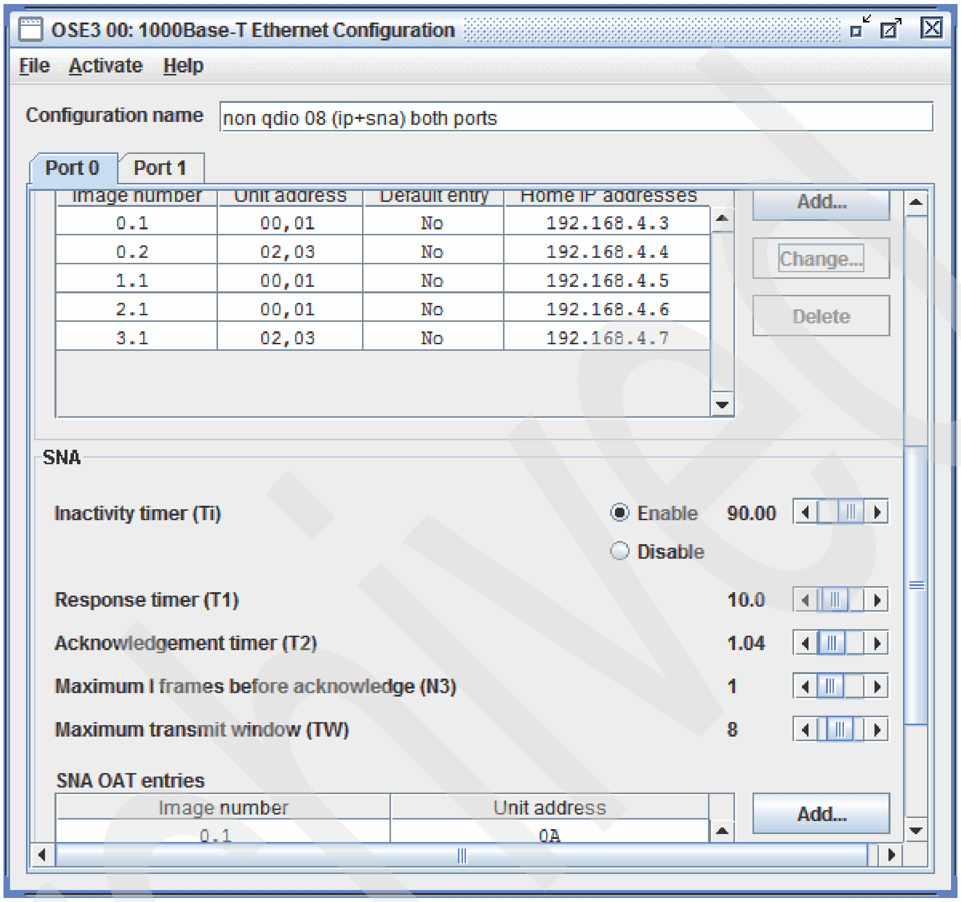
Note that the Host Configuration List being displayed varies with the OSA-Express3 feature type selected in Figure 5-24 on page 237. For example, a request for OSA-Express3 1000BASE-T Ethernet displays the list shown in Figure 5-26.



Configuration name	CHPID type	CHP#
non qdio 08 (ip+sna) both ports	OSE3 1000Base-T Ethernet	08
non qdio 00 (ip+sna) both ports	OSE3 1000Base-T Ethernet	00
non qdio 00 ip+sna	OSE3 1000Base-T Ethernet	01
non qdio 0C (ip+sna) both ports	OSE3 1000Base-T Ethernet	0C
non qdio 0C ip+sna JH	OSE3 1000Base-T Ethernet	0C
non qdio chpid 0C (ip+sna)	OSE3 1000Base-T Ethernet	0C

Figure 5-26 OSA/SF Workstation Interface: Host Configuration List

4. From the list, select the saved configuration name and click **Load**. Configuration information previously saved is now displayed in the OSA configuration window. Any changes that may be needed can be done for this configuration by using OSA/SF (Figure 5-27).



Configuration name: non qdio 08 (ip+sna) both ports

Image number	Unit address	Default entry	Home IP addresses
0.1	00,01	No	192.168.4.3
0.2	02,03	No	192.168.4.4
1.1	00,01	No	192.168.4.5
2.1	00,01	No	192.168.4.6
3.1	02,03	No	192.168.4.7

SNA

Inactivity timer (Ti) ● Enable ○ Disable 90.00

Response timer (T1) 10.0

Acknowledgement timer (T2) 1.04

Maximum I frames before acknowledge (N3) 1

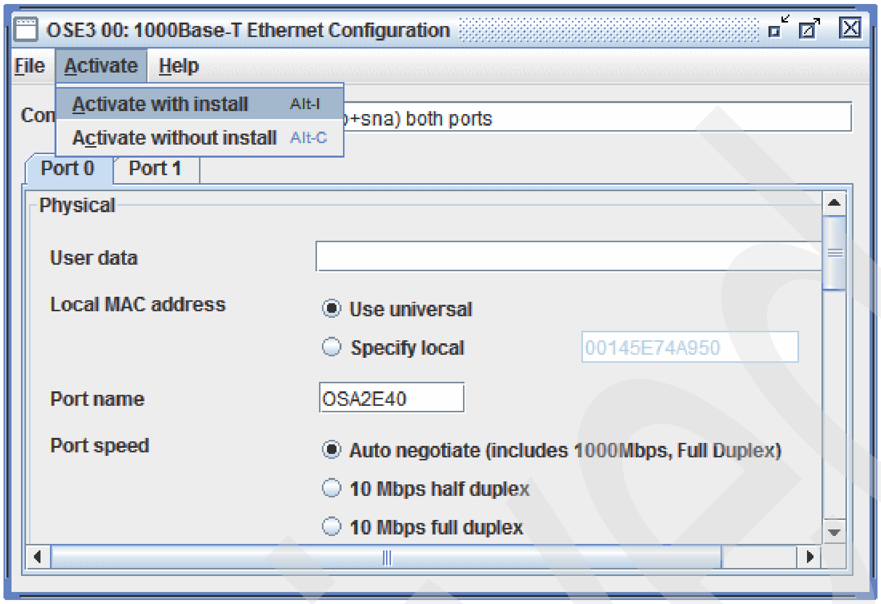
Maximum transmit window (TW) 8

SNA OAT entries

Image number	Unit address
0.1	0A

Figure 5-27 OSA/SF Workstation Interface: Change Configuration

5. Select **Activate** → **Activate with install** to restore the OSA feature configuration (Figure 5-28).



Con...)+sna) both ports

User data

Local MAC address ● Use universal

○ Specify local 00145E74A950

Port name OSA2E40

Port speed ● Auto negotiate (includes 1000Mbps, Full Duplex)

○ 10 Mbps half duplex

○ 10 Mbps full duplex

Figure 5-28 OSA/SF Workstation Interface: Install

5.3.2 OSA-ICC and CHPID=OSC

If the 2094 or 2097 being replaced contains any TYPE=OSC CHPIDs, then the operator console, TN3270, and printer definitions are stored and managed on the Support Element and their definitions only are associated with a PCHID, not a CHPID. Therefore, it is a best practice to have a backup copy of these definitions.

Exporting the configuration data for OSA-ICC using HMC V2.11.0

To export the configuration data, perform the following steps:

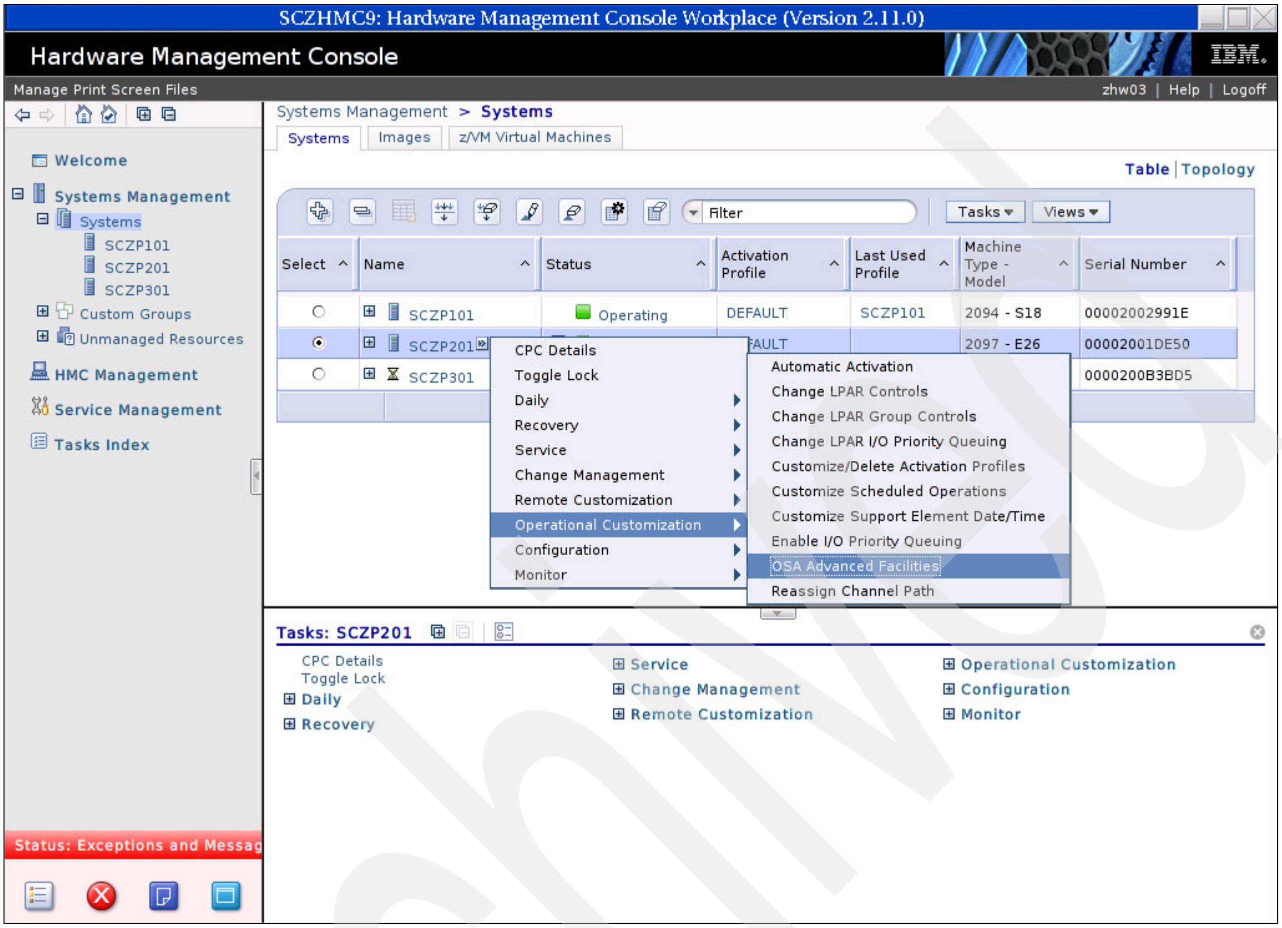
1. Log on using SYSPROG authority to the HMC workstation supplied with the 2094 or 2097 (as opposed to a remote web browser) and select the CPC that contains the OSC CHPIDs for which you want to export the configuration data (in our example, SCZP201).

> **Note:** A HMC upgraded from V2.9.2 to V2.10.2 might contain a usable floppy disk drive. A new HMC installed with a z10 EC or later will not contain a floppy disk drive.

2. Under Systems Management, click **Servers** to expand the list:

   a. In the right pane, you see all the servers defined to this HMC. Click the radio button for the server you want to access (in this example, SCZP201)

b. Click the small drop-down menu arrow just after the CPC name and use it to expand to and select the **OSA Advanced Facilities** menu (Figure 5-29).



Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
●	SCZP201		FAULT		2097 - E26	00002001DE50
○	SCZP301					0000200B3BD5

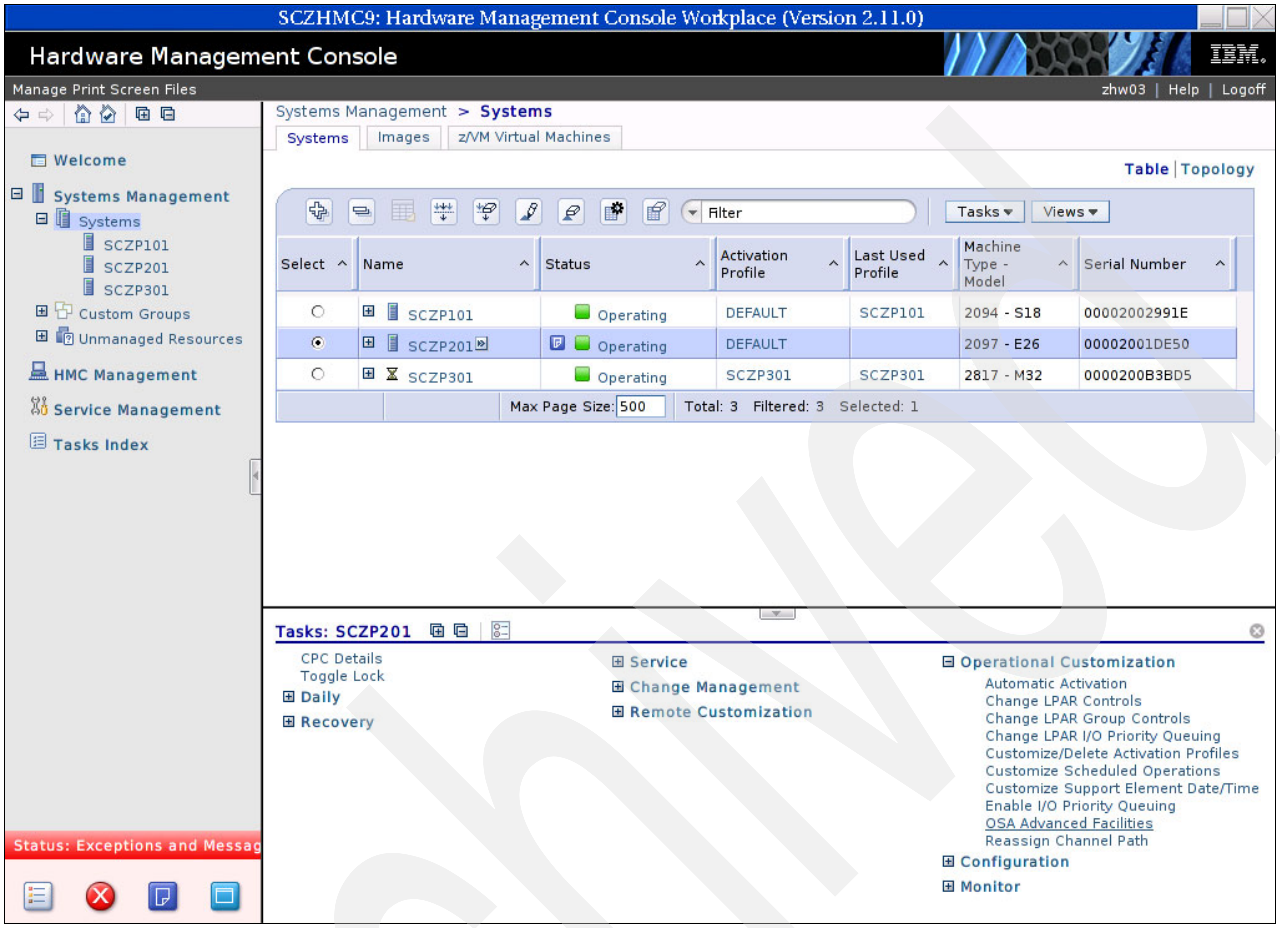
Figure 5-29 OSA Advanced Facilities

3. Alternatively, you can access the OSA options in the following way:

   a. Under Systems Management, click **Servers** to expand the list.

   b. Under Servers, click the server to select it (in this example, SCZP201).

c. On the Tasks pad, click **Operational Customization** to expand it, and select **OSA Advanced Facilities** (Figure 5-30).

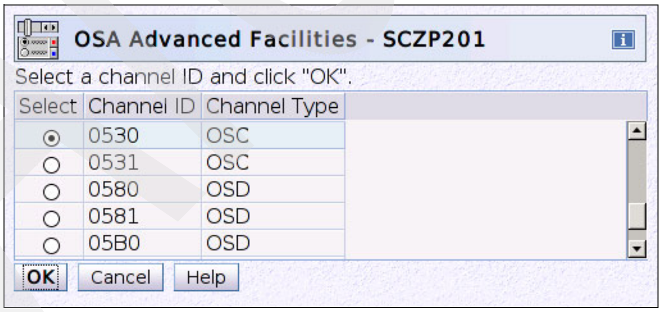


Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	🟩 Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
●	SCZP201	🟩 Operating	DEFAULT		2097 - E26	00002001DE50
○	SCZP301	🟩 Operating	SCZP301	SCZP301	2817 - M32	0000200B3BD5

Max Page Size: 500 Total: 3 Filtered: 3 Selected: 1

Figure 5-30 OSA Advanced Facilities (task menu)

4. Click the radio button for the Channel ID card that you want to export and click **OK** (Figure 5-31).

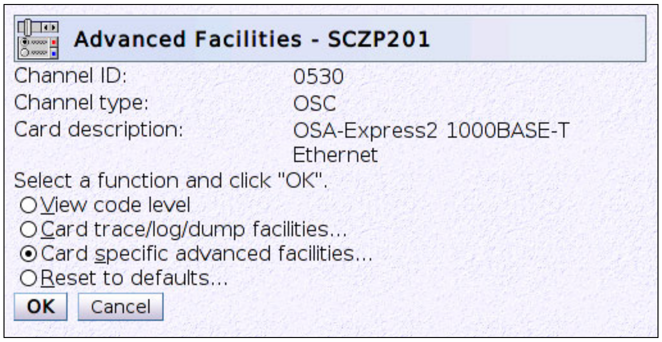


Select a channel ID and click "OK".

Select	Channel ID	Channel Type
●	0530	OSC
○	0531	OSC
○	0580	OSD
○	0581	OSD
○	05B0	OSD

Figure 5-31 OSA Advanced Facilities (OSC Channel)

5. Select the **Card specific advanced facilities...** radio button and click **OK** (Figure 5-32).



Advanced Facilities - SCZP201

Channel ID: 0530
Channel type: OSC
Card description: OSA-Express2 1000BASE-T Ethernet

Select a function and click "OK".

○ View code level
○ Card trace/log/dump facilities...
● Card specific advanced facilities...
○ Reset to defaults...

Figure 5-32 OSA Advanced Facilities (Card specific)

6. Select the **Manual configuration options...** radio button and click **OK** (Figure 5-33).

Advanced Facilities - SCZP201

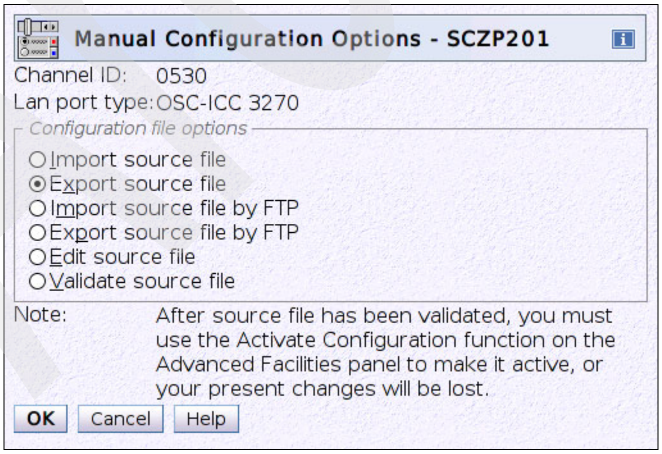
Channel ID: 0530
Lan port type: OSC-ICC 3270

Select a function and click "OK".

○ View port parameters...
○ Run port diagnostics
○ Set card mode...
○ Display client connections...
○ Display active sessions configuration...
○ Display active server configuration...
○ Panel configuration options...
● Manual configuration options...
○ Activate configuration
○ Display activate configuration errors...
○ Debug utilities...

Figure 5-33 OSA Advanced Facilities (Manual configuration)

7. Select the **Export source file** radio button and click **OK** (Figure 5-34).



Manual Configuration Options - SCZP201

Channel ID: 0530
Lan port type: OSC-ICC 3270

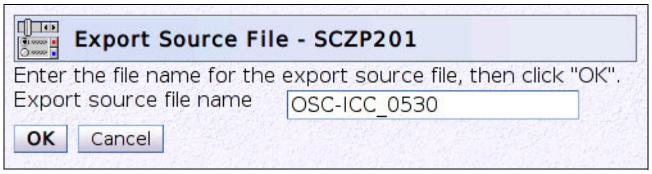
Configuration file options

○ Import source file
● Export source file
○ Import source file by FTP
○ Export source file by FTP
○ Edit source file
○ Validate source file

Note: After source file has been validated, you must use the Activate Configuration function on the Advanced Facilities panel to make it active, or your present changes will be lost.

Figure 5-34 OSA Advanced Facilities (Export source)

8. The task requests a file name to be written onto the installed media device. In our example, we entered `OSC-ICC_0530` (Figure 5-35). Click **OK**.



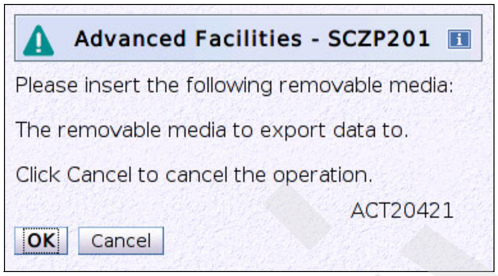
Export Source File - SCZP201

Enter the file name for the export source file, then click "OK".

Export source file name: OSC-ICC_0530

Figure 5-35 HMC - OSA Advanced Facilities (Export file name)

9. HMC displays the ACT20421 window, which prompts us to insert the removable media (Figure 5-36).



Advanced Facilities - SCZP201

Please insert the following removable media:

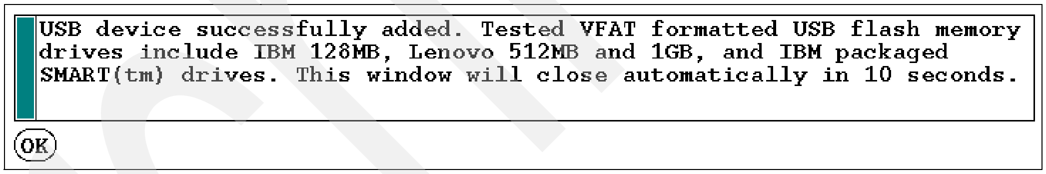
The removable media to export data to.

Click Cancel to cancel the operation.

ACT20421

Figure 5-36 OSA Advanced Facilities (Insert removable media)

10. Insert the USB flash memory drive to which you want to export the OSA-ICC source file. The following message is displayed (Figure 5-37).

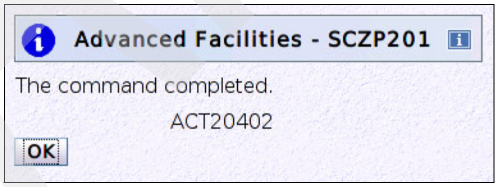


```
USB device successfully added. Tested VFAT formatted USB flash memory
drives include IBM 128MB, Lenovo 512MB and 1GB, and IBM packaged
SMART(tm) drives. This window will close automatically in 10 seconds.
```

Figure 5-37 OSA Advanced Facilities (removable media inserted)

11. Click **OK** to return to the previous ACT20421 message.

12. The HMC task writes the configuration data for the Channel ID that was selected onto the media device and displays a message window when it has completed the process (Figure 5-38). Click **OK**.



Advanced Facilities - SCZP201

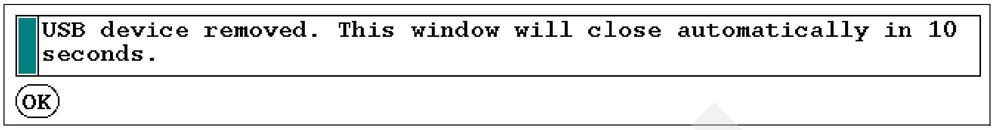
The command completed.

ACT20402

Figure 5-38 OSA Advanced Facilities (Export source file complete)

13. You can now remove the USB flash memory drive at any time.

14. HMC displays a message advising you that the USB device has been removed (Figure 5-39).



USB device removed. This window will close automatically in 10 seconds.

Figure 5-39 OSA Advanced Facilities (removable media removed)

15. Click **Cancel** to exit all the OSA Advanced Facilities windows.

Example 5-1 shows a sample of the configuration data downloaded on to the USB flash drive.

Example 5-1 OSC configuration sample (OSC-0530)

```
<OSC_SERVER>
  HOST_IP= 9.12.4.97
  DEFAULT_GATEWAY= 9.12.4.1
  SUBNET_MASK= 255.255.252.0
  PORT= 3270
  ETHERNET_FRAME= DIX
  MTU= 1492
  NAME= OSAF280
</OSC_SERVER>


<CONFIG_SESSION>
<SESSION1>
  CSS= 00 IID= 01 DEVICE= F280
  GROUP=  "SCZCF280"
  CONSOLE_TYPE= 2    RESPONSE= OFF    READ_TIMEOUT= 60
  DEFER_HOST_DISCONNECT= 0
</SESSION1>

<SESSION2>
  CSS= 01 IID= 02 DEVICE= F281
  GROUP=  "SCZCF281"
  CONSOLE_TYPE= 1    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION2>
............................................

............................................
<SESSION32>
  CSS= 01 IID= 09 DEVICE= F283
  GROUP=  "SCC19283"
  CONSOLE_TYPE= 2    RESPONSE= OFF    READ_TIMEOUT= 60
</SESSION32>

</CONFIG_SESSION>
```

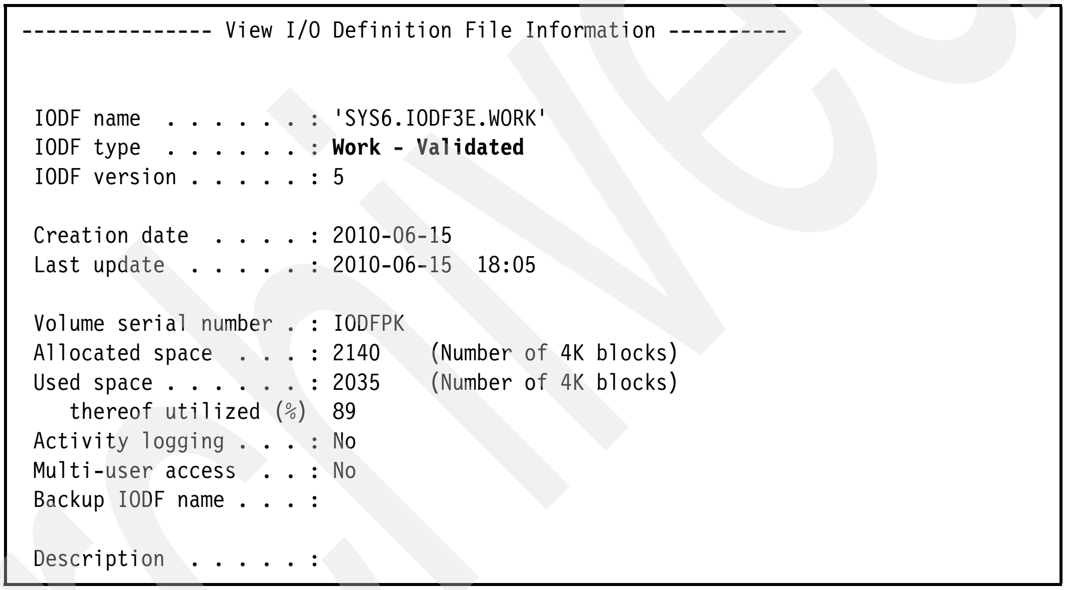
5.4 HCD: Validating the 2817 work IODF

In this section, we explain the steps needed to validate the 2817 work IODF.

5.4.1 Validating the work IODF

To validate the work IODF, perform the following steps:

1. Select HCD Option 2.12. Build validated work I/O definition file. Review the message list and correct any errors.
2. Press PF3 to continue. The `Requested action successfully processed` message is displayed.
3. Select HCD Option 6.4. View I/O Definition File Information and notice that the IODF type is now `Work - Validated` (Figure 5-40).



```
---------------- View I/O Definition File Information ----------


 IODF name  . . . . . . : 'SYS6.IODF3E.WORK'
 IODF type  . . . . . . : Work - Validated
 IODF version . . . . . : 5

 Creation date  . . . . : 2010-06-15
 Last update  . . . . . : 2010-06-15  18:05

 Volume serial number . : IODFPK
 Allocated space  . . . : 2140    (Number of 4K blocks)
 Used space . . . . . . : 2035    (Number of 4K blocks)
    thereof utilized (%)  89
 Activity logging . . . : No
 Multi-user access  . . : No
 Backup IODF name . . . :

 Description  . . . . . :
```

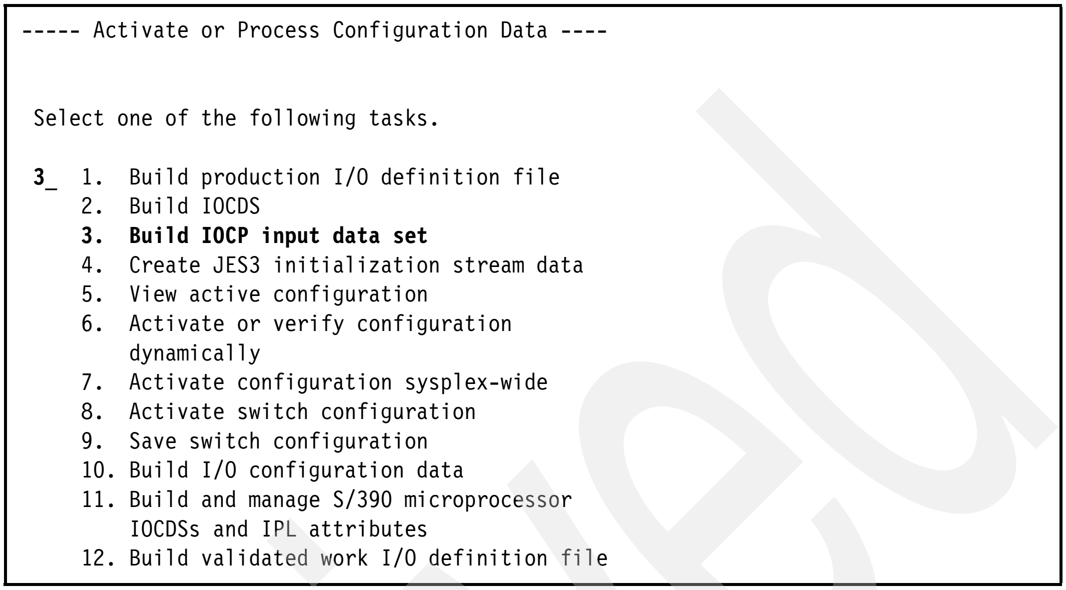
Figure 5-40 View I/O Definition File Information (Validated work IODF)

5.4.2 Creating the IOCP for the CHPID Mapping Tool

Note: You may prefer to use HCM to create the IOCP statements file and transfer the file to your workstation. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

To create the IOCP for the CHPID Mapping Tool, perform the following steps:

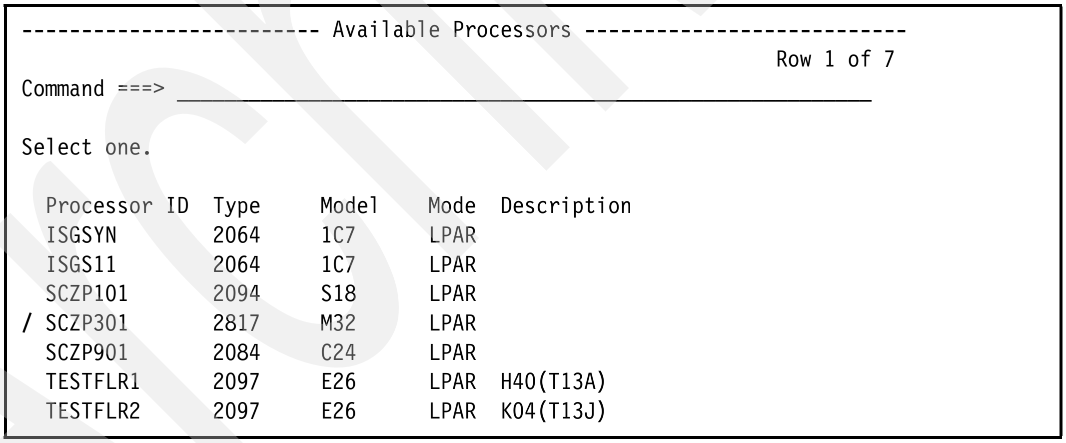
1. Select HCD Option 2.3. Build IOCP input data set and press Enter (Figure 5-41).



```
----- Activate or Process Configuration Data ----


 Select one of the following tasks.

 3_  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

Figure 5-41 Activate or Process Configuration Data (Build IOCP for SCZP102)

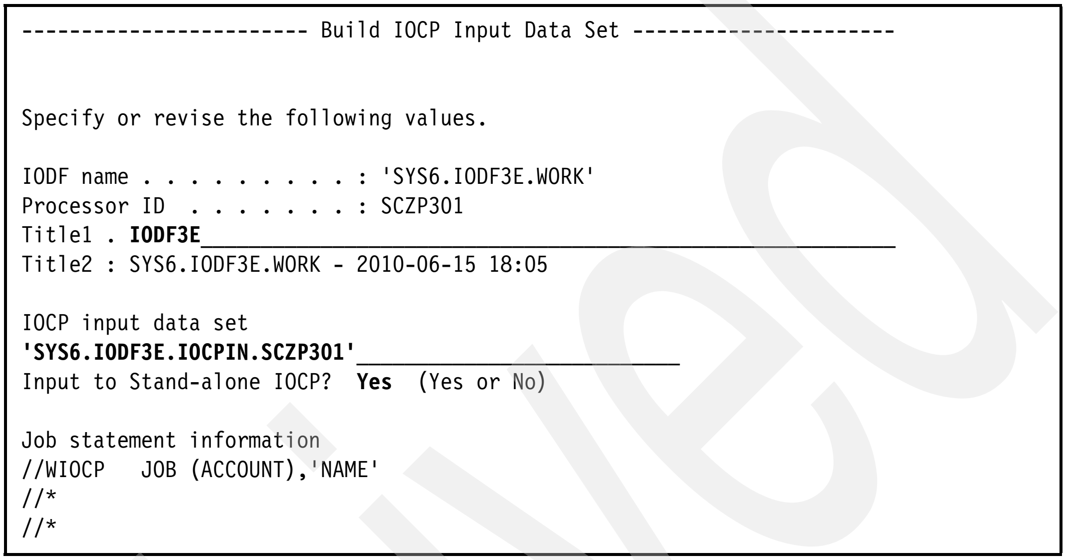
2. HCD displays the list of available processors from which to chose. Select the SCZP301 processor by typing a forward slash (/) and press Enter (Figure 5-42).



```
------------------------- Available Processors ---------------------------
                                                             Row 1 of 7
Command ===> __________________________________________________________

Select one.

  Processor ID  Type     Model    Mode  Description
  ISGSYN        2064     1C7      LPAR
  ISGS11        2064     1C7      LPAR
  SCZP101       2094     S18      LPAR
/ SCZP301       2817     M32      LPAR
  SCZP901       2084     C24      LPAR
  TESTFLR1      2097     E26      LPAR  H40(T13A)
  TESTFLR2      2097     E26      LPAR  K04(T13J)
```

Figure 5-42 Available Processors (select processor for IOCP file)

3. HCD displays a panel on which you enter information regarding the IOCP input data set to be created (Figure 5-43). Complete the following fields:
   - `Title1`.
   - `IOCP input data set`.
   - Type `Yes` in the field `Input to Stand-alone IOCP`.
   - Complete the Job statement information for the installation.



```
------------------------ Build IOCP Input Data Set ----------------------


Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF3E.WORK'
Processor ID  . . . . . . . : SCZP301
Title1 . IODF3E___________________________________________________________
Title2 : SYS6.IODF3E.WORK - 2010-06-15 18:05

IOCP input data set
'SYS6.IODF3E.IOCPIN.SCZP301'___________________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
```

Figure 5-43 Build IOCP Input Data Set

4. Press Enter. HCD submits a batch job to create the data set.

5. In TSO, verify that the data set you just created exists and that it contains IOCP statements (Figure 5-44).

   This data set is used as input into the CHPID Mapping Tool.

```
  ID    MSG1='IODF3E',                                         *
        MSG2='SYS6.IODF3E.WORK - 2010-06-15 18:05',            *
        SYSTEM=(2817,1),LSYSTEM=SCZP301,                       *
        TOK=('SCZP301',008000013BD52817180529160110166F00000000,*
        00000000,'10-06-15','18:05:29','........','........')
  RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
        0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
        06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1A,A),(A1B,B),(*
        A1C,C),(A1D,D),(A1E,E),(A1F,F),(A11,1),(A12,2),(A13,3),(*
        A14,4),(A15,5),(A16,6),(A17,7),(A18,8),(A19,9)),(CSS(2),*
        (A2A,A),(A2B,B),(A2C,C),(A2D,D),(A2E,E),(A2F,F),(A21,1),*
        (A22,2),(A23,3),(A24,4),(A25,5),(A26,6),(A27,7),(A28,8),*
        (A29,9)),(CSS(3),(A3E,E),(A3F,F),(A31,1),(A32,2),(A33,3)*
        ,(A34,4),(A35,5),(A36,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*
        *,C),(*,D)))
  CHPID PATH=(CSS(0,1,2,3),06),SHARED,                         *
        NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1E,A1F),(=*
        )),(CSS(2),(A2D,A2E,A2F),(=)),(CSS(3),(A36,A3E,A3F),(=))*
        ),PCHID=140,TYPE=OSD
  CHPID PATH=(CSS(0,1,2,3),08),SHARED,                         *
        NOTPART=((CSS(0),(A0D,A0E,A0F),(=)),(CSS(1),(A1E,A1F),(=*
        )),(CSS(2),(A2D,A2E,A2F),(=)),(CSS(3),(A36,A3E,A3F),(=))*
        ),PCHID=180,TYPE=OSD
```

Figure 5-44 IOCP input data set contents (truncated)

   Also note that part of the TOK statement has been blanked out with dots (Example 5-2).

Example 5-2 IOCP file (TOK statement)

```
TOK=('SCZP301',008000013BD52817180529160110166F00000000,*
00000000,'10-06-15','18:05:29','........','........')
```

   This is a safeguard to ensure that this IOCP file cannot be written to a processor and used for a power-on reset, because this IOCP file was created from a validated work IODF and not a production IODF, which is something that can be done only for processors that contain PCHID definitions.

> **Important:** When an IOCP statement file is exported from a Validated Work IODF using HCD, it must be imported back to HCD in order for the process to be valid. The IOCP file cannot be used directly by the IOCP program.

6. Download this file from z/OS to your workstation. Use a workstation file transfer facility such as the one in the IBM Personal Communications Workstation Program, or any equivalent 3270 emulation program. Be sure to use TEXT as the transfer type. In this example, we call this file `SCZP301in.iocp`.

5.5 CMT: Assigning PCHIDs to CHPIDs

In this section, we take the output from the previous set of HCD steps (IOCP) (see 5.4.2, “Creating the IOCP for the CHPID Mapping Tool” on page 246) and the output from the 2817 order process (CFReport) (see step 1d on page 213) and, using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2817.

For this process, the CHPID Mapping Tool (CMT) must be downloaded. Refer to 2.1.5, “CHPID Mapping Tool” on page 28 for information about downloading and installing the CMT. If you already have CMT installed, then verify that you have the latest updates installed.

Using the CHPID Mapping Tool, perform the following steps:

1. Import the IOCP statements file and the `CFReport` file into the CHPID Mapping Tool. You may obtain the IOCP statements by using the HCM.
2. Resolve CHPIDs that have a PCHID conflict.
3. Resolve CHPIDs without associated hardware.
4. Resolve hardware resolution.
5. Set the priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
6. Run the CHPID Mapping Tool availability function.
7. Create CHPID Mapping Tool reports.
8. Create an updated IOCP statements file and transfer it back to the host z/OS image. This step may be performed with HCM.

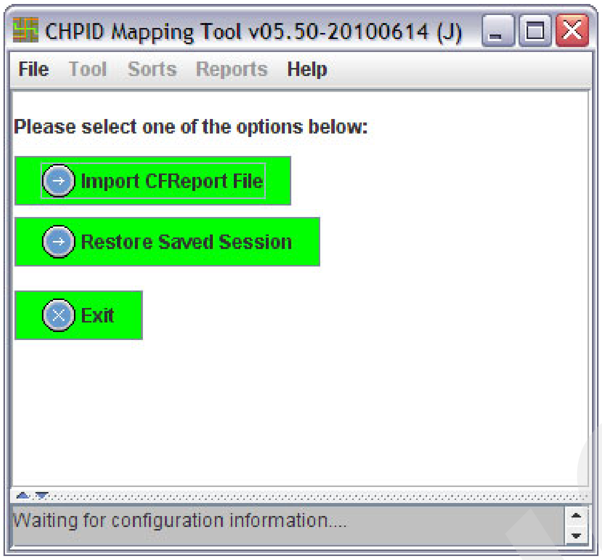
> **Note:** When replacing a 2094 or a 2097 with a 2817, you *must* use the CHPID Mapping Tool level that supports the 2817. The internal availability characteristics of the 2817 are different from previous System z processors.

5.5.1 Importing the CFReport file into the CHPID Mapping Tool

To importing the `CFReport` file into the CHPID Mapping Tool, perform the following steps:

1. Start the CHPID Mapping Tool on your workstation.
2. Import the `CFReport` file into the CHPID Mapping Tool.

3. Select **File** → **Import CFReport file** (Figure 5-45).

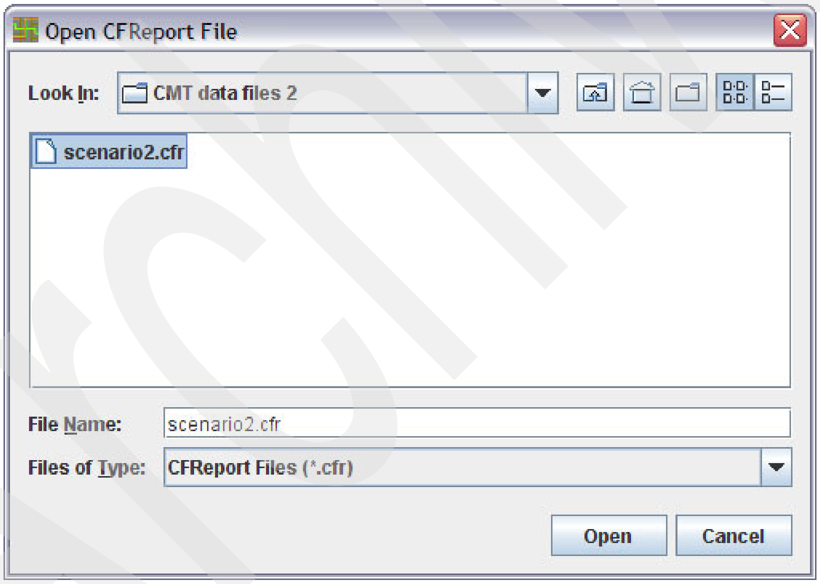


Please select one of the options below:

Waiting for configuration information....

Figure 5-45 Import CFReport Order file

4. Select the CFReport file to import and click **Open** (Figure 5-46).



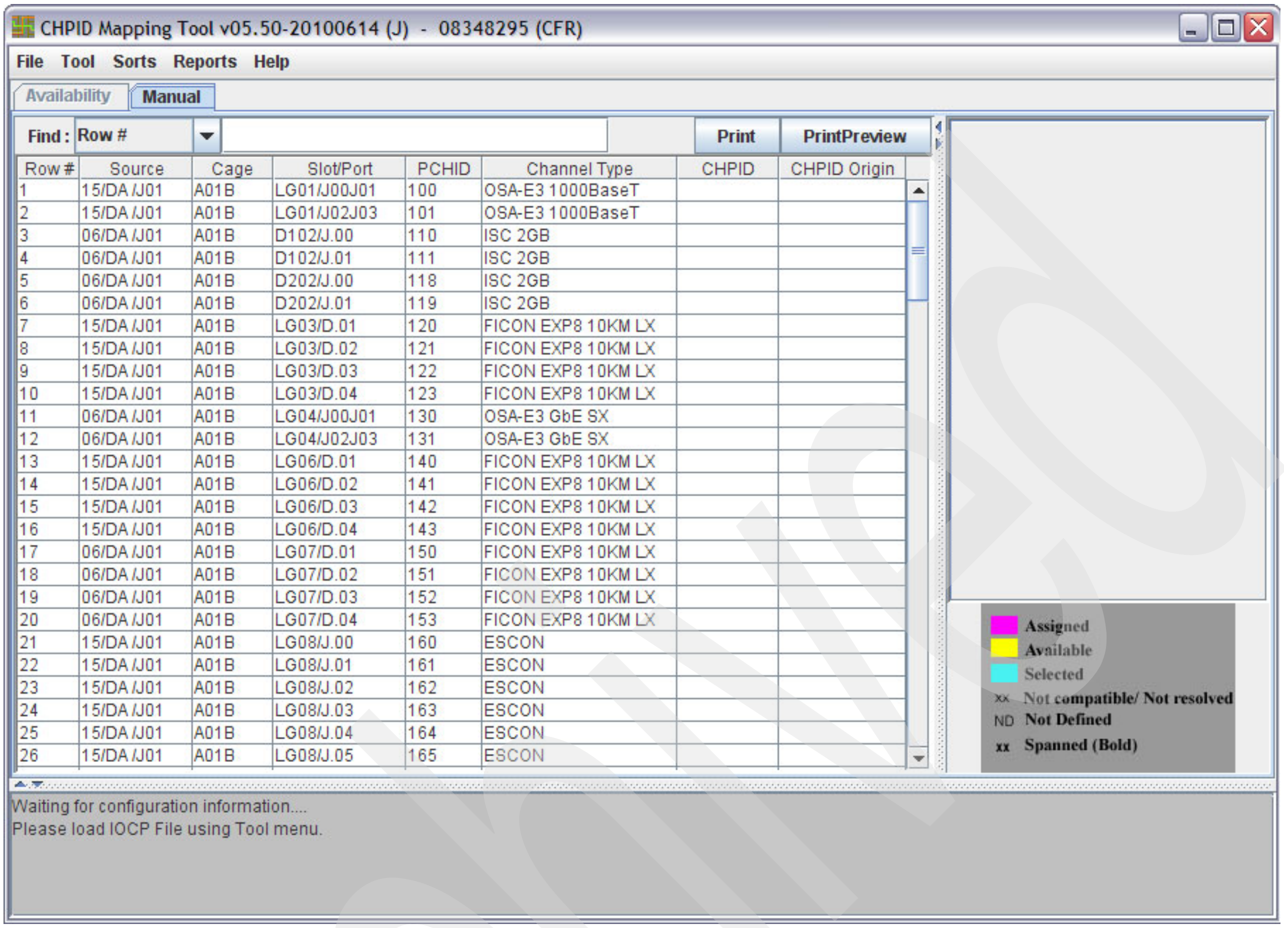
Look In: CMT data files 2

File Name: scenario2.cfr

Files of Type: CFReport Files (*.cfr)

Figure 5-46 Open CFReport file

Information from the CFReport is displayed on the left side of the window (Figure 5-47).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB		
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB		
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB		
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB		
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX		
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX		
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON		
22	15/DA /J01	A01B	LG08/J.01	161	ESCON		
23	15/DA /J01	A01B	LG08/J.02	162	ESCON		
24	15/DA /J01	A01B	LG08/J.03	163	ESCON		
25	15/DA /J01	A01B	LG08/J.04	164	ESCON		
26	15/DA /J01	A01B	LG08/J.05	165	ESCON		

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

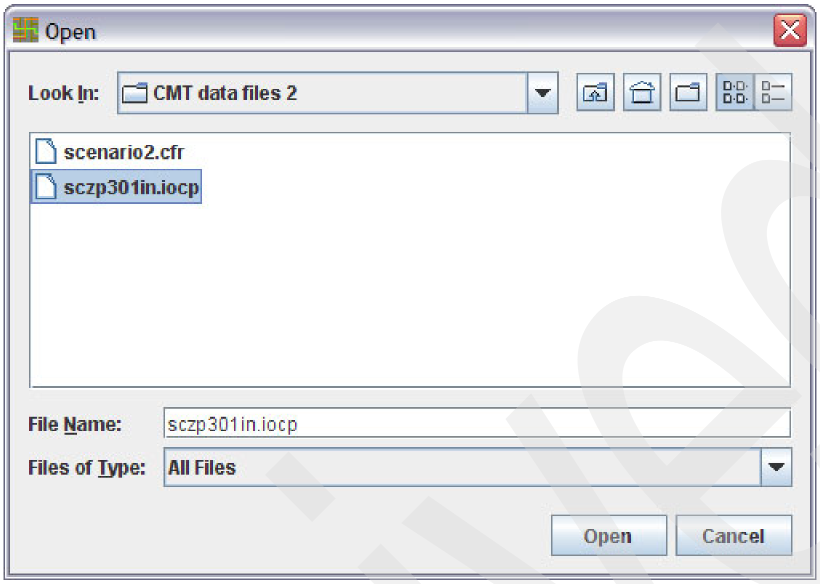
Waiting for configuration information....
Please load IOCP File using Tool menu.

Figure 5-47 Imported CFReport Order file

5.5.2 Importing the 2817 IOCP file into the CHPID Mapping Tool

To importing the 2817 IOCP file into the CHPID Mapping Tool, perform the following steps:

1. To import the IOCP file, select **Tool** → **Import IOCP File** (Figure 5-48).



Look In: CMT data files 2

scenario2.cfr

sczp301in.iocp

File Name: sczp301in.iocp

Files of Type: All Files

Figure 5-48 Import IOCP file

2. Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**.

In our example, the CHPID Mapping Tool shows the following options:

- Matching CHPID: This window lists all CHPIDs that are assigned with PCHIDs that have been moved during MES upgrade. This window is for informational purposes only.
- Invalid CHPID: This window lists all the CHPIDs that have been found with Invalid PCHID values assigned in the IOCP Input file. PCHID might represent hardware that is not compatible with a given CHPID type, or there may be no hardware present at a given PCHID.
- HW Resolution: A few CHPIDs support more than one available channel type. Users should select the preferred channel type for any given CHPID. CHPIDs are grouped and displayed per CHPID type.
- CHPID Reset: Availability considers only CHPIDs that are not assigned with a PCHID. CHPIDs that already have PCHIDs assigned can be reset using this panel.
- Reset CHPIDs assigned by Availability: Checking this option resets all CHPIDs that were processed by prior availability runs in this session.

  By default, this option is checked.
- Reset CHPIDs assigned by Manual Remap: Checking this option resets CHPIDs that were assigned a PCHID in the Manual panel. If this option is not checked, then availability PCHIDs for these CHPIDs are not reset.

  By default, this option is clear.
- Reset CHPIDs assigned by the CHPID Mapping Tool for config files: The `CFReport` file indicates that you are doing an MES/upgrade, and you have channels or CHPIDs (or both)

that might have configuration files currently associated with them. The MES/upgrade might be moving some of those channel cards.

Regardless of whether the channels are moving or not, the CHPID Mapping Tool either has assigned PCHIDs to the logical CHPID definitions to keep the CHPID definition associated with its current configuration file, or has moved the definition to the new location where the channel is moving.

If you reset the CHPID Mapping Tool assignments, it is your responsibility to have a backup of the configuration file data prior to the MES, and to restore that data to the new location (the PCHID where the affected CHPIDs are assigned) before you can use the CHPIDs.

By default, this option is clear.

- Reset CHPIDs assigned by IOCP: If some of the CHPIDs were assigned in the IOCP Input file, then checking this option resets the CHPIDs. Checking this option may require recabling after availability assignments.

  This option should be checked.

If none of the options is checked, availability only works on CHPIDs that do not have PCHIDs assigned.

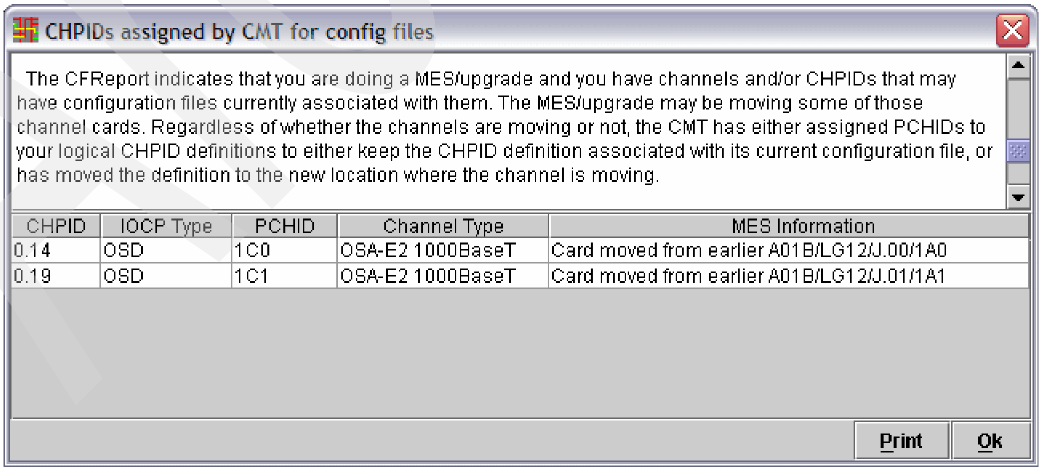
To give the CHPID Mapping Tool the most choices when using the availability option, we recommend that you choose **Reset all IOCP assigned PCHIDs**.

However, if you choose **Reset only the PCHID/hardware mismatch**, then review the intersects from availability processing carefully to ensure that preserving the prior CHPID-to-PCHID relationship is not causing unacceptable availability.

If you choose to run Availability mapping, this will reset any previously mapped CHPID assignments and could result in recabling of the server.

5.5.3 CHPIDs that might have associated configuration files

As shown in Figure 5-49, you can see any PCHIDs that could potentially have configuration files associated with them. Click **OK**.



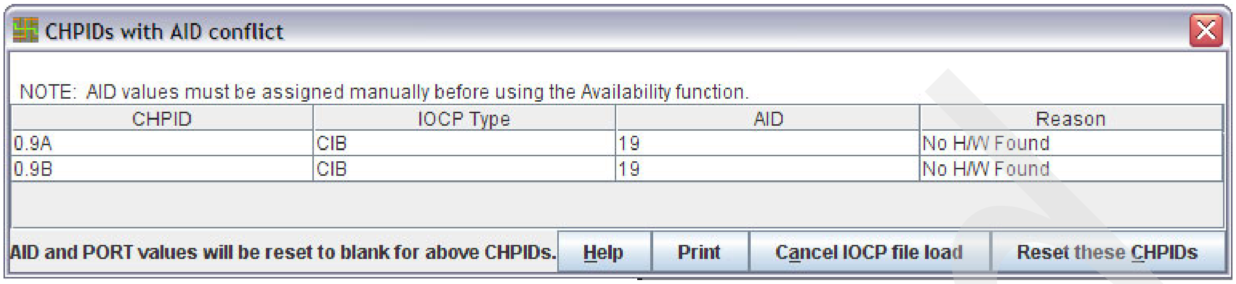
The CFReport indicates that you are doing a MES/upgrade and you have channels and/or CHPIDs that may have configuration files currently associated with them. The MES/upgrade may be moving some of those channel cards. Regardless of whether the channels are moving or not, the CMT has either assigned PCHIDs to your logical CHPID definitions to either keep the CHPID definition associated with its current configuration file, or has moved the definition to the new location where the channel is moving.

CHPID	IOCP Type	PCHID	Channel Type	MES Information
0.14	OSD	1C0	OSA-E2 1000BaseT	Card moved from earlier A01B/LG12/J.00/1A0
0.19	OSD	1C1	OSA-E2 1000BaseT	Card moved from earlier A01B/LG12/J.01/1A1

Figure 5-49 CHPIDs assigned by CMT

5.5.4 Resolving CHPIDs with AID conflicts

Now the CMT displays the CHPIDs with AID conflicts (Figure 5-50).



NOTE: AID values must be assigned manually before using the Availability function.

CHPID	IOCP Type	AID	Reason
0.9A	CIB	19	No H/W Found
0.9B	CIB	19	No H/W Found

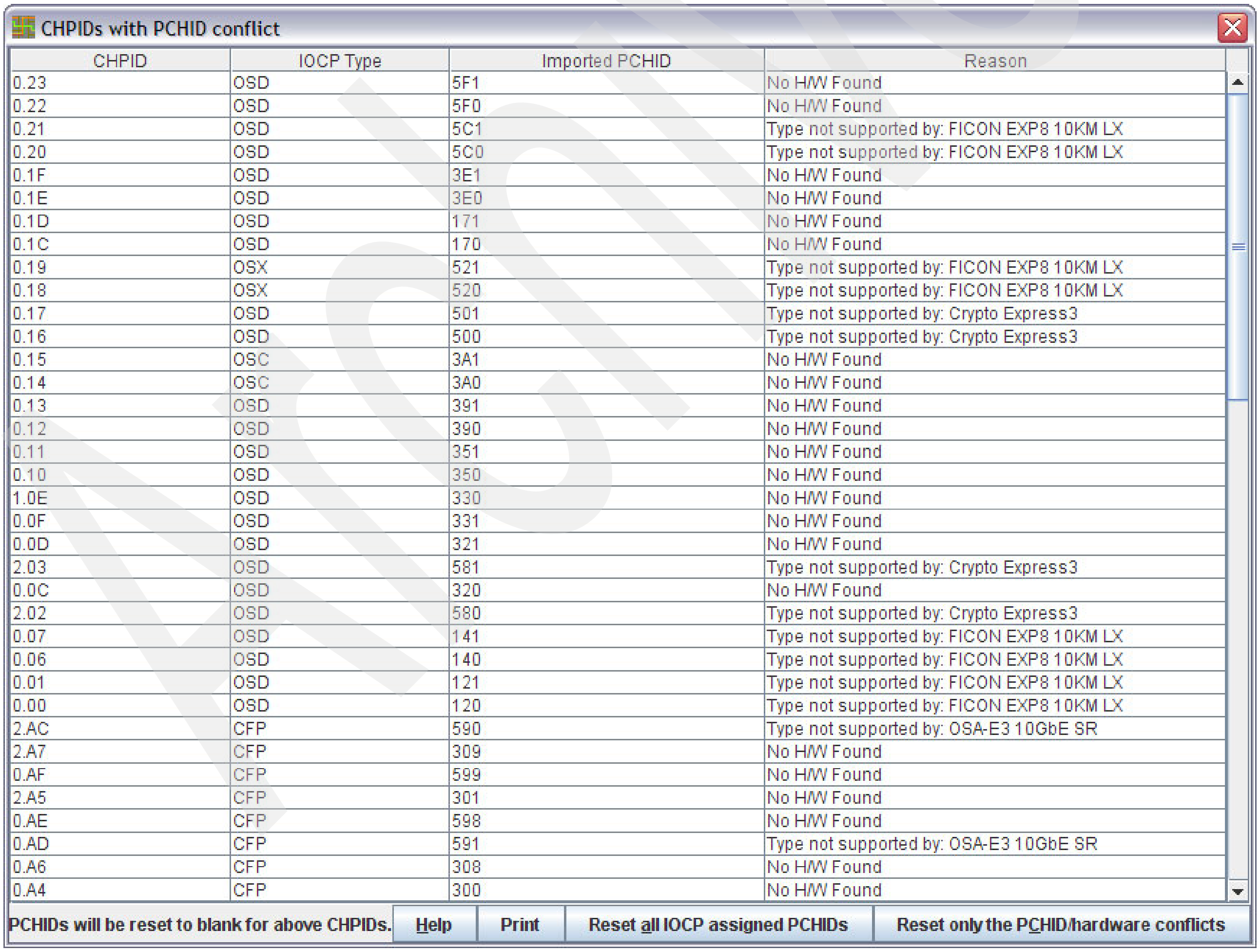
AID and PORT values will be reset to blank for above CHPIDs.

Figure 5-50 CHPIDs with AID conflicts

In our example, we select **Reset these CHPIDs**.

5.5.5 Resolving CHPIDs with PCHID conflicts

The CMT displays the CHPIDs with PCHID conflicts (Figure 5-51).



CHPID	IOCP Type	Imported PCHID	Reason
0.23	OSD	5F1	No H/W Found
0.22	OSD	5F0	No H/W Found
0.21	OSD	5C1	Type not supported by: FICON EXP8 10KM LX
0.20	OSD	5C0	Type not supported by: FICON EXP8 10KM LX
0.1F	OSD	3E1	No H/W Found
0.1E	OSD	3E0	No H/W Found
0.1D	OSD	171	No H/W Found
0.1C	OSD	170	No H/W Found
0.19	OSX	521	Type not supported by: FICON EXP8 10KM LX
0.18	OSX	520	Type not supported by: FICON EXP8 10KM LX
0.17	OSD	501	Type not supported by: Crypto Express3
0.16	OSD	500	Type not supported by: Crypto Express3
0.15	OSC	3A1	No H/W Found
0.14	OSC	3A0	No H/W Found
0.13	OSD	391	No H/W Found
0.12	OSD	390	No H/W Found
0.11	OSD	351	No H/W Found
0.10	OSD	350	No H/W Found
1.0E	OSD	330	No H/W Found
0.0F	OSD	331	No H/W Found
0.0D	OSD	321	No H/W Found
2.03	OSD	581	Type not supported by: Crypto Express3
0.0C	OSD	320	No H/W Found
2.02	OSD	580	Type not supported by: Crypto Express3
0.07	OSD	141	Type not supported by: FICON EXP8 10KM LX
0.06	OSD	140	Type not supported by: FICON EXP8 10KM LX
0.01	OSD	121	Type not supported by: FICON EXP8 10KM LX
0.00	OSD	120	Type not supported by: FICON EXP8 10KM LX
2.AC	CFP	590	Type not supported by: OSA-E3 10GbE SR
2.A7	CFP	309	No H/W Found
0.AF	CFP	599	No H/W Found
2.A5	CFP	301	No H/W Found
0.AE	CFP	598	No H/W Found
0.AD	CFP	591	Type not supported by: OSA-E3 10GbE SR
0.A6	CFP	308	No H/W Found
0.A4	CFP	300	No H/W Found

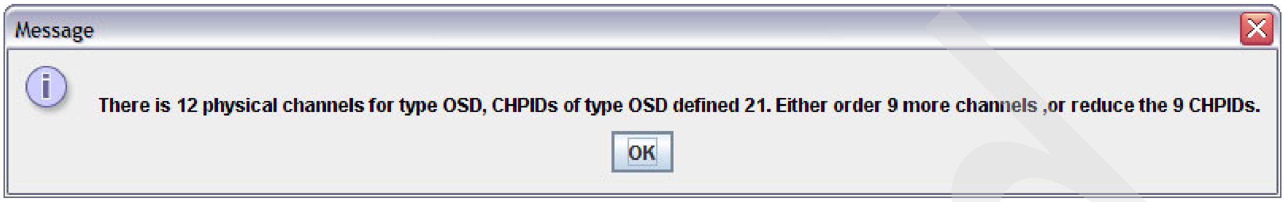
PCHIDs will be reset to blank for above CHPIDs.

Figure 5-51 CHPIDs with PCHID conflicts

In our example, we select **Reset only the PCHID/hardware conflicts**.

5.5.6 Resolving CHPIDs without associated hardware

The CHPID Mapping Tool now displays messages about any CHPID types that were imported from the IOCP input file (IODF) into the CMT that do not have any associated hardware support in the CFReport file (Figure 5-52). Click **OK.**



There is 12 physical channels for type OSD, CHPIDs of type OSD defined 21. Either order 9 more channels ,or reduce the 9 CHPIDs.

Figure 5-52 Required Hardware unavailable

The following message is issued:

```
CHPIDs with invalid/incompatible hardware found.
```

We left excessive numbers of CHPID types *OSD* in our IODF to show how the CHPID Mapping Tool would handle this condition and to explain how you can resolve this situation. Refer to 5.2.8, "Overdefining channel paths on an XMP processor" on page 230.

This is an example of where you can use this option to change the PCHID value to an asterisk (*) in the IODF, if you should still want to retain the OSD CHPID definitions in the IODF and expect to have OSD CHPIDs installed in the processor at a later date.

Note: Other CHPID types can also be *overdefined* by entering an asterisk (*) for the PCHID value. Overdefining is now supported for CIB type CHPID definitions.

Alternatively, you could remove the OSD CHPID definitions from the IODF.

To continue with this example, perform the following steps:

1. Go back into the IODF and change the PCHID values for the OSD CHPIDs (or any other CHPIDs that have no supporting hardware in the CFReport) to an asterisk (*).
2. Re-validate the IODF by using HCD Option 2.12.
3. Recreate the IOCP statements file and transfer it to your workstation.
4. Import the IOCP file by selecting **Tool** → **Import IOCP File**.

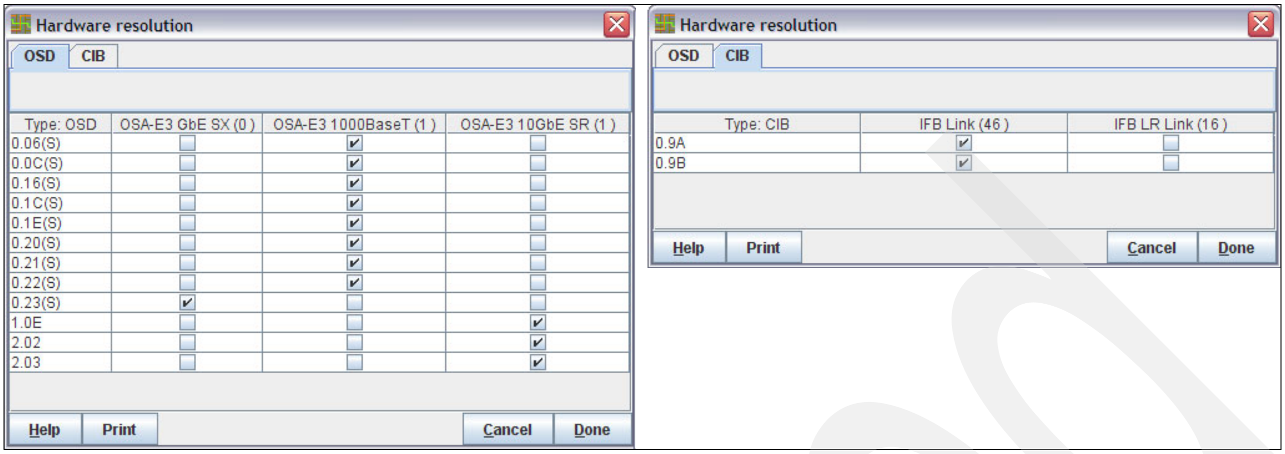
Note: If you look at the IOCP statements file now, notice that the OSD CHPIDs have been omitted from the file, but are still defined in the IODF.

Now when you click **Reset only the PCHID/hardware conflicts**, the CHPID Mapping Tool asks you to resolve some hardware.

5.5.7 Hardware resolution

The CHPID Mapping Tool might prompt you to resolve issues that may arise from importing the IOCP file. In our example, the CHPID Mapping Tool wants clarification about the TYPE=OSD and TYPE=CIB channels.

In each case, we must check off for what each of the channels is used (Figure 5-53).



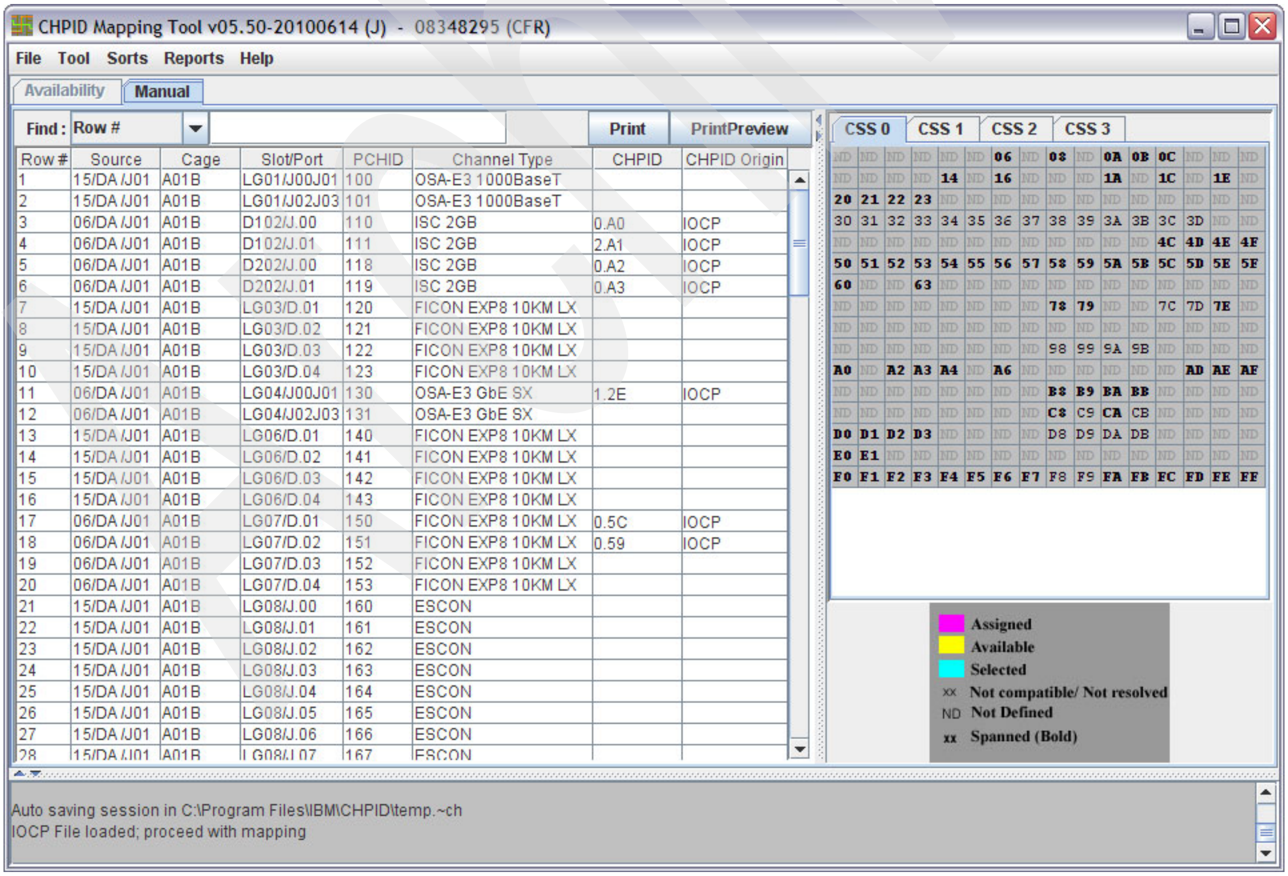
Type: OSD	OSA-E3 GbE SX (0)	OSA-E3 1000BaseT (1)	OSA-E3 10GbE SR (1)
0.06(S)	☐	☑	☐
0.0C(S)	☐	☑	☐
0.16(S)	☐	☑	☐
0.1C(S)	☐	☑	☐
0.1E(S)	☐	☑	☐
0.20(S)	☐	☑	☐
0.21(S)	☐	☑	☐
0.22(S)	☐	☑	☐
0.23(S)	☑	☐	☐
1.0E	☐	☐	☑
2.02	☐	☐	☑
2.03	☐	☐	☑

Type: CIB	IFB Link (46)	IFB LR Link (16)
0.9A	☑	☐
0.9B	☑	☐

Figure 5-53 Hardware resolution after IOCP import

Perform the following steps:

1. Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the OSD CHPID definitions use between the OSA-Express3 GbE, OSA-Express3 100BaseT and OSA-Express3 10 GbE. Select the desired box and move to the next tab until all CHPID definitions have hardware selected. The CHPID Mapping Tool displays all of the information that it currently knows (Figure 5-54).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.A0	IOCP
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.A1	IOCP
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A2	IOCP
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	0.A3	IOCP
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	1.2E	IOCP
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.5C	IOCP
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX	0.59	IOCP
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON		
22	15/DA /J01	A01B	LG08/J.01	161	ESCON		
23	15/DA /J01	A01B	LG08/J.02	162	ESCON		
24	15/DA /J01	A01B	LG08/J.03	163	ESCON		
25	15/DA /J01	A01B	LG08/J.04	164	ESCON		
26	15/DA /J01	A01B	LG08/J.05	165	ESCON		
27	15/DA /J01	A01B	LG08/J.06	166	ESCON		
28	15/DA /J01	A01B	LG08/J.07	167	ESCON		

ND	ND	ND	ND	ND	ND	**06**	ND	**08**	ND	**0A**	**0B**	**0C**	ND	ND	ND
ND	ND	ND	ND	**14**	ND	**16**	ND	ND	ND	**1A**	ND	**1C**	ND	**1E**	ND
20	**21**	**22**	**23**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**4C**	**4D**	**4E**	**4F**
50	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**5A**	**5B**	**5C**	**5D**	**5E**	**5F**
60	ND	ND	**63**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	**78**	**79**	ND	ND	7C	7D	**7E**	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	**A2**	**A3**	**A4**	ND	**A6**	ND	ND	ND	ND	ND	ND	**AD**	**AE**	**AF**
ND	ND	ND	ND	ND	ND	ND	ND	**B8**	**B9**	**BA**	**BB**	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	**C8**	C9	**CA**	CB	ND	ND	ND	ND
D0	**D1**	**D2**	**D3**	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	**E1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	F8	F9	**FA**	**FB**	**FC**	**FD**	**FE**	**FF**

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

Auto saving session in C:\Program Files\IBM\CHPID\temp.~ch
IOCP File loaded; proceed with mapping

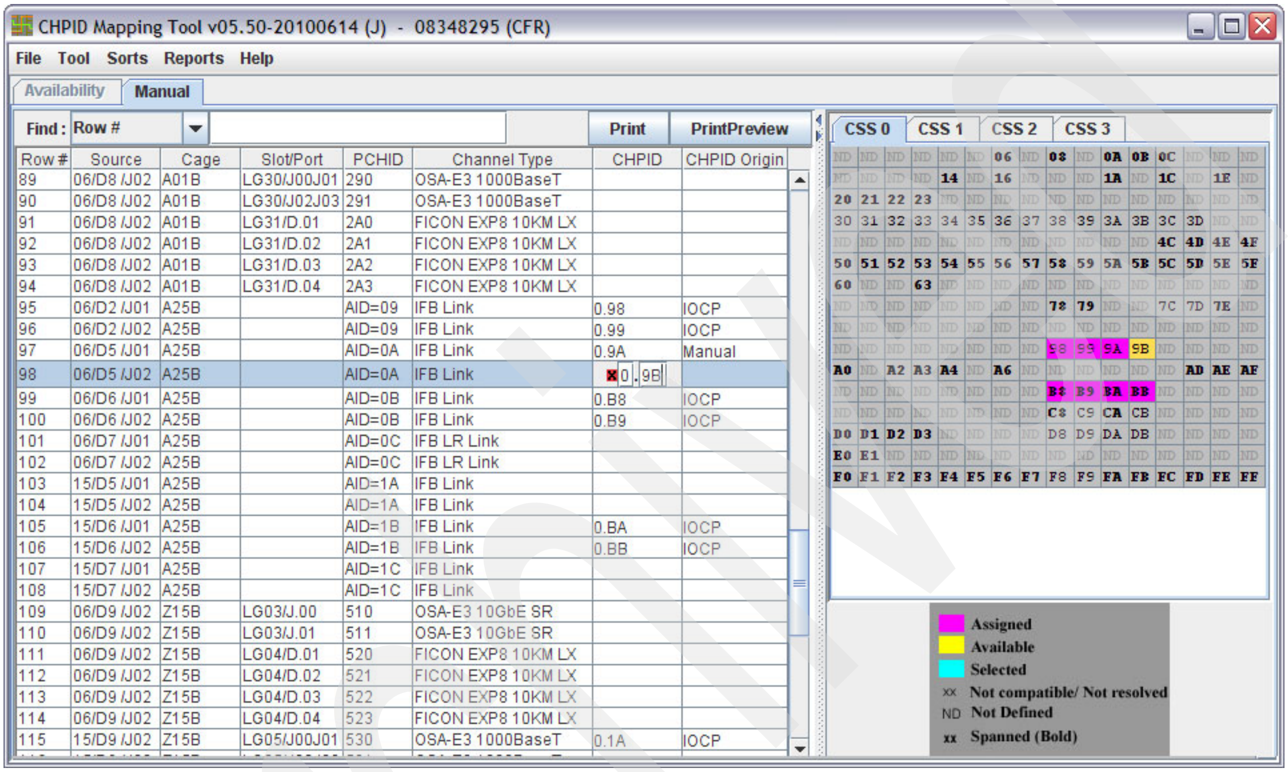
Figure 5-54 Manual tab

2. Click **Done** when all the selections have been made.

5.5.8 Manual mapping to resolve CIB CHPIDs

Observe that the Availability tab is disabled (Figure 5-55). You cannot use availability mapping until all CIB CHPIDs are resolved. You can use manual mapping to correct this issue.

To resolve the CIB CHPIDS, you must assign all the available CHPIDs for these rows.



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
89	06/D8 /J02	A01B	LG30/J00J01	290	OSA-E3 1000BaseT		
90	06/D8 /J02	A01B	LG30/J02J03	291	OSA-E3 1000BaseT		
91	06/D8 /J02	A01B	LG31/D.01	2A0	FICON EXP8 10KM LX		
92	06/D8 /J02	A01B	LG31/D.02	2A1	FICON EXP8 10KM LX		
93	06/D8 /J02	A01B	LG31/D.03	2A2	FICON EXP8 10KM LX		
94	06/D8 /J02	A01B	LG31/D.04	2A3	FICON EXP8 10KM LX		
95	06/D2 /J01	A25B		AID=09	IFB Link	0.98	IOCP
96	06/D2 /J02	A25B		AID=09	IFB Link	0.99	IOCP
97	06/D5 /J01	A25B		AID=0A	IFB Link	0.9A	Manual
98	06/D5 /J02	A25B		AID=0A	IFB Link	☒ 0.9B	
99	06/D6 /J01	A25B		AID=0B	IFB Link	0.B8	IOCP
100	06/D6 /J02	A25B		AID=0B	IFB Link	0.B9	IOCP
101	06/D7 /J01	A25B		AID=0C	IFB LR Link		
102	06/D7 /J02	A25B		AID=0C	IFB LR Link		
103	15/D5 /J01	A25B		AID=1A	IFB Link		
104	15/D5 /J02	A25B		AID=1A	IFB Link		
105	15/D6 /J01	A25B		AID=1B	IFB Link	0.BA	IOCP
106	15/D6 /J02	A25B		AID=1B	IFB Link	0.BB	IOCP
107	15/D7 /J01	A25B		AID=1C	IFB Link		
108	15/D7 /J02	A25B		AID=1C	IFB Link		
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR		
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR		
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX		
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX		
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX		
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX		
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT	0.1A	IOCP

ND	ND	ND	ND	ND	ND	06	ND	08	ND	0A	0B	0C	ND	ND	ND
ND	ND	ND	ND	14	ND	16	ND	ND	ND	1A	ND	1C	ND	1E	ND
20	21	22	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	ND	ND	63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	78	79	ND	ND	7C	7D	7E	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	A2	A3	A4	ND	A6	ND	ND	ND	ND	ND	ND	AD	AE	AF
ND	ND	ND	ND	ND	ND	ND	ND	B8	B9	BA	BB	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	C8	C9	CA	CB	ND	ND	ND	ND
D0	D1	D2	D3	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	E1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

Figure 5-55 Manual mapping to resolve CIB CHPIDs

5.5.9 Processing the CU Priority

If you are importing an IOCP statements file from a 2094 or 2097 that had CU Priority values defined, you might want to review the CU Priority beforehand. The CHPID Mapping Tool can then perform the availability functions appropriately for a 2817.

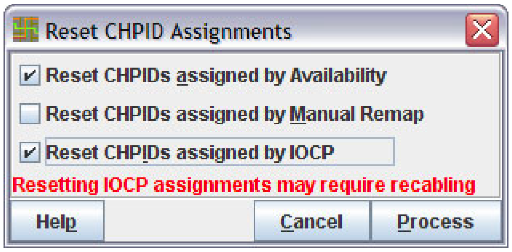
Perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority** and a window opens.

   The Reset CHPID Assignment window allows you to reset previously assigned PCHIDs, as follows:

   – Reset CHPIDs assigned by Availability
   – Reset CHPIDs assigned by Manual Remap
   – Reset CHPIDs assigned by IOCP

In our example, we select **Reset CHPIDs assigned by Availability** and **Reset CHPIDs assigned by IOCP** (Figure 5-56).

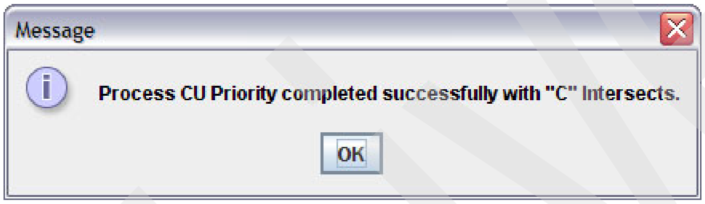


☑ Reset CHPIDs assigned by Availability
☐ Reset CHPIDs assigned by Manual Remap
☑ Reset CHPIDs assigned by IOCP
Resetting IOCP assignments may require recabling

Figure 5-56 Reset CHPID Assignments

The 2817 has different availability rules than the 2094 and 2097, so we need to remove all PCHIDs assignments that are still in the IOCP.

3. Click **Process**. After the CHPID Mapping Tool has reset the CHPIDs, it displays a message indicating the results of the process (Figure 5-57).



Process CU Priority completed successfully with "C" Intersects.

Figure 5-57 Process CU Priority completion message

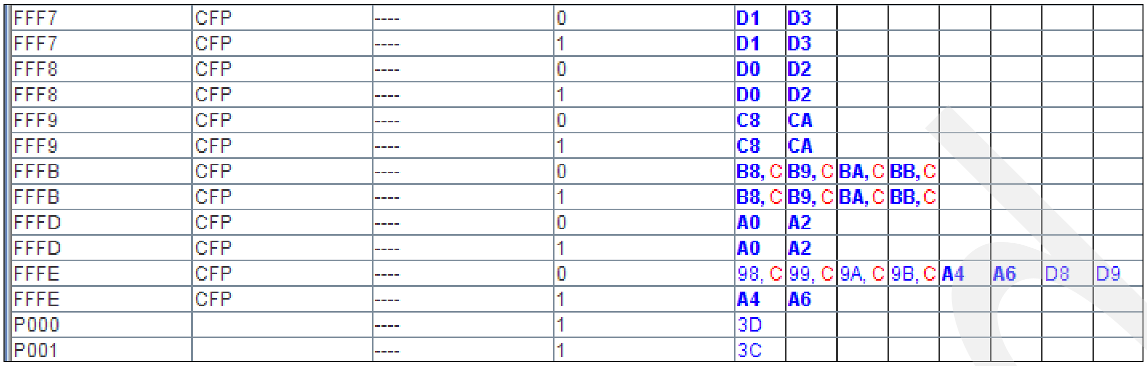
The following list defines the possible intersects:

C	Two or more assigned channels use the same channel card.
S	More than half the assigned channels use the same STI.
M	All assigned channels are supported by the same MBA group.
B	More than half the assigned channels are supported by the same book.
D	Assigned channels are on the same daughter card.

Our example returned the “C” intersect.

> **Note:** Intersect messages inform you of a potential availability problem detected by the CMT, but do not necessarily indicate an error. It is your responsibility to evaluate whether the condition should be corrected.

4. Click **OK**. Scroll through the CMT listing until you find the intersect warnings and decide whether they are acceptable or not (Figure 5-58).



FFF7	CFP	----	0	**D1**	**D3**						
FFF7	CFP	----	1	**D1**	**D3**						
FFF8	CFP	----	0	**D0**	**D2**						
FFF8	CFP	----	1	**D0**	**D2**						
FFF9	CFP	----	0	**C8**	**CA**						
FFF9	CFP	----	1	**C8**	**CA**						
FFFB	CFP	----	0	**B8,** C	**B9,** C	**BA,** C	**BB,** C				
FFFB	CFP	----	1	**B8,** C	**B9,** C	**BA,** C	**BB,** C				
FFFD	CFP	----	0	**A0**	**A2**						
FFFD	CFP	----	1	**A0**	**A2**						
FFFE	CFP	----	0	98, C	99, C	9A, C	9B, C	**A4**	**A6**	D8	D9
FFFE	CFP	----	1	**A4**	**A6**						
P000		----	1	3D							
P001		----	1	3C							

Figure 5-58 C Intersect examples

5. You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

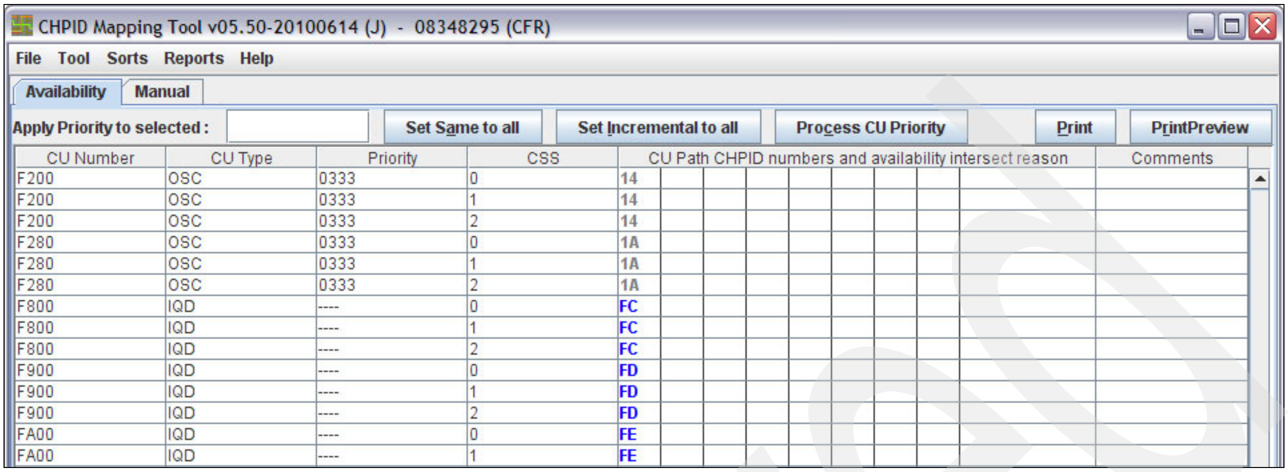
   Note: The control unit priorities are stored in the IOCP output file created by the CMT that gets migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck. They are in the form of commented lines at the end of the IOCP deck, as shown here:

   ```
   *CMT* VERSION=000
   *CMT* CCN=27132026(CFR from ResourceLink)
   *CMT* 8000.0=0010,8000.1=0010,8000.2=0010,8100.0=0010,8100.1=0010
   *CMT* 8100.2=0010,8200.0=0010,8200.1=0010,8200.2=0010,8300.0=0010
   *CMT* 8300.1=0010,8300.2=0010,8400.0=0010,8400.1=0010,8400.2=0010
   *CMT* 8500.0=0010,8500.1=0010,8500.2=0010,8600.0=0010,8600.1=0010
   *CMT* 8600.2=0010,8700.0=0010,8700.1=0010,8700.2=0010,C400.0=0020
   *CMT* C400.1=0020,C400.2=0020,C500.0=0020,C500.1=0020,C500.2=0020
   *CMT* C600.0=0020,C600.1=0020,C600.2=0020,C700.0=0020,C700.1=0020
   *CMT* C700.2=0020
   ```

   Our example does not contain any CU Priority values, but illustrates how CU Priority values are represented in the IOCP file.

6. You need to check and set values for items such as OSA-ICC CHPIDs and FCTC CHPIDs to ensure that the CHPID Mapping Tool allocates these CHPIDs with high PCHID availability.

Page through the listing and search through the column CU Number for any control units for which you want to set a priority. In our example, we set the OSC type CU Numbers to priority 333 (Figure 5-59).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason	Comments
F200	OSC	0333	0	14	
F200	OSC	0333	1	14	
F200	OSC	0333	2	14	
F280	OSC	0333	0	1A	
F280	OSC	0333	1	1A	
F280	OSC	0333	2	1A	
F800	IQD	----	0	FC	
F800	IQD	----	1	FC	
F800	IQD	----	2	FC	
F900	IQD	----	0	FD	
F900	IQD	----	1	FD	
F900	IQD	----	2	FD	
FA00	IQD	----	0	FE	
FA00	IQD	----	1	FE	

Figure 5-59 Set CU Priority

If there are coupling links used by a CF image, you should group these links.

Each set of CHPIDs going to a different CPC should be grouped with a common priority. For example, suppose the CF image has four links (CHPIDs 40, 41, 42, and 43) and that 40 and 41 go to one CPC, and 42 and 43 go to a different CPC. In this case, you should give CHPIDs 40 and 41 one priority and CHPIDs 42 and 43 a different priority. The concept is the same regardless of the number of connecting CPCs or the number of links to each CPC.

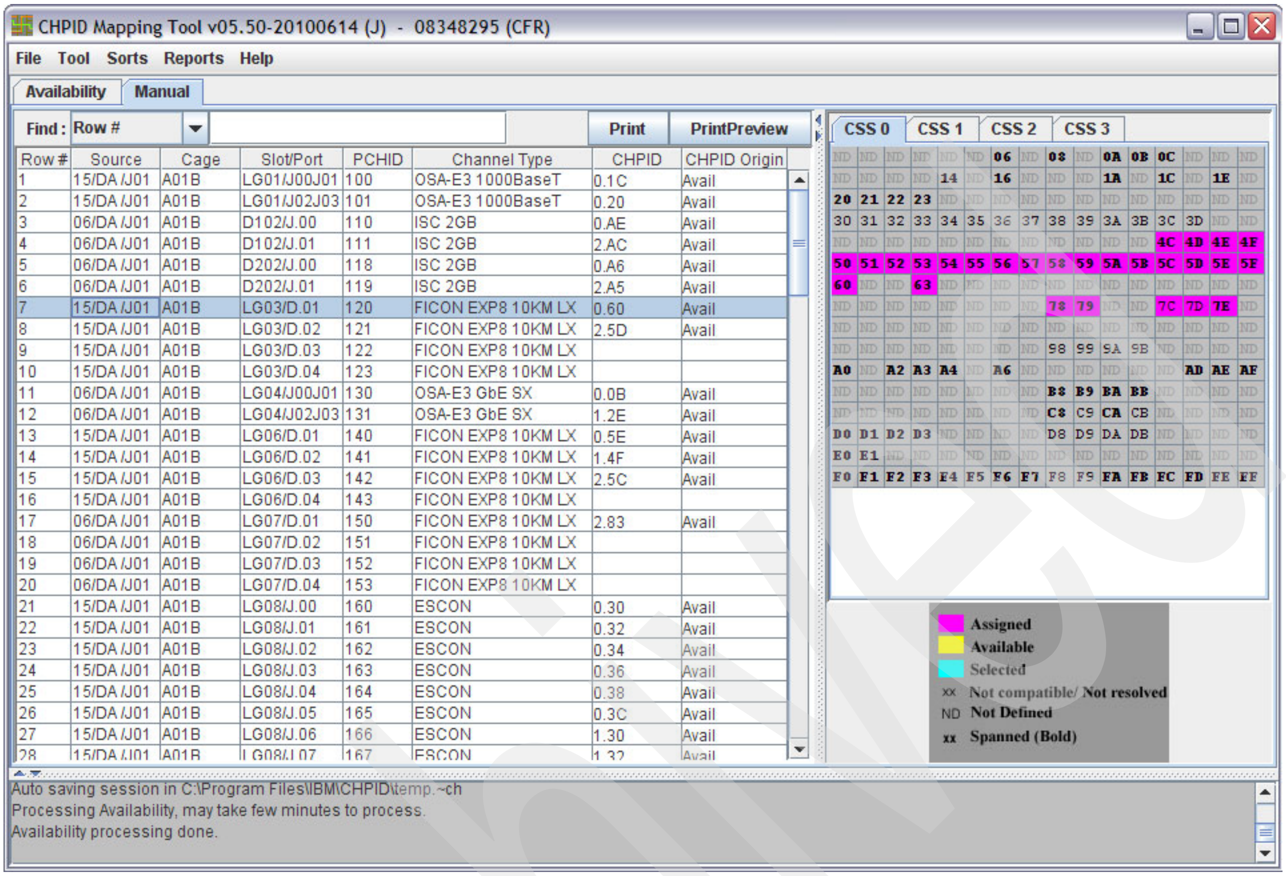
7. Under the File menu, click the **Availability** tab again.
8. Click **Process CU Priority** and a window opens.

   The Reset CHPID Assignment window allows you to change the CHPID values:

   - Reset CHPIDs assigned by Availability
   - Reset CHPIDs assigned by Manual Remap
   - Reset CHPIDs assigned by IOCP

   In our example, we select **Reset CHPIDs assigned by Availability**.
9. Click **Process** and select **Sorts** → **By CU Priority**; notice that the OSC type control units with priority of 333 have been sorted to the top of the list.
10. Select the **Manual** tab.

Figure 5-60 shows the results of mapping the CHPIDs.



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	1.4F	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	2.5C	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	2.83	Avail
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON	0.30	Avail
22	15/DA /J01	A01B	LG08/J.01	161	ESCON	0.32	Avail
23	15/DA /J01	A01B	LG08/J.02	162	ESCON	0.34	Avail
24	15/DA /J01	A01B	LG08/J.03	163	ESCON	0.36	Avail
25	15/DA /J01	A01B	LG08/J.04	164	ESCON	0.38	Avail
26	15/DA /J01	A01B	LG08/J.05	165	ESCON	0.3C	Avail
27	15/DA /J01	A01B	LG08/J.06	166	ESCON	1.30	Avail
28	15/DA /J01	A01B	LG08/J.07	167	ESCON	1.32	Avail

ND	ND	ND	ND	ND	ND	06	ND	08	ND	0A	0B	0C	ND	ND	ND
ND	ND	ND	ND	14	ND	16	ND	ND	ND	1A	ND	1C	ND	1E	ND
20	21	22	23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	ND	ND	63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	78	79	ND	ND	7C	7D	7E	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	98	99	9A	9B	ND	ND	ND	ND
A0	ND	A2	A3	A4	ND	A6	ND	ND	ND	ND	ND	ND	AD	AE	AF
ND	ND	ND	ND	ND	ND	ND	ND	B8	B9	BA	BB	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	C8	C9	CA	CB	ND	ND	ND	ND
D0	D1	D2	D3	ND	ND	ND	ND	D8	D9	DA	DB	ND	ND	ND	ND
E0	E1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

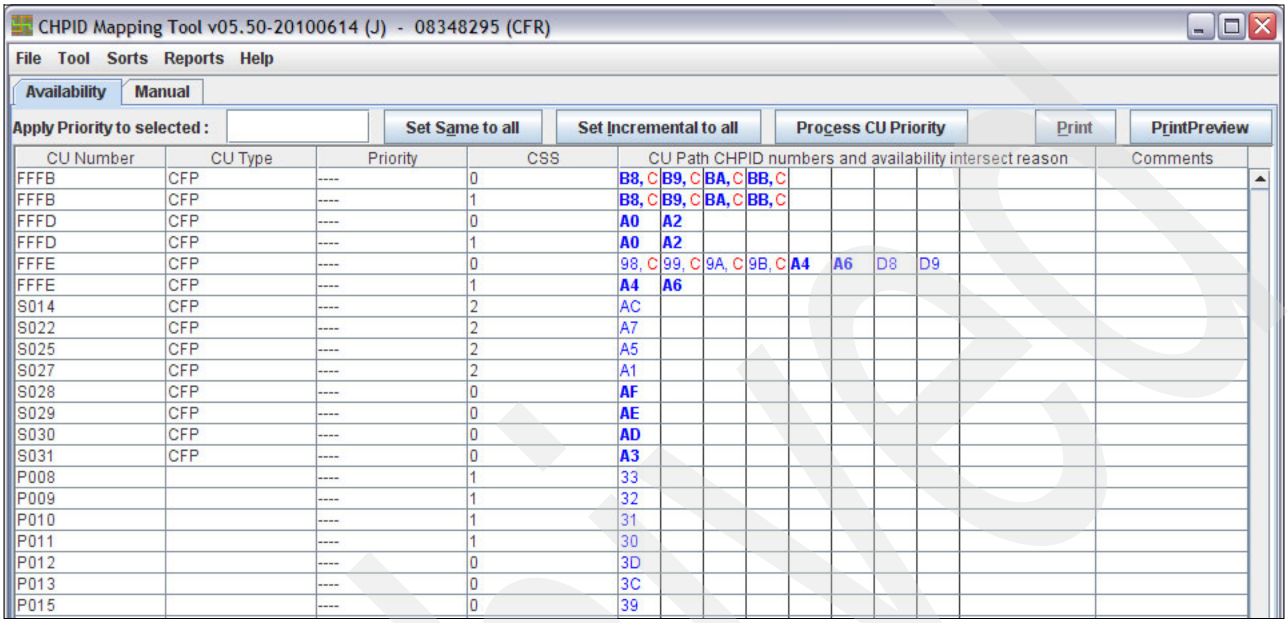
```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~ch
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 5-60 Manual (CHPIDs assigned)

As you can see, the CHPID and CHPID Origin columns are no longer blank. The CMT has assigned CHPIDs to PCHIDs and it has placed the Avail value in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

5.5.10 CHPIDs not connected to Control Units

Under the Availability tab, select **Sorts** → **By Control Unit**. The CHPID Mapping Tool displays at the end of the list all CHPIDs defined in the IOCP input that are not connected to control units. All coupling CHPIDs in this list are preceded with an “S” in the CU Number column (not shown in Figure 5-61). All non-coupling CHPIDs are preceded with a “P”.



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason								Comments
FFFB	CFP	----	0	B8, C	B9, C	BA, C	BB, C					
FFFB	CFP	----	1	B8, C	B9, C	BA, C	BB, C					
FFFD	CFP	----	0	A0	A2							
FFFD	CFP	----	1	A0	A2							
FFFE	CFP	----	0	98, C	99, C	9A, C	9B, C	A4	A6	D8	D9	
FFFE	CFP	----	1	A4	A6							
S014	CFP	----	2	AC								
S022	CFP	----	2	A7								
S025	CFP	----	2	A5								
S027	CFP	----	2	A1								
S028	CFP	----	0	AF								
S029	CFP	----	0	AE								
S030	CFP	----	0	AD								
S031	CFP	----	0	A3								
P008		----	1	33								
P009		----	1	32								
P010		----	1	31								
P011		----	1	30								
P012		----	0	3D								
P013		----	0	3C								
P015		----	0	39								

Figure 5-61 Sort by Control Unit

You should review the list because:

- You might have forgotten to add a CHPID to a control unit and might need to update the IOCP source before continuing with the CHPID Mapping Tool.
- The unconnected CHPIDs may be extra channels you are ordering in anticipation of new control units.
- The unconnected CHPIDs may be coupling links that are being used in coupling facility (CF) images (they do not require control units).

If there are extra CHPIDs for anticipated new control units, you might want to group these CHPIDs with a common priority. This action allows the availability mapping function to pick PCHIDs that will afford your new control unit good availability.

5.5.11 Creating reports

The CHPID Mapping Tool offers built-in reports, which are available from the Reports drop-down menu. You can also print the information in the Availability tab or the Manual tab by clicking **Print**. When in the Availability tab, you can enter information in to the comments column that might be useful at a later date.

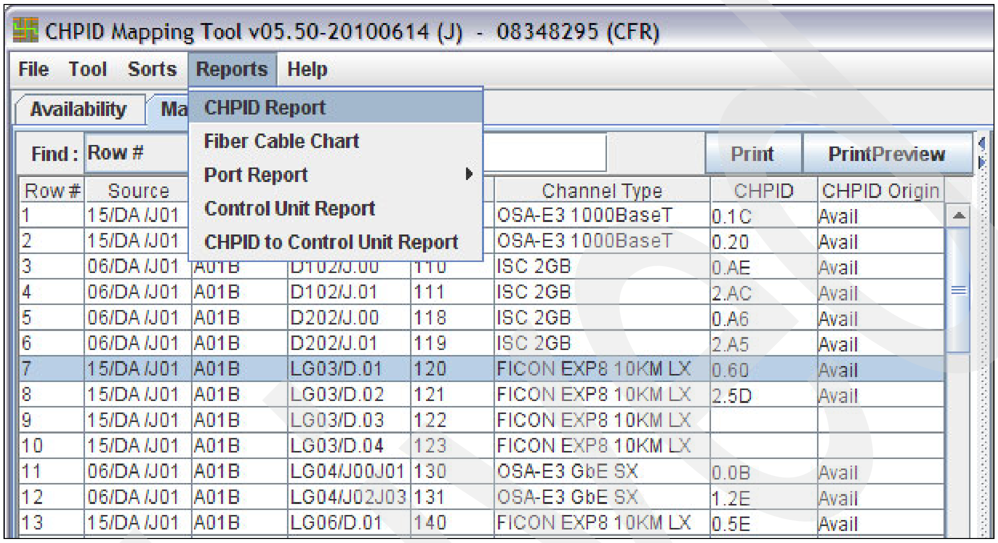
For simplicity, we only describe how to print three reports in this example (the CHPID Report, the Port Report, Sorted by Location, and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

The person who installs the I/O cables during system installation needs one of these reports. The Port Report, Sorted by Location, is recommended. The installer can use this report to label the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

CHPID Report

To create the CHPID Report, perform the following steps:

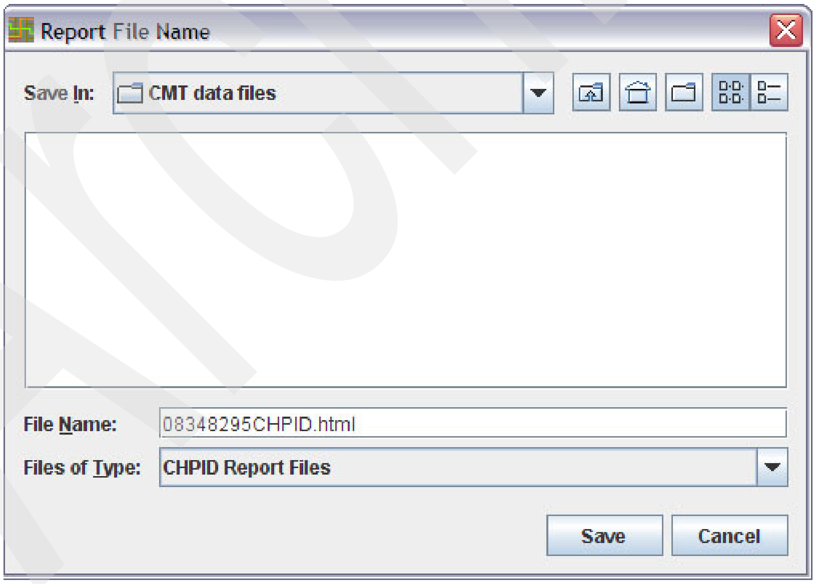
1. Select **Reports** → **CHPID Report** (Figure 5-62).



Row #	Source				Channel Type	CHPID	CHPID Origin
1	15/DA /J01				OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01				OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail

Figure 5-62 Select CHPID Report

2. Enter the Report File Name (or accept the default name offered by CMT) and click **Save** (Figure 5-63).



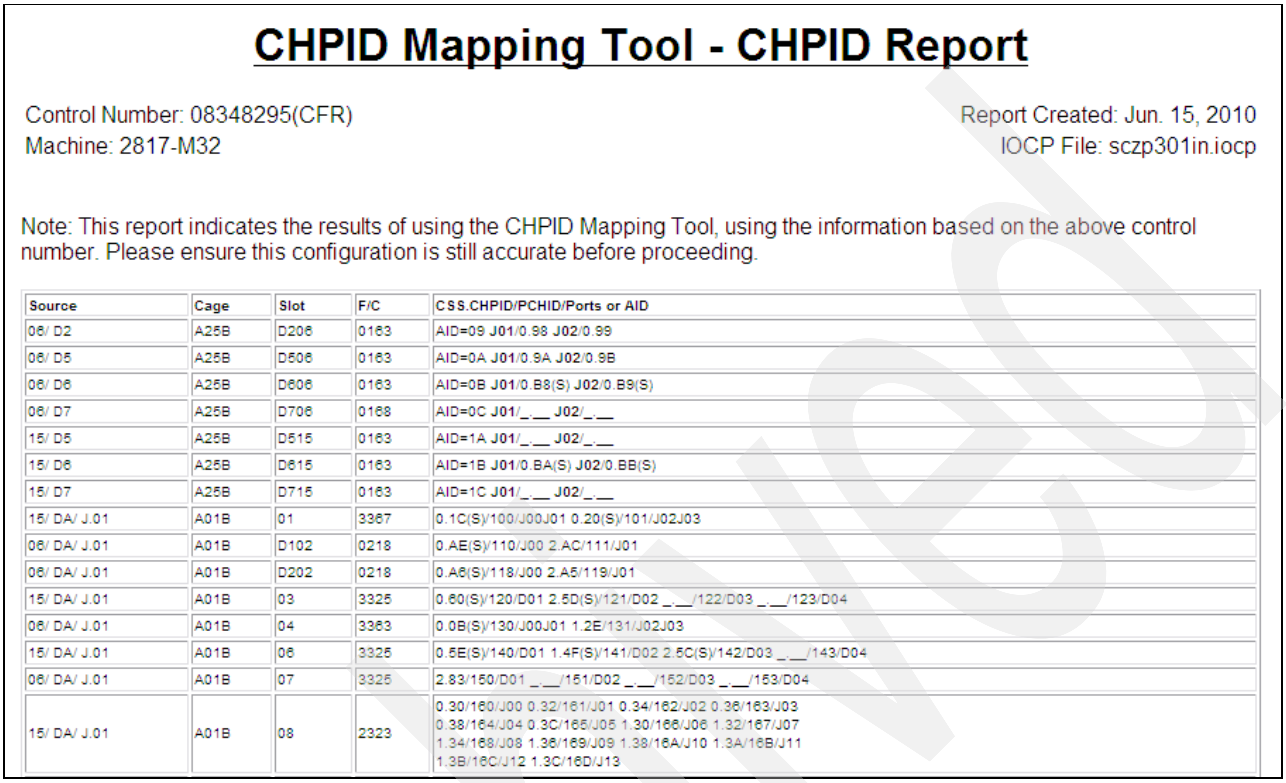
Save In: CMT data files

File Name: 08348295CHPID.html

Files of Type: CHPID Report Files

Figure 5-63 Report File Name

3. The CHPID Mapping Tool opens a browser window with the CHPID Report (Figure 5-64). You might be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID Report

Control Number: 08348295(CFR)
Machine: 2817-M32

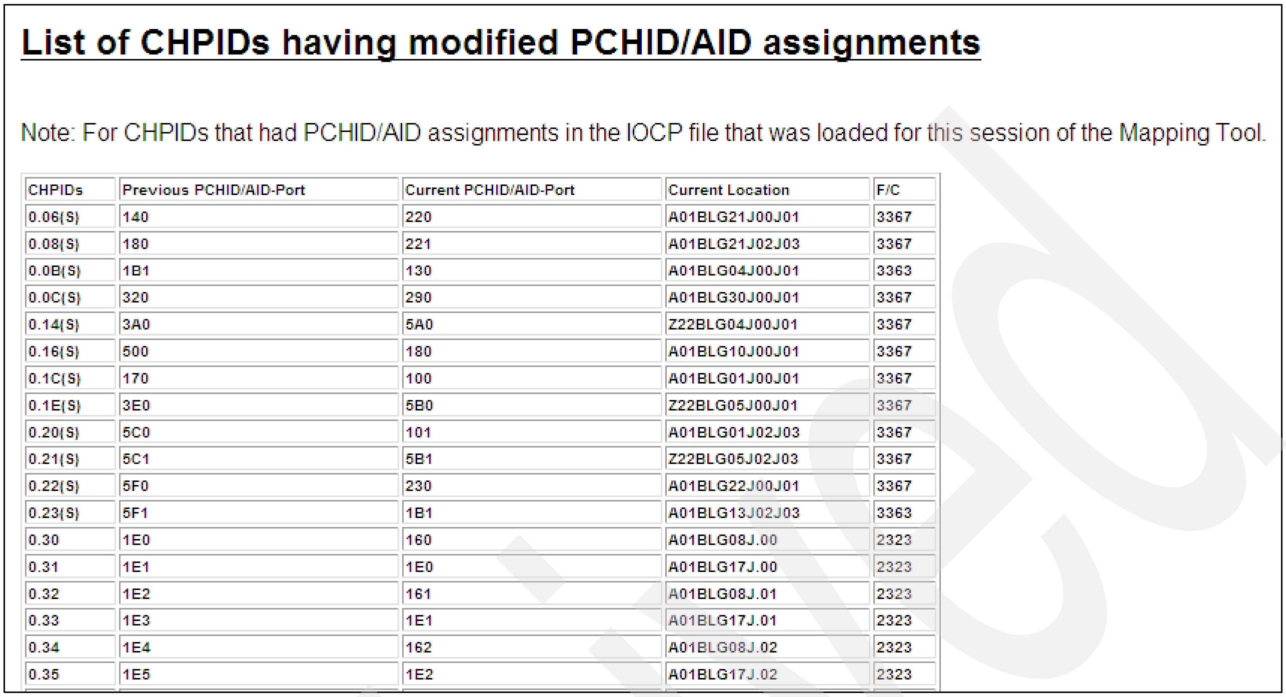
Report Created: Jun. 15, 2010
IOCP File: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Source	**Cage**	**Slot**	**F/C**	**CSS.CHPID/PCHID/Ports or AID**
06/ D2	A25B	D206	0163	AID=09 **J01**/0.98 **J02**/0.99
06/ D5	A25B	D506	0163	AID=0A **J01**/0.9A **J02**/0.9B
06/ D6	A25B	D606	0163	AID=0B **J01**/0.B8(S) **J02**/0.B9(S)
06/ D7	A25B	D706	0168	AID=0C **J01**/_.__ **J02**/_.__
15/ D5	A25B	D515	0163	AID=1A **J01**/_.__ **J02**/_.__
15/ D6	A25B	D615	0163	AID=1B **J01**/0.BA(S) **J02**/0.BB(S)
15/ D7	A25B	D715	0163	AID=1C **J01**/_.__ **J02**/_.__
15/ DA/ J.01	A01B	01	3367	0.1C(S)/100/J00J01 0.20(S)/101/J02J03
06/ DA/ J.01	A01B	D102	0218	0.AE(S)/110/J00 2.AC/111/J01
06/ DA/ J.01	A01B	D202	0218	0.A6(S)/118/J00 2.A5/119/J01
15/ DA/ J.01	A01B	03	3325	0.60(S)/120/D01 2.5D(S)/121/D02 _.__/122/D03 _.__/123/D04
06/ DA/ J.01	A01B	04	3363	0.0B(S)/130/J00J01 1.2E/131/J02J03
15/ DA/ J.01	A01B	06	3325	0.5E(S)/140/D01 1.4F(S)/141/D02 2.5C(S)/142/D03 _.__/143/D04
06/ DA/ J.01	A01B	07	3325	2.83/150/D01 _.__/151/D02 _.__/152/D03 _.__/153/D04
15/ DA/ J.01	A01B	08	2323	0.30/160/J00 0.32/161/J01 0.34/162/J02 0.36/163/J03 0.38/164/J04 0.3C/165/J05 1.30/166/J06 1.32/167/J07 1.34/168/J08 1.36/169/J09 1.38/16A/J10 1.3A/16B/J11 1.3B/16C/J12 1.3C/16D/J13

Figure 5-64   CHPID Report

At the end of this CHPID report there is a list of CHPIDs with modified PCHID/AID assignments (Figure 5-65). This report is valuable for moving cables.



List of CHPIDs having modified PCHID/AID assignments

Note: For CHPIDs that had PCHID/AID assignments in the IOCP file that was loaded for this session of the Mapping Tool.

CHPIDs	Previous PCHID/AID-Port	Current PCHID/AID-Port	Current Location	F/C
0.06(S)	140	220	A01BLG21J00J01	3367
0.08(S)	180	221	A01BLG21J02J03	3367
0.0B(S)	1B1	130	A01BLG04J00J01	3363
0.0C(S)	320	290	A01BLG30J00J01	3367
0.14(S)	3A0	5A0	Z22BLG04J00J01	3367
0.16(S)	500	180	A01BLG10J00J01	3367
0.1C(S)	170	100	A01BLG01J00J01	3367
0.1E(S)	3E0	5B0	Z22BLG05J00J01	3367
0.20(S)	5C0	101	A01BLG01J02J03	3367
0.21(S)	5C1	5B1	Z22BLG05J02J03	3367
0.22(S)	5F0	230	A01BLG22J00J01	3367
0.23(S)	5F1	1B1	A01BLG13J02J03	3363
0.30	1E0	160	A01BLG08J.00	2323
0.31	1E1	1E0	A01BLG17J.00	2323
0.32	1E2	161	A01BLG08J.01	2323
0.33	1E3	1E1	A01BLG17J.01	2323
0.34	1E4	162	A01BLG08J.02	2323
0.35	1E5	1E2	A01BLG17J.02	2323

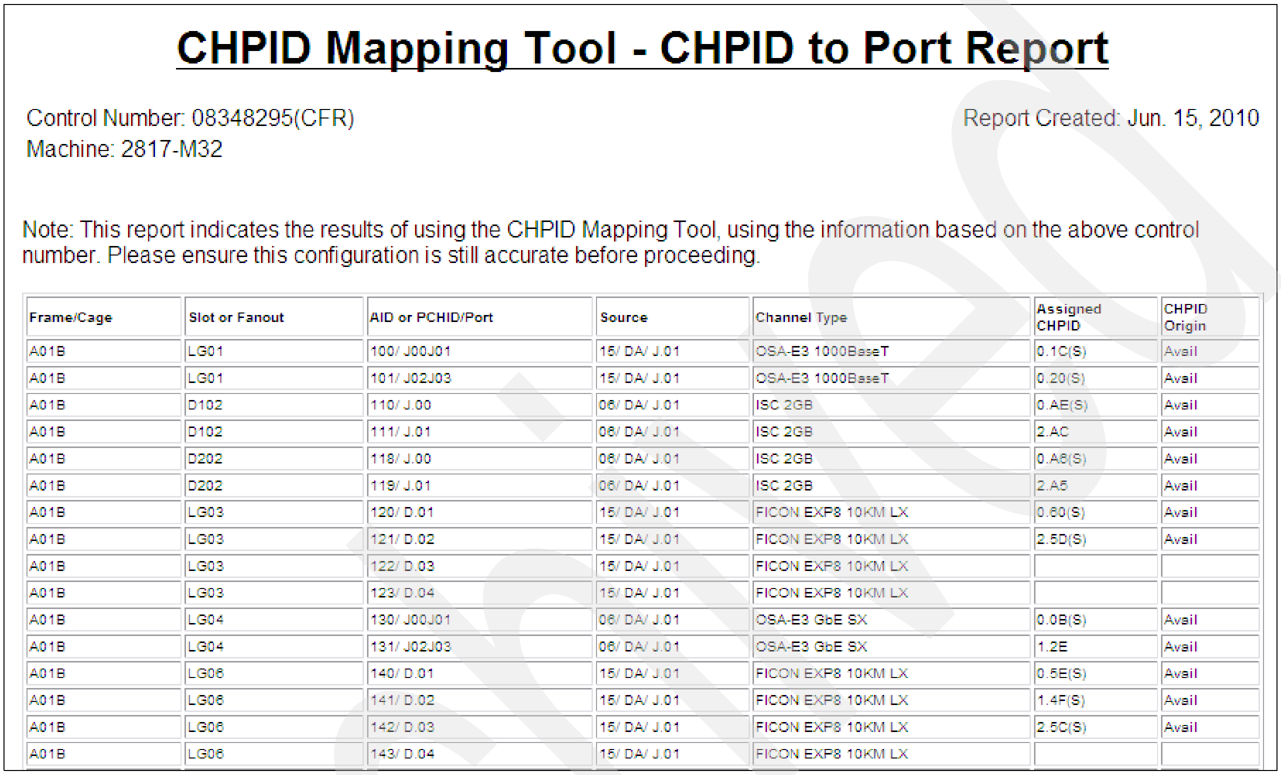
Figure 5-65 List of CHPIDs having modified PCHID/AID assignment

Port Report, Sorted by Location

To created the Port Report, Sorted by Location, perform the following steps:

1. Select **Reports** → **Port Report** → **Sorted by Location**, and then click **Save** (assuming that you accept the CHPID Mapping Tool report name).

   The CHPID Mapping Tool opens a browser window with the CHPID to Port Report (Figure 5-66).



CHPID Mapping Tool - CHPID to Port Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 15, 2010

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Frame/Cage	Slot or Fanout	AID or PCHID/Port	Source	Channel Type	Assigned CHPID	CHPID Origin
A01B	LG01	100/ J00J01	15/ DA/ J.01	OSA-E3 1000BaseT	0.1C(S)	Avail
A01B	LG01	101/ J02J03	15/ DA/ J.01	OSA-E3 1000BaseT	0.20(S)	Avail
A01B	D102	110/ J.00	06/ DA/ J.01	ISC 2GB	0.AE(S)	Avail
A01B	D102	111/ J.01	06/ DA/ J.01	ISC 2GB	2.AC	Avail
A01B	D202	118/ J.00	06/ DA/ J.01	ISC 2GB	0.A6(S)	Avail
A01B	D202	119/ J.01	06/ DA/ J.01	ISC 2GB	2.A5	Avail
A01B	LG03	120/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.60(S)	Avail
A01B	LG03	121/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	2.5D(S)	Avail
A01B	LG03	122/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX		
A01B	LG03	123/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX		
A01B	LG04	130/ J00J01	06/ DA/ J.01	OSA-E3 GbE SX	0.0B(S)	Avail
A01B	LG04	131/ J02J03	06/ DA/ J.01	OSA-E3 GbE SX	1.2E	Avail
A01B	LG06	140/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.5E(S)	Avail
A01B	LG06	141/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	1.4F(S)	Avail
A01B	LG06	142/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	2.5C(S)	Avail
A01B	LG06	143/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX		

Figure 5-66 CHPID to Port Report

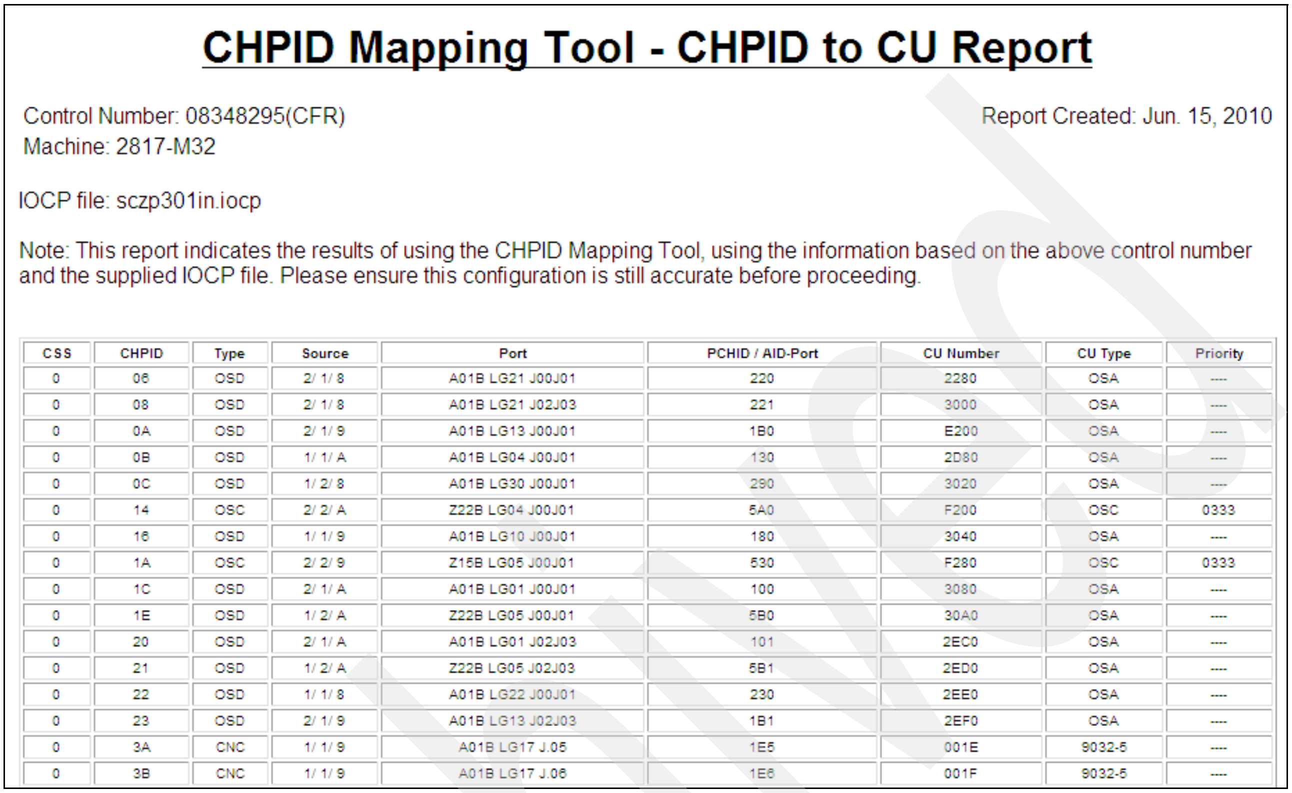
2. You may be prompted to accept active content. Accept the active content to display the report in your browser.

Creating the CHPID to Control Unit Report

This report is created in a similar way to the CHPID Report:

1. Select **Reports** → **CHPID to Control Unit Report**.
2. Click **Save**.

3. The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report (Figure 5-67). You might be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 15, 2010

IOCP file: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the supplied IOCP file. Please ensure this configuration is still accurate before proceeding.

CSS	CHPID	Type	Source	Port	PCHID / AID-Port	CU Number	CU Type	Priority
0	06	OSD	2/ 1/ 8	A01B LG21 J00J01	220	2280	OSA	----
0	08	OSD	2/ 1/ 8	A01B LG21 J02J03	221	3000	OSA	----
0	0A	OSD	2/ 1/ 9	A01B LG13 J00J01	1B0	E200	OSA	----
0	0B	OSD	1/ 1/ A	A01B LG04 J00J01	130	2D80	OSA	----
0	0C	OSD	1/ 2/ 8	A01B LG30 J00J01	290	3020	OSA	----
0	14	OSC	2/ 2/ A	Z22B LG04 J00J01	5A0	F200	OSC	0333
0	16	OSD	1/ 1/ 9	A01B LG10 J00J01	180	3040	OSA	----
0	1A	OSC	2/ 2/ 9	Z15B LG05 J00J01	530	F280	OSC	0333
0	1C	OSD	2/ 1/ A	A01B LG01 J00J01	100	3080	OSA	----
0	1E	OSD	1/ 2/ A	Z22B LG05 J00J01	5B0	30A0	OSA	----
0	20	OSD	2/ 1/ A	A01B LG01 J02J03	101	2EC0	OSA	----
0	21	OSD	1/ 2/ A	Z22B LG05 J02J03	5B1	2ED0	OSA	----
0	22	OSD	1/ 1/ 8	A01B LG22 J00J01	230	2EE0	OSA	----
0	23	OSD	2/ 1/ 9	A01B LG13 J02J03	1B1	2EF0	OSA	----
0	3A	CNC	1/ 1/ 9	A01B LG17 J.05	1E5	001E	9032-5	----
0	3B	CNC	1/ 1/ 9	A01B LG17 J.06	1E6	001F	9032-5	----

Figure 5-67 CHPID to CU Report

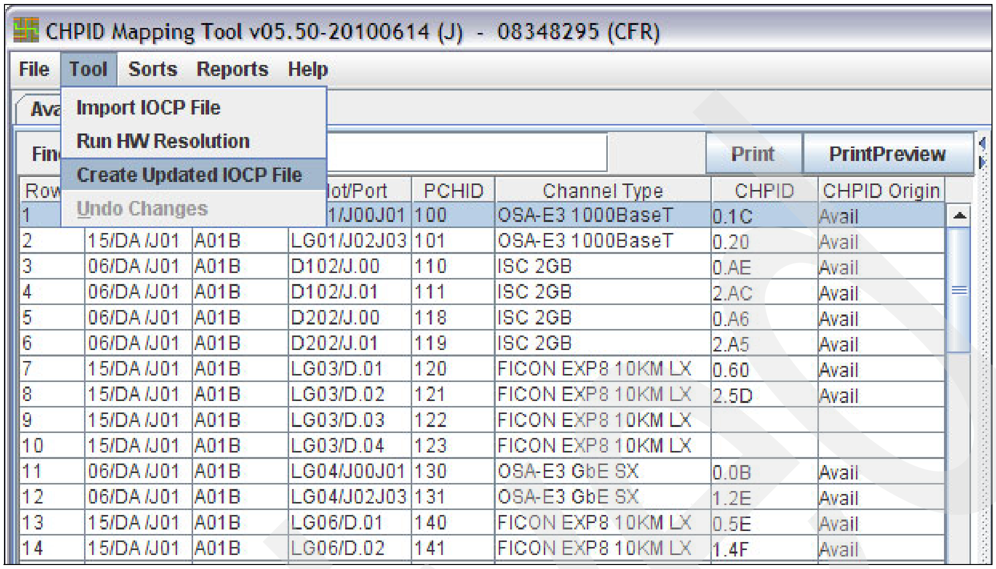
5.5.12 Creating an updated IOCP

> **Note:** You might prefer to use HCM to transfer the updated IOCP statements file back to the host. Before doing so, however, first run the next step in the CHPID Mapping Tool to create the updated IOCP file.

At this point, create an IOCP statements file to enter back into the IODF using HCD. This IOCP statements file has the CHPIDs assigned to PCHIDs.

Perform the following steps:

1. Select **Tool** → **Create Updated IOCP File** (Figure 5-68).

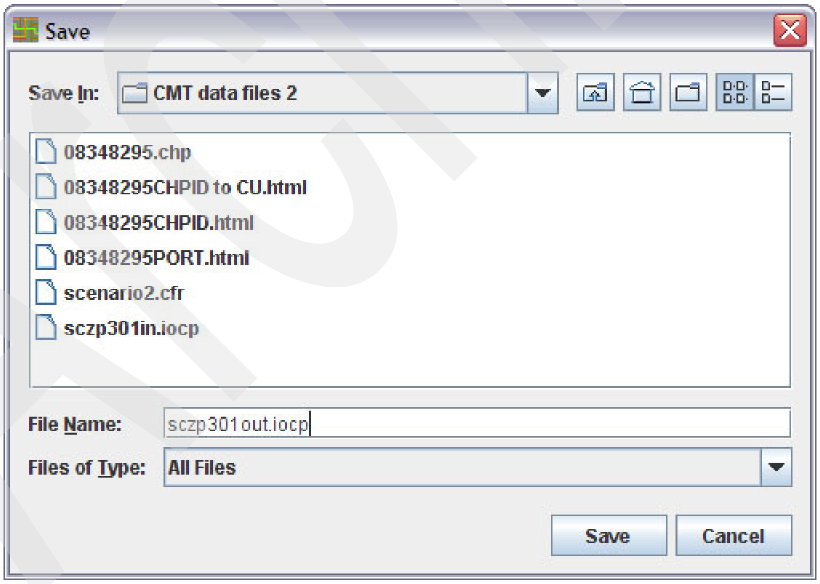


Row			lot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1			1/J00J01	100	OSA-E3 1000BaseT	0.1C	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.20	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	0.AE	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	2.AC	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	0.A6	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.2E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	1.4F	Avail

Figure 5-68 Create Updated IOCP File

2. Enter the File name and location for the IOCP output file and click **Save** (Figure 5-69).

> **Note:** This file needs to be uploaded to the z/OS image on which you have the work IODF used previously to create the IOCP input data set.



Save In: CMT data files 2

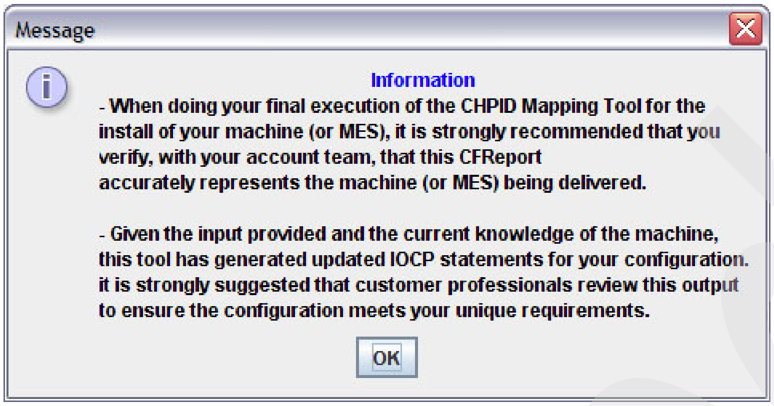
08348295.chp
08348295CHPID to CU.html
08348295CHPID.html
08348295PORT.html
scenario2.cfr
sczp301in.iocp

File Name: sczp301out.iocp

Files of Type: All Files

Figure 5-69 Save IOCP output file

3. The CMT displays an informational message, shown in Figure 5-70, regarding what to do for the final execution of the tool.



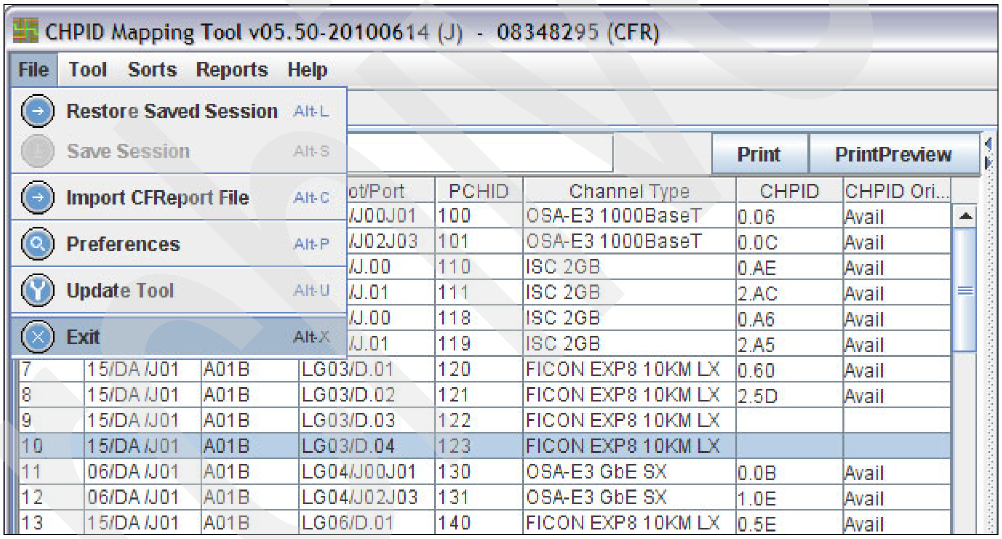
Information

- When doing your final execution of the CHPID Mapping Tool for the install of your machine (or MES), it is strongly recommended that you verify, with your account team, that this CFReport accurately represents the machine (or MES) being delivered.

- Given the input provided and the current knowledge of the machine, this tool has generated updated IOCP statements for your configuration. it is strongly suggested that customer professionals review this output to ensure the configuration meets your unique requirements.

Figure 5-70 Informational message

4. The CHPID Mapping Tool program can be shut down now. Select **File** → **Exit** (Figure 5-71).



			ot/Port	PCHID	Channel Type	CHPID	CHPID Ori...
			/J00J01	100	OSA-E3 1000BaseT	0.06	Avail
			/J02J03	101	OSA-E3 1000BaseT	0.0C	Avail
			/J.00	110	ISC 2GB	0.AE	Avail
			/J.01	111	ISC 2GB	2.AC	Avail
			/J.00	118	ISC 2GB	0.A6	Avail
			/J.01	119	ISC 2GB	2.A5	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.60	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	2.5D	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.0B	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	1.0E	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.5E	Avail

Figure 5-71 Exit program

5.6 HCD: Updating the 2817 work IODF with PCHIDs

After mapping the PCHIDs to CHPIDs using the CHPID Mapping Tool, this information needs to be transferred back to the HCD.

Perform the following steps:

1. Upload the IOCP file created by the CMT (`sczp301out.iocp`, in our example) to the z/OS image. Use a file transfer facility such as the one in IBM Personal Communications or an equivalent FTP program. Be sure to use TEXT as the transfer type.

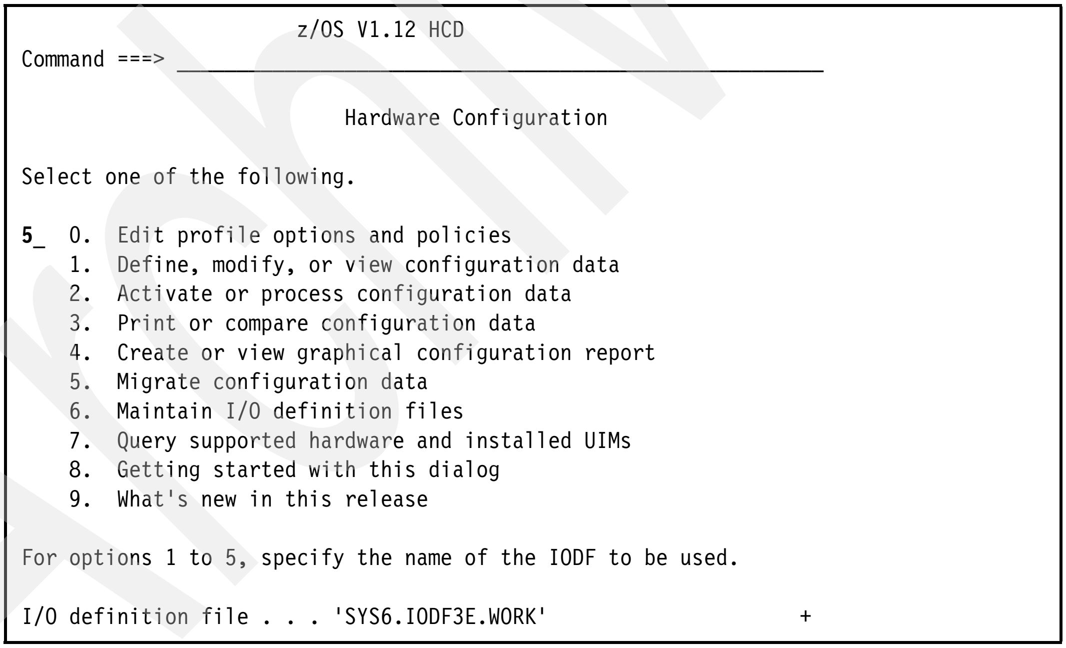
   Looking at the updated IOCP statements file, you notice that the CMT has left a reference to the CCN. Also note the CU Priority values added for the OSC control units.

Note: Control Unit priorities are stored in the IOCP output file created by the CHPID Mapping Tool that is migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck. They are in the form of commented lines at the end of the IOCP deck (Example 5-3).

Example 5-3 Updated IOCP statements file (with CMT statements)

```
IODEVICE ADDRESS=(FF38,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFC8,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFD6,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFE4,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFEB,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF2,007),CUNUMBR=(FFFE),UNIT=CFP
         IODEVICE ADDRESS=(FFF9,007),CUNUMBR=(FFFE),UNIT=CFP
*CMT* VERSION=000
*CMT* CCN=08348295(CFR)
*CMT* 21E0.2=0333,F200.0=0333,F200.1=0333,F200.2=0333,F280.0=0333
*CMT* F280.1=0333,F280.2=0333
******************************* Bottom of Data *********************
```

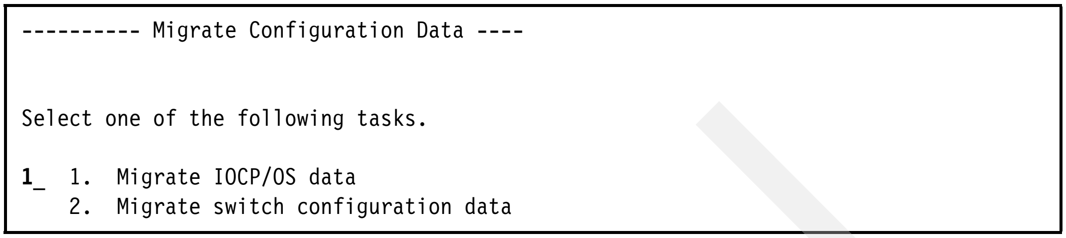
2. From the HCD main panel (Figure 5-72), enter the work IODF name used. Select Option 5. Migrate configuration data.



```
                        z/OS V1.12 HCD
Command ===> ______________________________________________________

                            Hardware Configuration

Select one of the following.

5_  0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3E.WORK'                     +
```

Figure 5-72 Main menu: Migrate configuration data

3. From the Migrate Configuration Data panel (Figure 5-73), select Option 1. Migrate IOCP/OS data and press Enter.

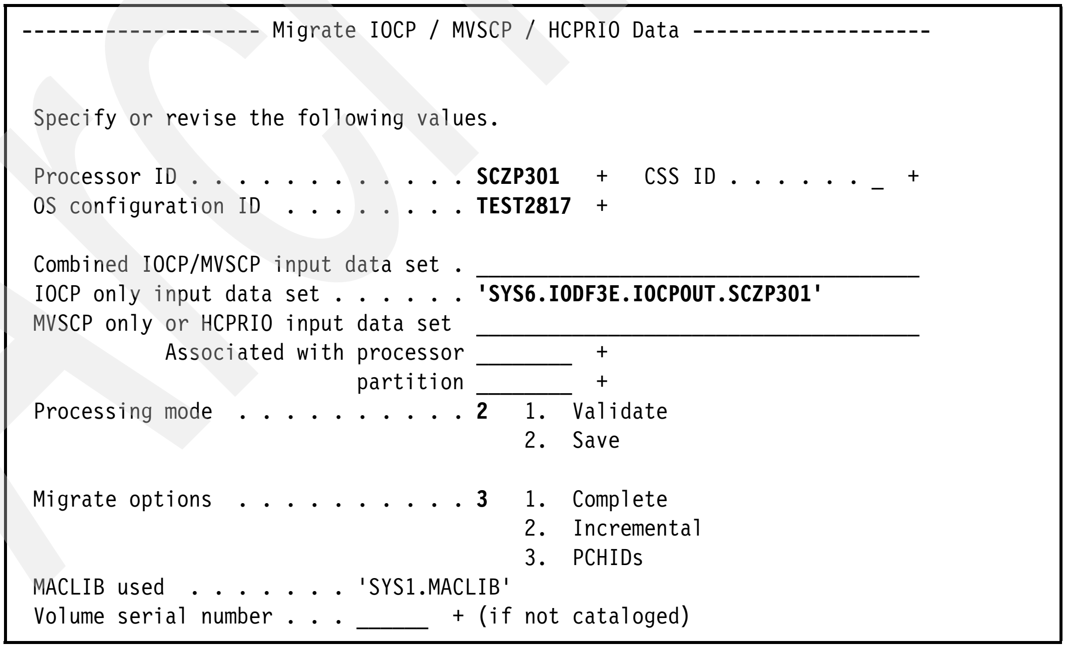


```
---------- Migrate Configuration Data ----


Select one of the following tasks.

1_  1.  Migrate IOCP/OS data
    2.  Migrate switch configuration data
```

Figure 5-73 Migrate Configuration Data

4. On the Migrate IOCP Data panel (Figure 5-74), complete the following fields and press Enter:

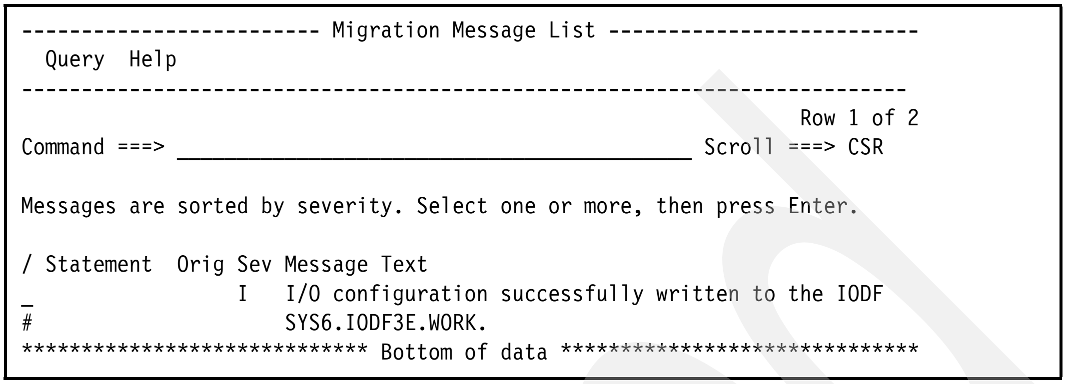
Processor ID	Use the same ID used to create the IOCP input deck.
OS configuration ID	This configuration is the OS configuration associated with the processor.
IOCP only input data set	This data set is the data set specified when the `iocpout.txt` file was uploaded to z/OS (refer to 5.6, “HCD: Updating the 2817 work IODF with PCHIDs” on page 270).
Processing mode	Select Option 2 to save the results of the migration. (Prior to using Option 2, however, try to migrate using Option 1 to validate the operation).
Migrate options	Select Option 3 for PCHIDS. Only the PCHIDs are migrated into the work IODF.



```
-------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------


 Specify or revise the following values.

 Processor ID . . . . . . . . . . . . SCZP301   +   CSS ID . . . . . . _  +
 OS configuration ID  . . . . . . . . TEST2817  +

 Combined IOCP/MVSCP input data set . _____________________________________
 IOCP only input data set . . . . . . 'SYS6.IODF3E.IOCPOUT.SCZP301'
 MVSCP only or HCPRIO input data set  _____________________________________
            Associated with processor ________  +
                            partition ________  +
 Processing mode  . . . . . . . . . . 2   1.  Validate
                                          2.  Save

 Migrate options  . . . . . . . . . . 3   1.  Complete
                                          2.  Incremental
                                          3.  PCHIDs
 MACLIB used  . . . . . . . 'SYS1.MACLIB'
 Volume serial number . . . ______  + (if not cataloged)
```

Figure 5-74 Migrate IOCP / MVSCP / HCPRIO Data

5. HCD displays any errors or warning messages resulting from the migration action. In our example, the only message we received indicated that the migration was successful (Figure 5-75).



```
------------------------- Migration Message List --------------------------
  Query  Help
---------------------------------------------------------------------------
                                                                 Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Statement  Orig Sev Message Text
_                 I   I/O configuration successfully written to the IODF
#                     SYS6.IODF3E.WORK.
***************************** Bottom of data ******************************
```

Figure 5-75 Migration Message List

6. At this point, the work IODF contains both the CHPID definitions and the mapping to PCHIDs that was done using the CHPID Mapping Tool. Press PF3 and you should receive the following message:

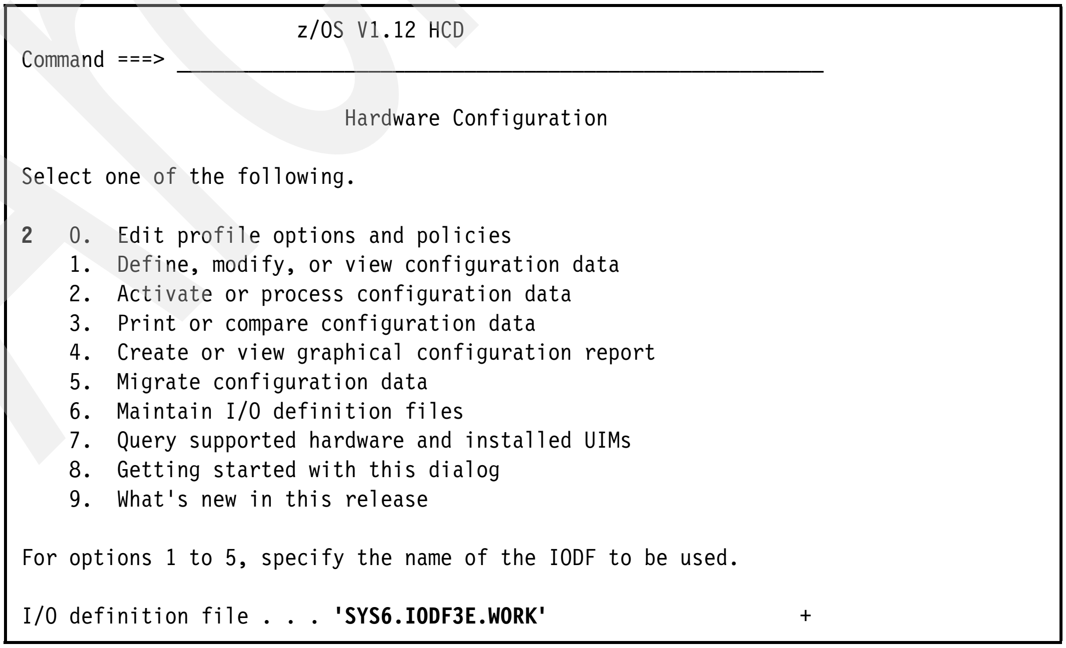
   `IOCP/Operating system deck migration processing complete, return code = 0.`

7. Press PF3 again.

5.7 HCD: Building the 2817 production IODF

To make use of the definitions that we updated in HCD, the next step is to create a production IODF from the work IODF by performing the following steps:

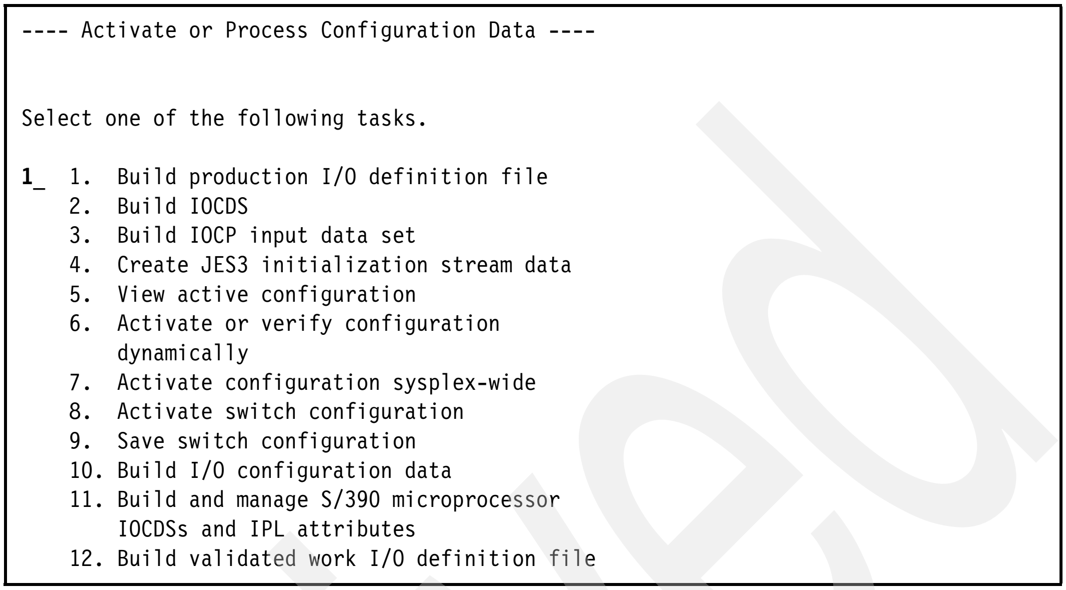
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 5-76).



```
                       z/OS V1.12 HCD
Command ===> ______________________________________________________

                           Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3E.WORK'                    +
```

Figure 5-76 Main menu: Select activate or process configuration data

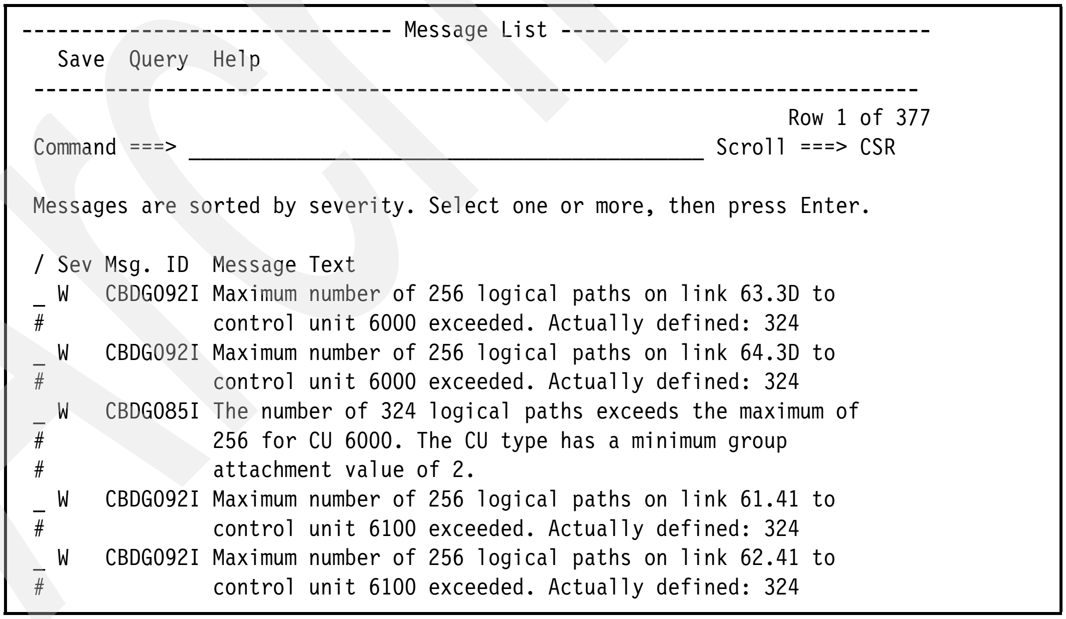
2. The Activate or Process Configuration Data panel opens (Figure 5-77). Select Option 1. Build production I/O definition file and press Enter.



```
---- Activate or Process Configuration Data ----


Select one of the following tasks.

1_  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

Figure 5-77 Activate or Process Configuration Data: Select Build production IODF

3. HCD displays the Message List panel (Figure 5-78). Verify that you have only Severity W warning messages and that they are normal for your configuration. Correct any messages that should not occur and try to build the production IODF again. Continue this process until you have no messages indicating problems.

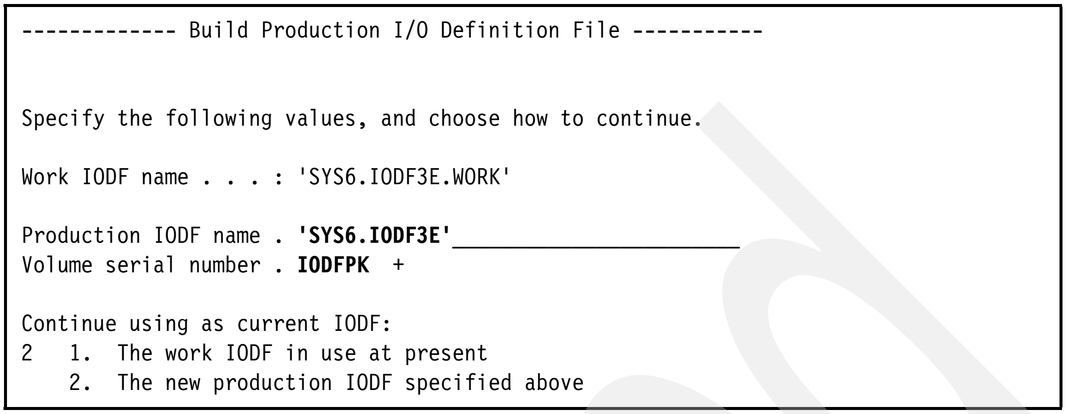


```
------------------------------- Message List -------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                            Row 1 of 377
 Command ===> ___________________________________________ Scroll ===> CSR

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 _ W   CBDG092I Maximum number of 256 logical paths on link 63.3D to
 #              control unit 6000 exceeded. Actually defined: 324
 _ W   CBDG092I Maximum number of 256 logical paths on link 64.3D to
 #              control unit 6000 exceeded. Actually defined: 324
 _ W   CBDG085I The number of 324 logical paths exceeds the maximum of
 #              256 for CU 6000. The CU type has a minimum group
 #              attachment value of 2.
 _ W   CBDG092I Maximum number of 256 logical paths on link 61.41 to
 #              control unit 6100 exceeded. Actually defined: 324
 _ W   CBDG092I Maximum number of 256 logical paths on link 62.41 to
 #              control unit 6100 exceeded. Actually defined: 324
```

Figure 5-78 Message List (building Production IODF)

4. Press PF3 to continue.

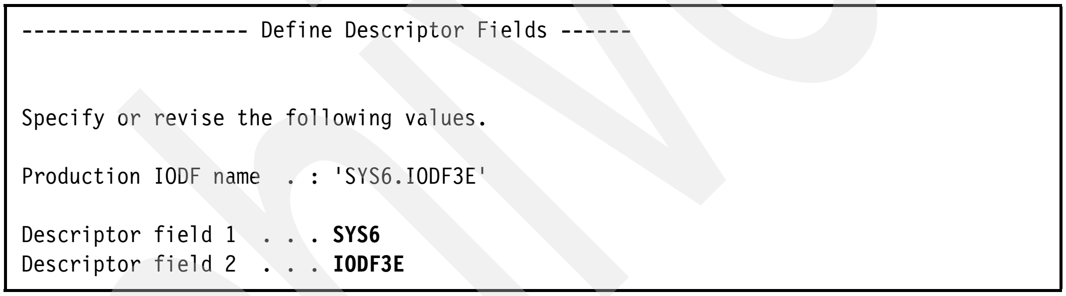
5. The Build Production I/O Definition File panel opens (Figure 5-79). Complete the `Production IODF name` and `Volume serial number` fields and press Enter.



```
------------ Build Production I/O Definition File -----------


Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS6.IODF3E.WORK'

Production IODF name . 'SYS6.IODF3E'________________________
Volume serial number . IODFPK  +

Continue using as current IODF:
2   1.  The work IODF in use at present
    2.  The new production IODF specified above
```

Figure 5-79 Build Production I/O Definition File

6. The Define Descriptor Fields panel opens (Figure 5-80). Press Enter to accept the descriptor fields selected by HCD, or enter different values and then press Enter.



```
------------------ Define Descriptor Fields ------


Specify or revise the following values.

Production IODF name  . : 'SYS6.IODF3E'

Descriptor field 1  . . . SYS6
Descriptor field 2  . . . IODF3E
```

Figure 5-80 Define Descriptor Fields

7. HCD displays the following message, indicating that the production IODF was successfully created:

   `Production IODF SYS6.IODF3E created.`

5.8 HCD/HMC: Loading the 2817 processor IOCDS

At this point there is a production IODF, which is called SYS6.IODF3E. Now the IOCDS component of the IODF needs to be updated on the replacement CPC that is being installed (for example, SCZP301) and activated (POR) using this IOCDS. The final step is to perform an IPL of the processor using this IODF. (Describing how to perform the IPL of the new hardware is beyond the scope of this book.)

There are two possible ways to load the IOCP Statements onto the 2817 Service Element IOCDS:

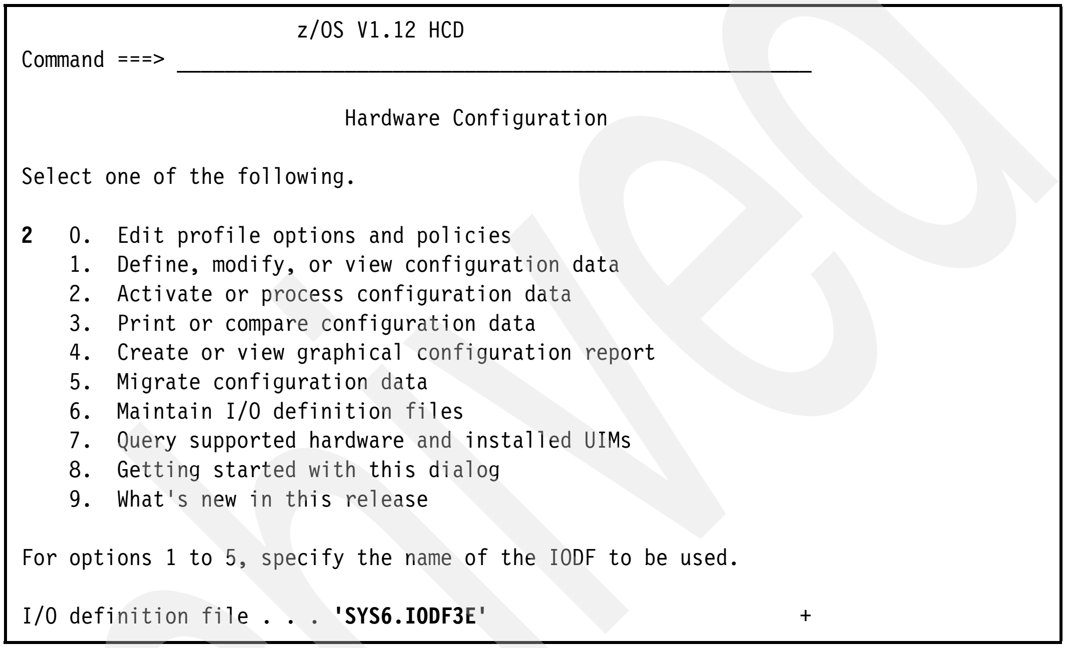
- HCD, using Option 2.11
- HMC/SE, using Stand-Alone Input/Output Configuration Program

Although both ways are valid methods to write the new configuration to the IOCDS, we recommend using HCD Option 2.11. However, your 2817 processor and Service Element that are replacing the 2097 might not be connected to the system where the configuration was generated or cannot be connected to any system where HCD is running. In that case, you need to use the Stand-Alone IOCP process.

5.8.1 Updating the IOCDS using HCD Option 2.11

To update the IOCDS using HCD Option 2.11, perform the following steps:

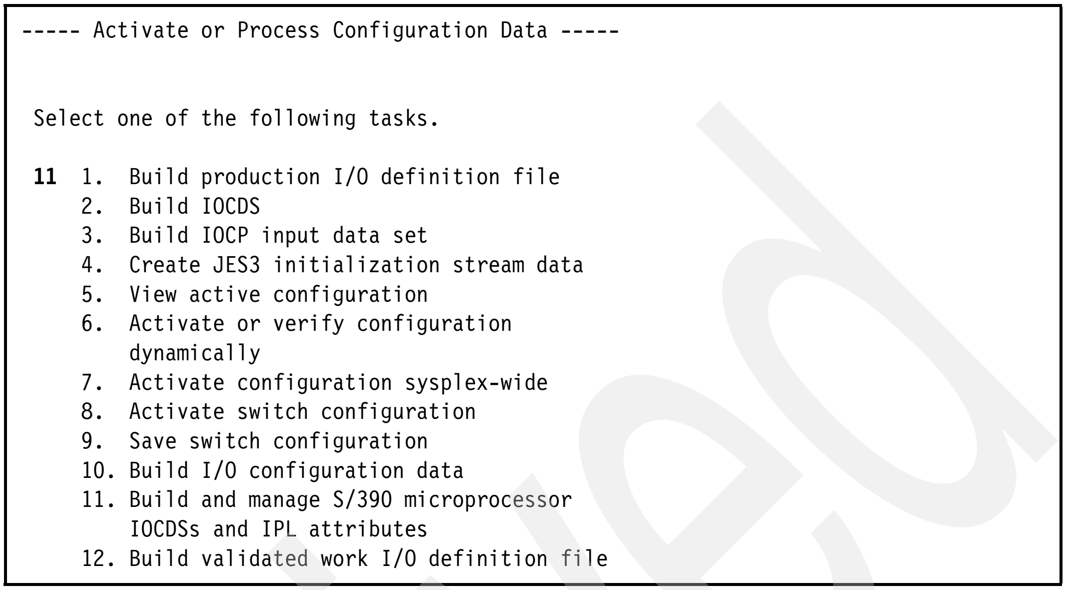
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 5-81). Ensure that the IODF is the production one created in 5.7, “HCD: Building the 2817 production IODF” on page 273. Press Enter.



```
                       z/OS V1.12 HCD
Command ===> _____________________________________________________

                           Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3E'                          +
```

Figure 5-81 Main menu: Select Activate or process configuration data

2. The Activate or Process Configuration Data panel opens (Figure 5-82). Select Option 11. Build and manage S/390 microprocessor IOCDSs and IPL attributes.



```
----- Activate or Process Configuration Data -----


 Select one of the following tasks.

 11  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

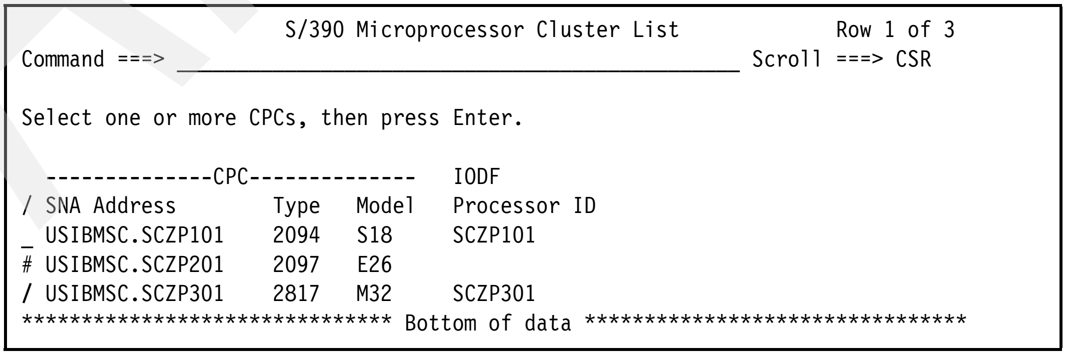
Figure 5-82 Activate or Process Configuration Data: Select Build IOCDSs

Note: In this example, we assume that the replacement 2817 has been delivered and has connectivity to the HMC LAN so we can create an IOCDS from which to power-on reset. This might not be the case for all situations.

If the replacement 2817 is not accessible from the HMC LAN, we need to copy the IOCP statements onto a USB flash memory drive and import them onto the 2817 HMC to run a stand-alone IOCP. Creating a file on a USB flash memory drive can be done using the same process that is used to create an IOCP input file for the CHPID Mapping Tool.

Tip: The Support Element can now read an IOCP file that has been written to a USB flash memory drive.

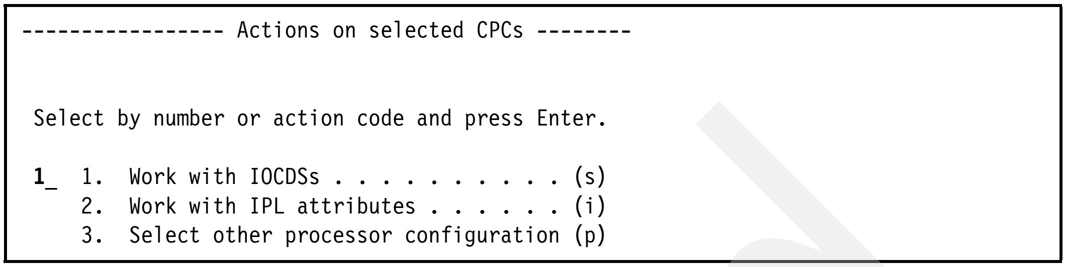
3. The S/390 Microprocessor Cluster List panel opens (Figure 5-83). Use a forward slash mark (/) to select the new 2817 from the list to update one of its IOCDSs. Press Enter.



```
                      S/390 Microprocessor Cluster List             Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
# USIBMSC.SCZP201    2097   E26
/ USIBMSC.SCZP301    2817   M32     SCZP301
******************************* Bottom of data ********************************
```

Figure 5-83 S/390 Microprocessor Cluster List

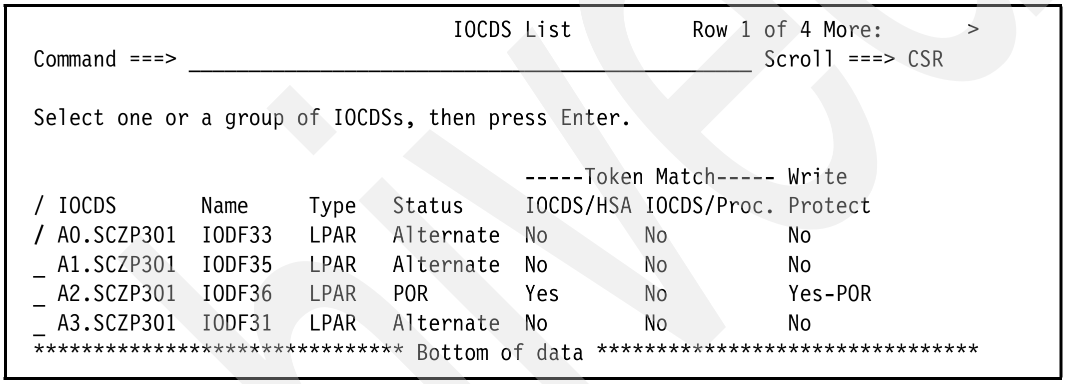
4. The Actions on selected CPCs panel opens (Figure 5-84). Select Option 1. Work with IOCDSs and press Enter.



```
----------------- Actions on selected CPCs --------


 Select by number or action code and press Enter.

 1_  1.  Work with IOCDSs . . . . . . . . . . (s)
     2.  Work with IPL attributes . . . . . . (i)
     3.  Select other processor configuration (p)
```

Figure 5-84 Actions on selected CPCs, Work with IOCDSs

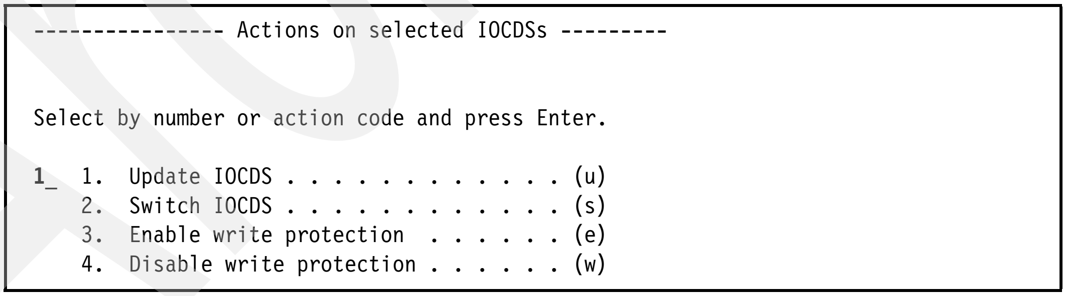
5. The IOCDS List panel opens (Figure 5-85). Select the IOCDS that you want to update for the 2817 install by typing a slash (/) and then press Enter.



```
                                   IOCDS List         Row 1 of 4 More:       >
 Command ===> _______________________________________________ Scroll ===> CSR

 Select one or a group of IOCDSs, then press Enter.

                                          -----Token Match----- Write
 / IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
 / A0.SCZP301  IODF33   LPAR   Alternate  No        No          No
 _ A1.SCZP301  IODF35   LPAR   Alternate  No        No          No
 _ A2.SCZP301  IODF36   LPAR   POR        Yes       No          Yes-POR
 _ A3.SCZP301  IODF31   LPAR   Alternate  No        No          No
 ****************************** Bottom of data ********************************
```

Figure 5-85 IOCDS List

6. The Actions on selected IOCDSs panel opens (Figure 5-86). Select Option 1. Update IOCDS and press Enter.

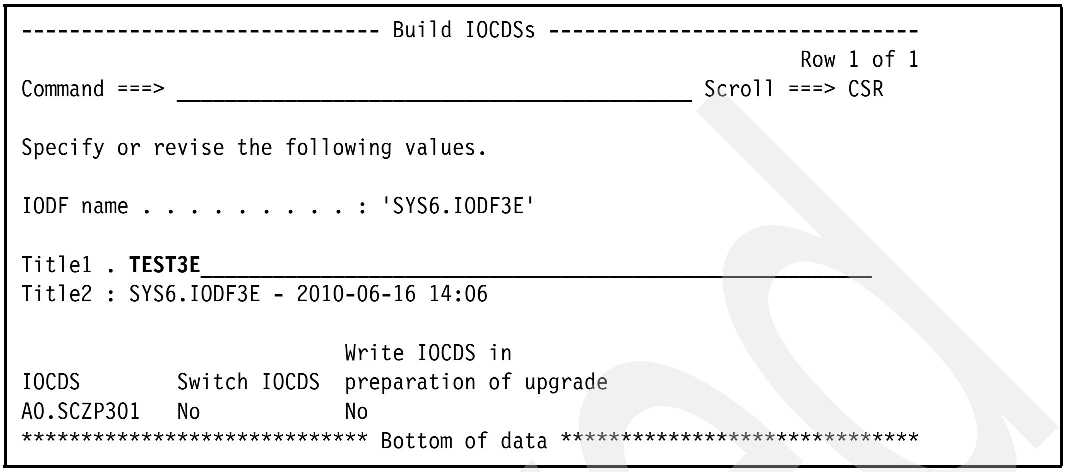


```
 ---------------- Actions on selected IOCDSs ---------


 Select by number or action code and press Enter.

 1_  1.  Update IOCDS . . . . . . . . . . . . (u)
     2.  Switch IOCDS . . . . . . . . . . . . (s)
     3.  Enable write protection  . . . . . . (e)
     4.  Disable write protection . . . . . . (w)
```

Figure 5-86 Actions on selected IOCDSs

7. The Build IOCDSs panel opens (Figure 5-87). Verify that all the information is correct.

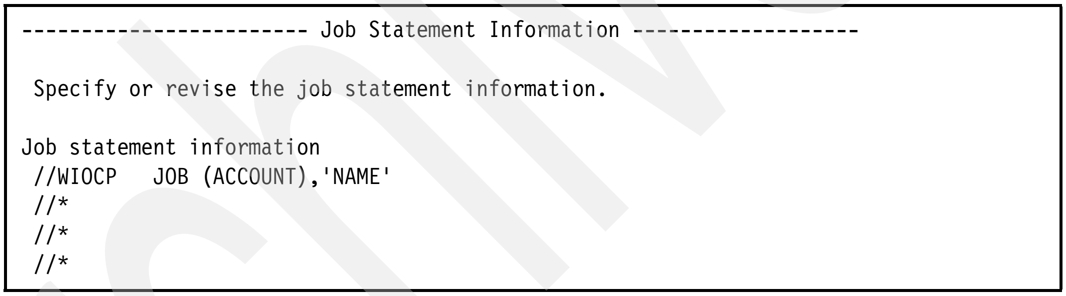
   Complete the `Title1` field and press Enter.



```
------------------------------ Build IOCDSs -------------------------------
                                                               Row 1 of 1
Command ===> ___________________________________________ Scroll ===> CSR

Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF3E'

Title1 . TEST3E_____________________________________________________
Title2 : SYS6.IODF3E - 2010-06-16 14:06

                           Write IOCDS in
IOCDS        Switch IOCDS  preparation of upgrade
A0.SCZP301   No            No
**************************** Bottom of data *****************************
```

Figure 5-87 Build IOCDSs

8. The Job Statement Information panel opens (Figure 5-88). Complete the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.



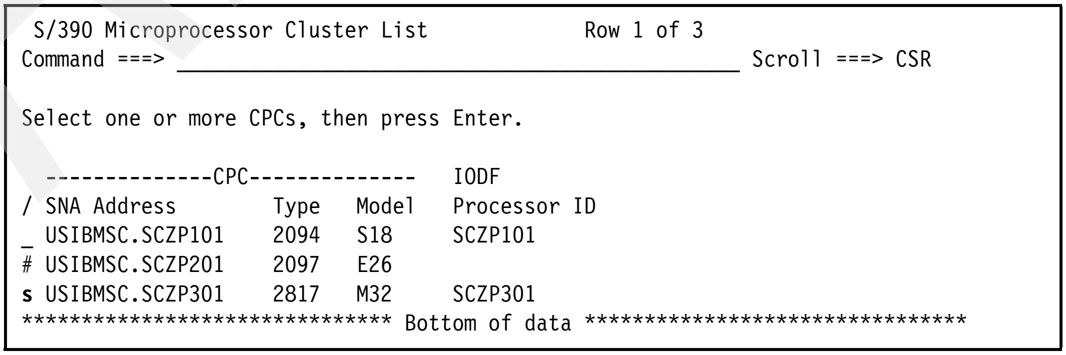
```
------------------------ Job Statement Information --------------------

 Specify or revise the job statement information.

Job statement information
 //WIOCP   JOB (ACCOUNT),'NAME'
 //*
 //*
 //*
```

Figure 5-88 Job Statement Information

9. Verify the job output to ensure that the IOCDS was written without error and to the correct IOCDS. You should receive a message similar to the following one:

   `ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A0 IOCDS REPLACED.`

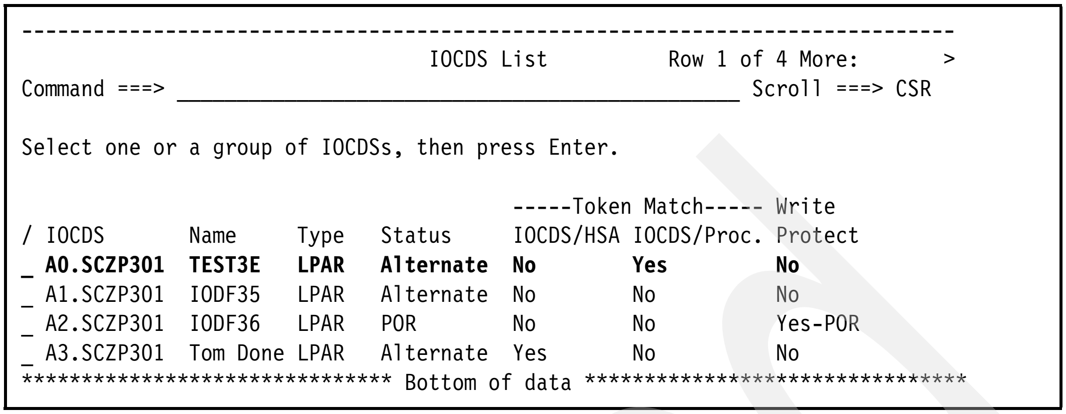
10. Now if you return to HCD Option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP301` (Figure 5-89).



```
 S/390 Microprocessor Cluster List              Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
# USIBMSC.SCZP201    2097   E26
s USIBMSC.SCZP301    2817   M32     SCZP301
****************************** Bottom of data *******************************
```

Figure 5-89 IOCDS with replacement IODF

11. Figure 5-90 shows the updated IOCDS.



```
-------------------------------------------------------------------------------
                                  IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                          -----Token Match----- Write
/ IOCDS        Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP301  TEST3E   LPAR   Alternate  No        Yes         No
_ A1.SCZP301  IODF35   LPAR   Alternate  No        No          No
_ A2.SCZP301  IODF36   LPAR   POR        No        No          Yes-POR
_ A3.SCZP301  Tom Done LPAR   Alternate  Yes       No          No
****************************** Bottom of data ********************************
```

Figure 5-90 IOCDS showing Alternate Status

5.8.2 Updating the IOCDS using Stand-Alone Input/Output Config Program

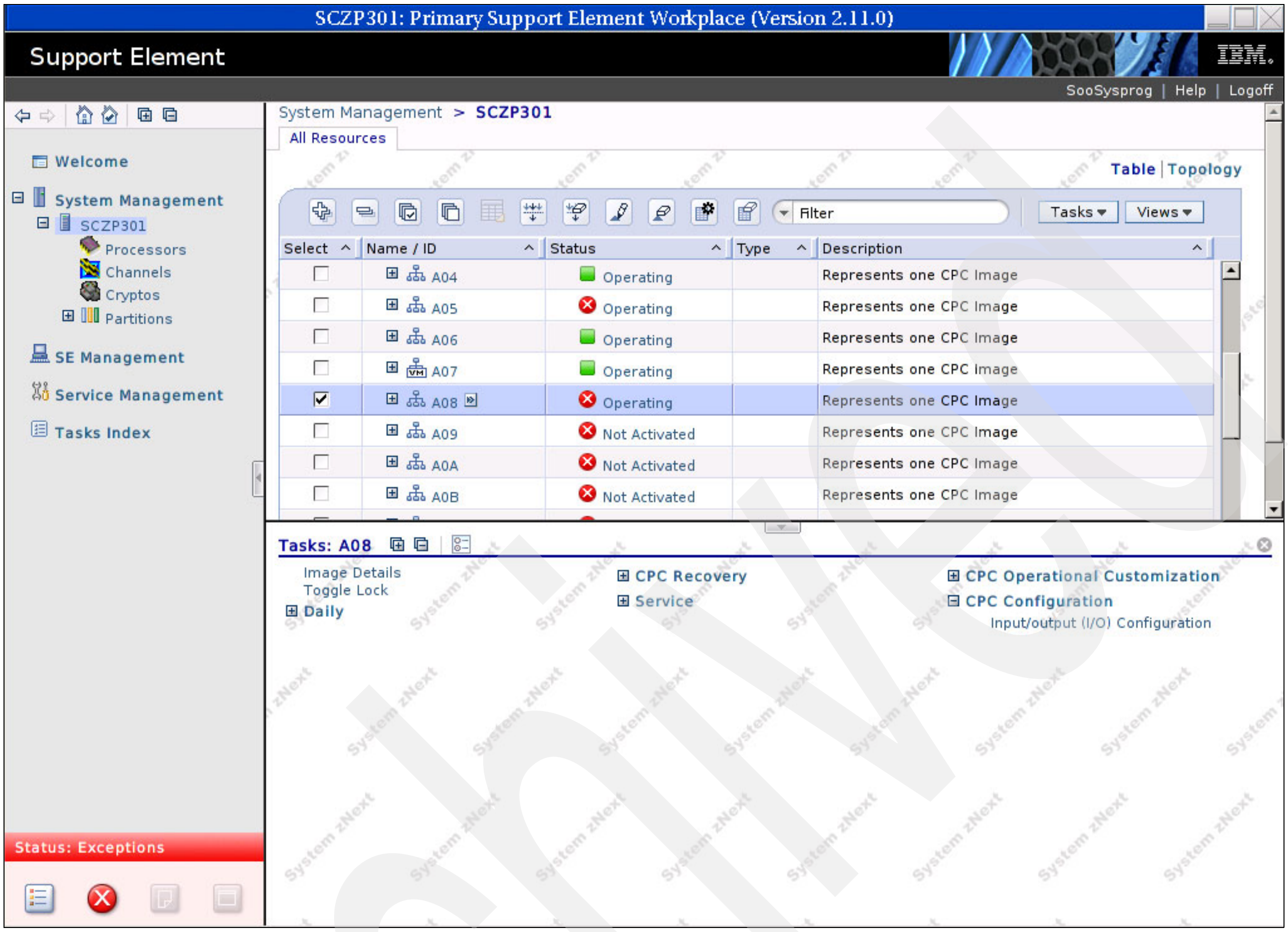
> **Note:** Refer to *Stand-Alone Input/Output Configuration Program User's Guide*, SB10-7152 for detailed information about the following steps.

Copy the IOCP statements that were generated using HCD Option 2.3. Build IOCP input data set onto a USB flash memory drive and retain it

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817, as opposed to a remote web browser, and select the new 2817, assuming it has been defined to the Defined CPCs Work Area.
2. Perform a power-on reset using one of the Reset profiles and Starter IOCDSs provided with the processor during installation. This action creates an environment on the processor that allows you to run the Stand-Alone IOCP process.
3. When the power-on reset is complete, activate one of the logical partitions with at least 128 MB of storage and use this partition to run the I/O Configuration Program.
4. Under Systems Management, click **Systems** to expand the list.
5. Under Systems, click the system to select it (in this example, SCZP301).
6. In the Tasks tab, select **Recovery** → **Single Object Operations** → **Yes**.

7. Under Partitions, check the LPAR you want to use to run the Stand-Alone IOCP program (in this example, A08) (Figure 5-91).

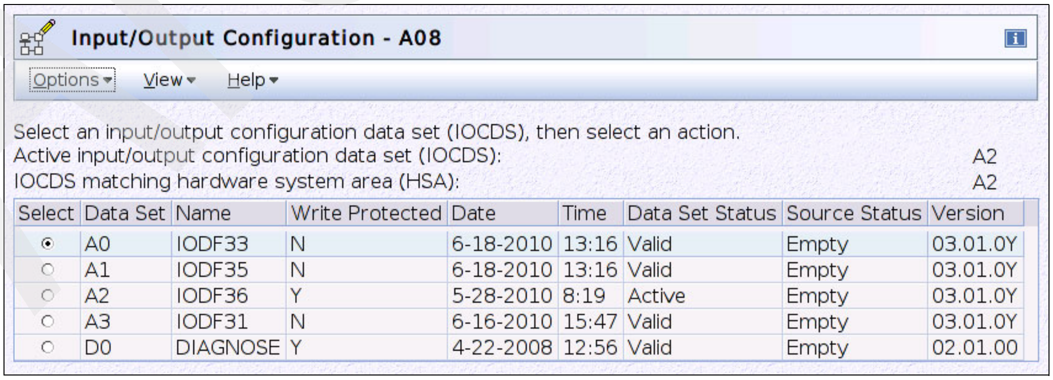


Select	Name / ID	Status	Type	Description
☐	A04	🟩 Operating		Represents one CPC Image
☐	A05	✖ Operating		Represents one CPC Image
☐	A06	🟩 Operating		Represents one CPC Image
☐	A07	🟩 Operating		Represents one CPC Image
☑	A08	✖ Operating		Represents one CPC Image
☐	A09	✖ Not Activated		Represents one CPC Image
☐	A0A	✖ Not Activated		Represents one CPC Image
☐	A0B	✖ Not Activated		Represents one CPC Image

Figure 5-91 Support Element partition selected for SAIOCP program load

8. On the Tasks tab, select **CPC Configuration** → **Input/output (I/O) Configuration**.

9. Click the radio button for the Data Set into which you want to load the IOCDS (in this example, A0) (Figure 5-92).

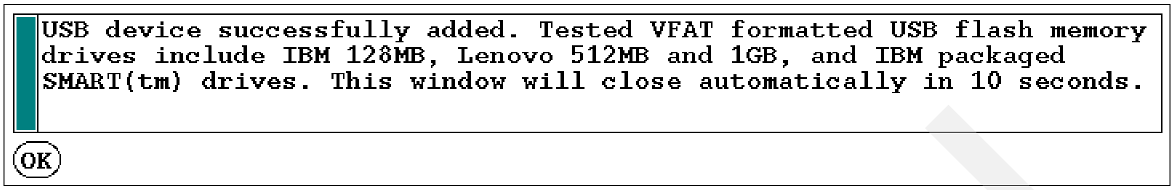


Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	IODF33	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 5-92 SAIOCP IOCDS selection for build

10. Insert the USB flash memory drive that contains the IOCP text. Wait for the drive insertion message to open (Figure 5-93).



USB device successfully added. Tested VFAT formatted USB flash memory drives include IBM 128MB, Lenovo 512MB and 1GB, and IBM packaged SMART(tm) drives. This window will close automatically in 10 seconds.

Figure 5-93 SAIOCP USB drive insertion message

> **Tip:** Only files in the root directory of the USB Drive can be read by the HMC. Any folders and their content will not be read.

11. Select **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive** (Figure 5-94).

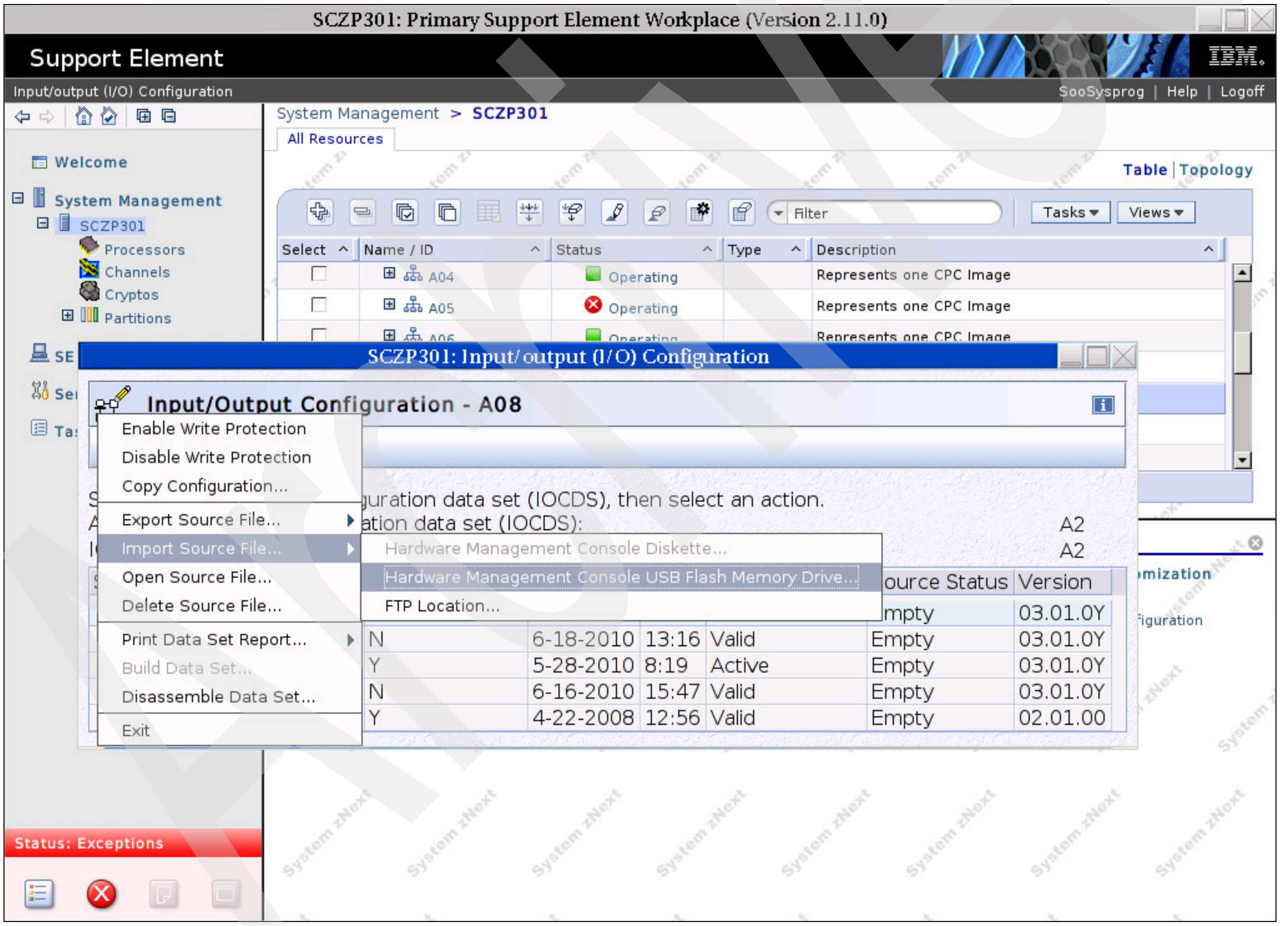
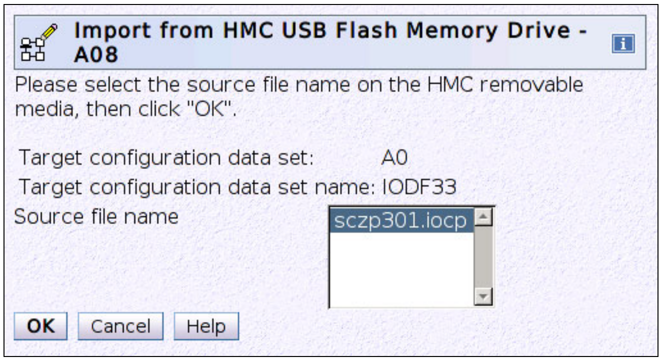


Figure 5-94 SAIOCP Import Source File

12. Select the source file name and click **OK** (Figure 5-95).

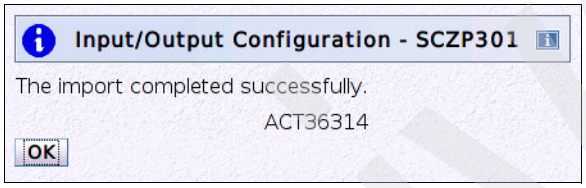


Please select the source file name on the HMC removable media, then click "OK".

Target configuration data set: A0
Target configuration data set name: IODF33
Source file name: sczp301.iocp

Figure 5-95 SAIOCP Select source file

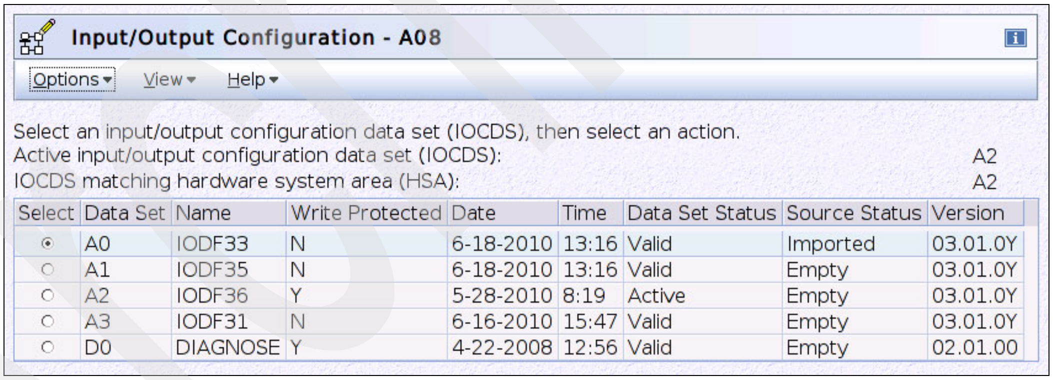
13. The source file is now read from the USB drive. Click **OK** (Figure 5-96).



The import completed successfully.
ACT36314

Figure 5-96 SAIOCP Source file imported

14. .Note that the Source Status now says Imported (Figure 5-97).

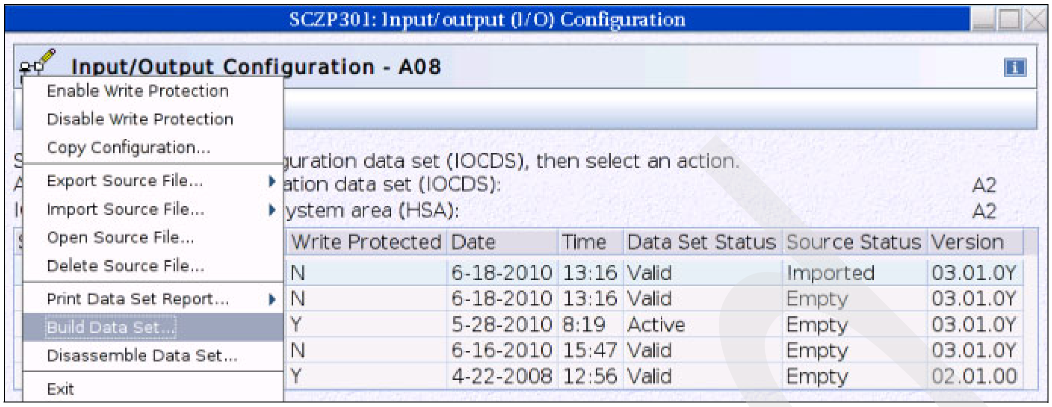


Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	IODF33	N	6-18-2010	13:16	Valid	Imported	03.01.0Y
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 5-97 SAIOCP IOCDS Source status changed to Imported

15.Select **Options** → **Build Data Set** (Figure 5-98).



guration data set (IOCDS), then select an action.

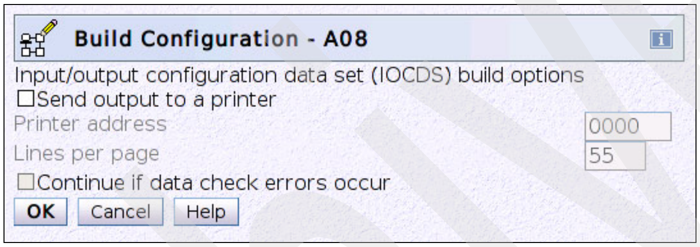
ation data set (IOCDS): A2

ystem area (HSA): A2

Write Protected	Date	Time	Data Set Status	Source Status	Version
N	6-18-2010	13:16	Valid	Imported	03.01.0Y
N	6-18-2010	13:16	Valid	Empty	03.01.0Y
Y	5-28-2010	8:19	Active	Empty	03.01.0Y
N	6-16-2010	15:47	Valid	Empty	03.01.0Y
Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 5-98 SAIOCP Building the IOCDS

16.Select desired build options and click **OK** (Figure 5-99).



Input/output configuration data set (IOCDS) build options

☐Send output to a printer

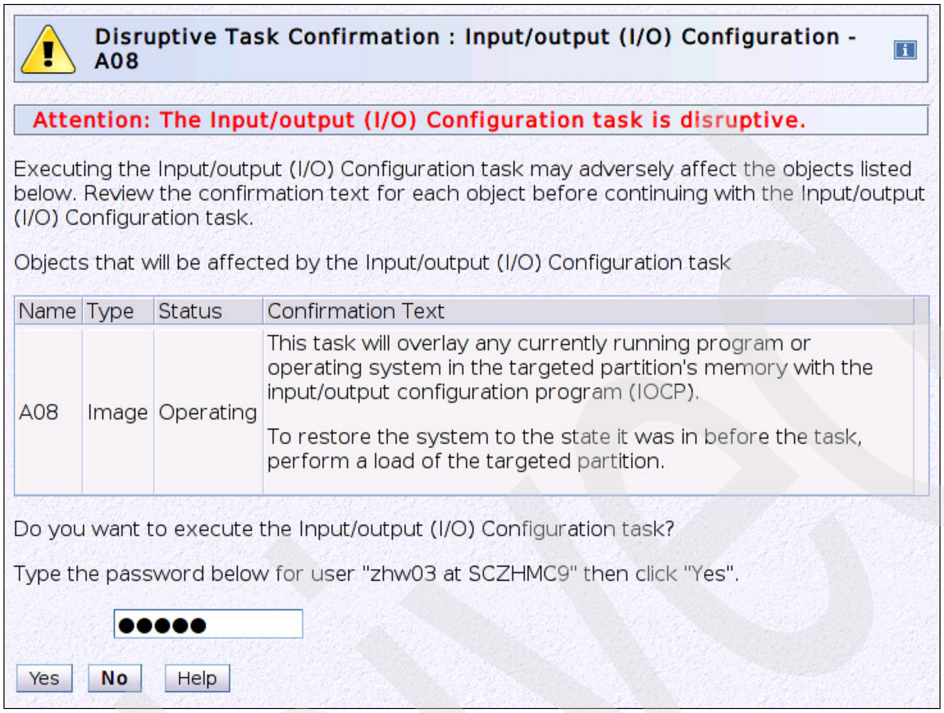
Printer address 0000

Lines per page 55

☐Continue if data check errors occur

Figure 5-99 SAIOCP Build options

17. Observe the Build warning message, enter your HMC password, and click **Yes** (Figure 5-100).



Disruptive Task Confirmation : Input/output (I/O) Configuration - A08

Attention: The Input/output (I/O) Configuration task is disruptive.

Executing the Input/output (I/O) Configuration task may adversely affect the objects listed below. Review the confirmation text for each object before continuing with the Input/output (I/O) Configuration task.

Objects that will be affected by the Input/output (I/O) Configuration task

Name	Type	Status	Confirmation Text
A08	Image	Operating	This task will overlay any currently running program or operating system in the targeted partition's memory with the input/output configuration program (IOCP). To restore the system to the state it was in before the task, perform a load of the targeted partition.

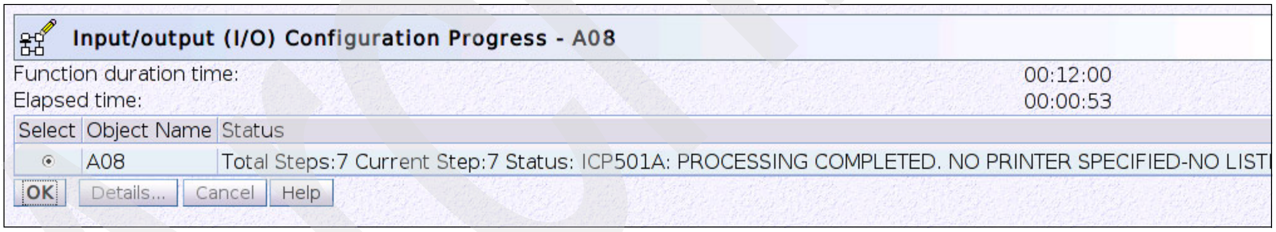
Do you want to execute the Input/output (I/O) Configuration task?

Type the password below for user "zhw03 at SCZHMC9" then click "Yes".

●●●●●

Figure 5-100 SAIOCP Build warning window

18. Status messages are displayed during the build process. After the process has completed successfully, the following message is displayed (Figure 5-101). Click **OK**.



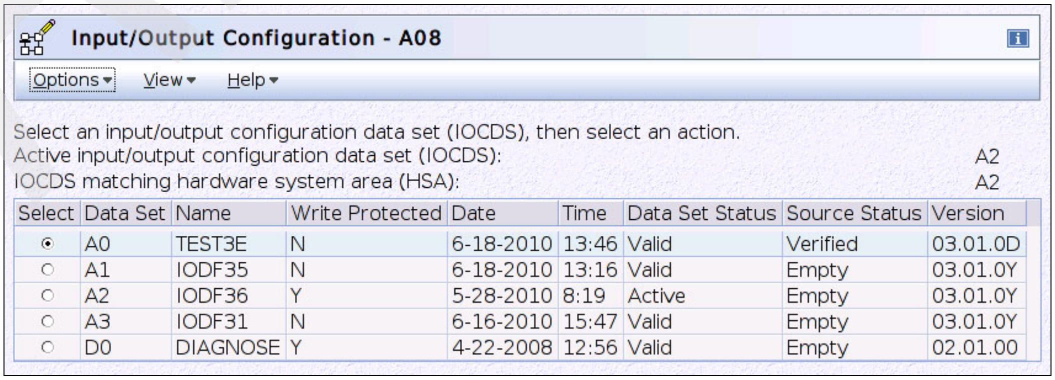
Input/output (I/O) Configuration Progress - A08

Function duration time: 00:12:00
Elapsed time: 00:00:53

Select	Object Name	Status
●	A08	Total Steps:7 Current Step:7 Status: ICP501A: PROCESSING COMPLETED. NO PRINTER SPECIFIED-NO LISTI

Figure 5-101 SAIOCP build process status message

19. Observe that the Source Status now says Verified (Figure 5-102).



Input/Output Configuration - A08

Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

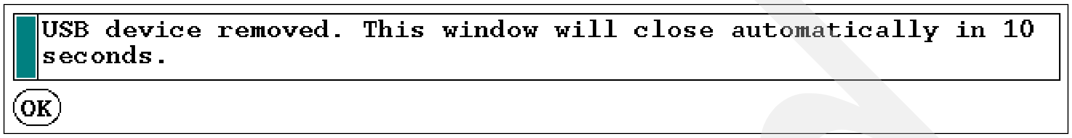
Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	TEST3E	N	6-18-2010	13:46	Valid	Verified	03.01.0D
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 5-102 SAIOCP IOCDS Source status changed to Verified

20. Select **Options** → **Exit** to end the IOCDS build process and deactivate the LPAR if it is no longer required.

This IOCDS is now ready to be selected by a Reset Profile and the 2817 may be activated (power-on reset) with the production IODF.

The USB Drive may also now be removed. A drive removal message opens (Figure 5-103).



USB device removed. This window will close automatically in 10 seconds.

Figure 5-103 SAIOCP USB drive removal message

5.9 HMC: Steps for profile activation

To activate your profile using the HMC, you need to perform the steps given in this section.

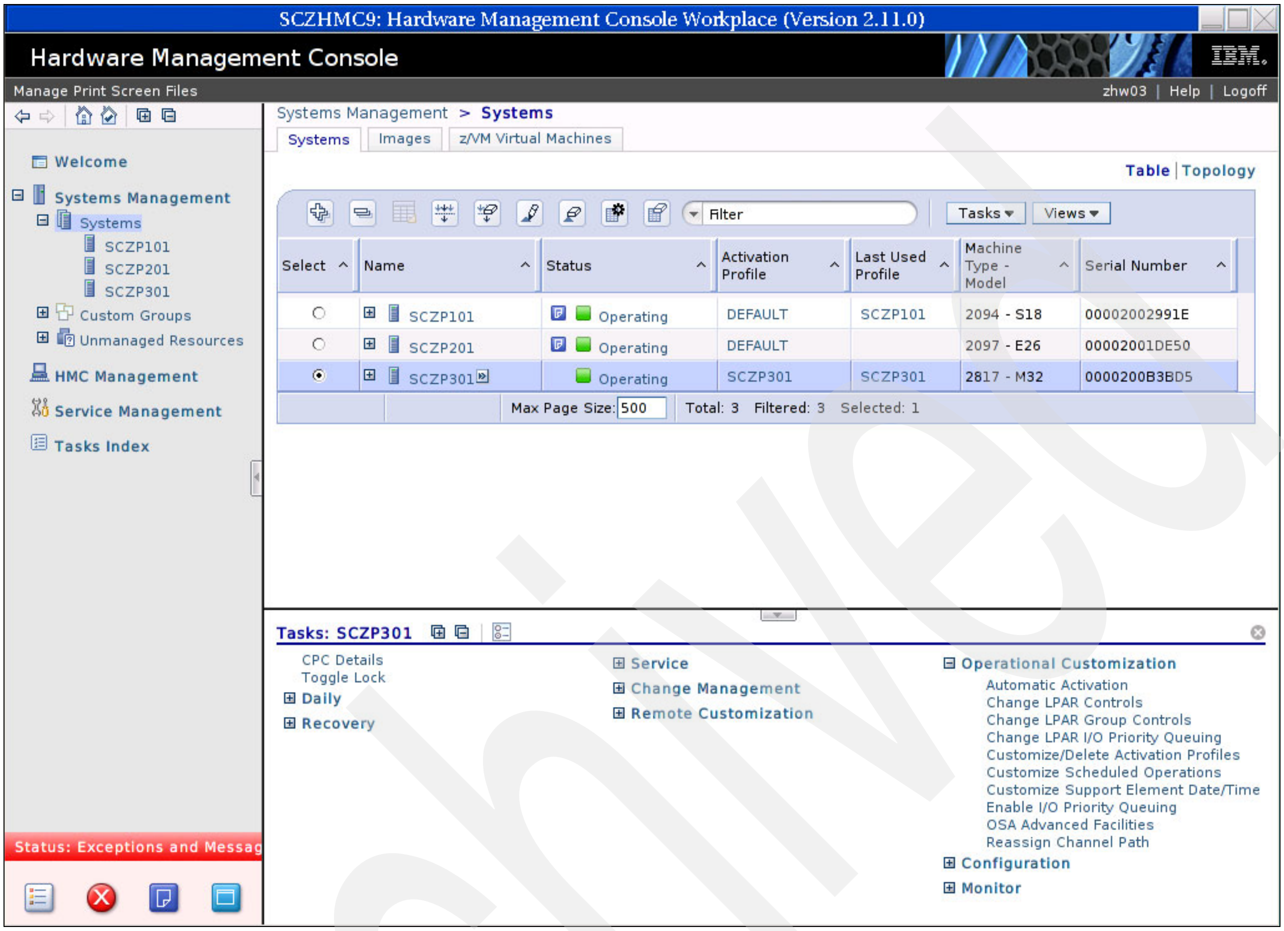
5.9.1 Building the Production Reset Profile and pointing to the required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (power-on reset) Profile needs to be built to point to that IOCDS. This Reset Profile is used to power-on reset the new 2817 after it has been handed over from the IBM service representative.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817 or use a remote web browser and select the new 2817.
2. Under Systems Management, click **Systems** to expand the list.
3. Under Systems, click the system to select it (in this example, SCZP301).

4. On the Tasks tab, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles** (Figure 5-104).

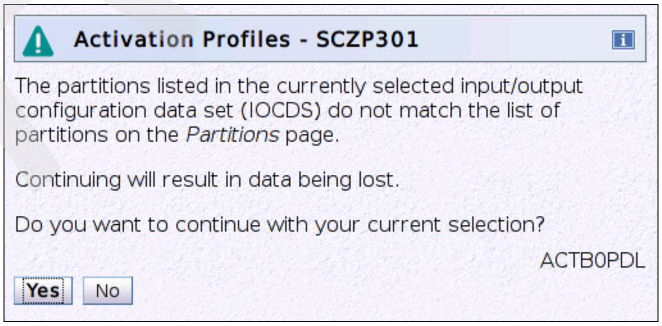


Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
○	SCZP201	Operating	DEFAULT		2097 - E26	00002001DE50
●	SCZP301	Operating	SCZP301	SCZP301	2817 - M32	0000200B3BD5

Max Page Size: 500 Total: 3 Filtered: 3 Selected: 1

Figure 5-104 Customize Activation Profile

5. Select the DEFAULT Reset Profile and click **Customize selected profile**.
6. Save this DEFAULT profile with a new Profile name to be referred to when the power-on reset is required (for example, TESTRESET).
7. Select the new Profile and click **Customize profile**.
8. Click the IOCDS that you just updated in the previous step. The ACTB0PDL message is displayed (Figure 5-105).



The partitions listed in the currently selected input/output configuration data set (IOCDS) do not match the list of partitions on the *Partitions* page.

Continuing will result in data being lost.

Do you want to continue with your current selection?

ACTB0PDL

Figure 5-105 Activation Profiles: ACTB0PDL message

9. Depending on the circumstances, you might want to answer **Yes** or **No**. You might now want to review the Partition Activation List. In our example, we clicked **Yes.**

10. HMC retrieves any Image profiles that match the LPAR names in the IOCDS that was selected and gives us the option to create new Image profiles for ones that it could not retrieve. We selected the last option. Click **OK** (Figure 5-106).

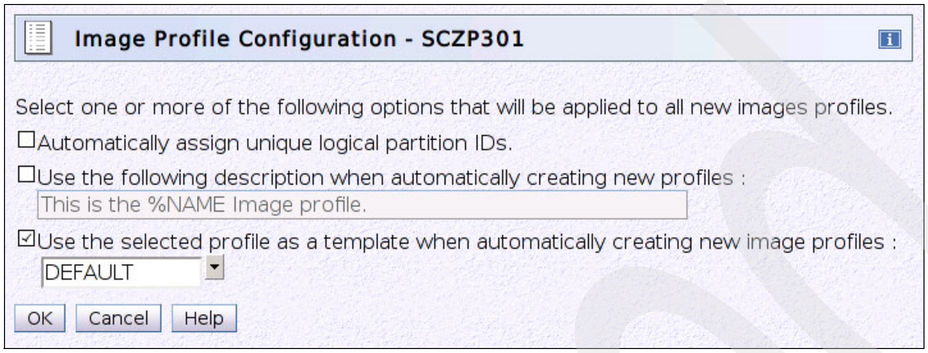


Image Profile Configuration - SCZP301

Select one or more of the following options that will be applied to all new images profiles.

☐ Automatically assign unique logical partition IDs.

☐ Use the following description when automatically creating new profiles :

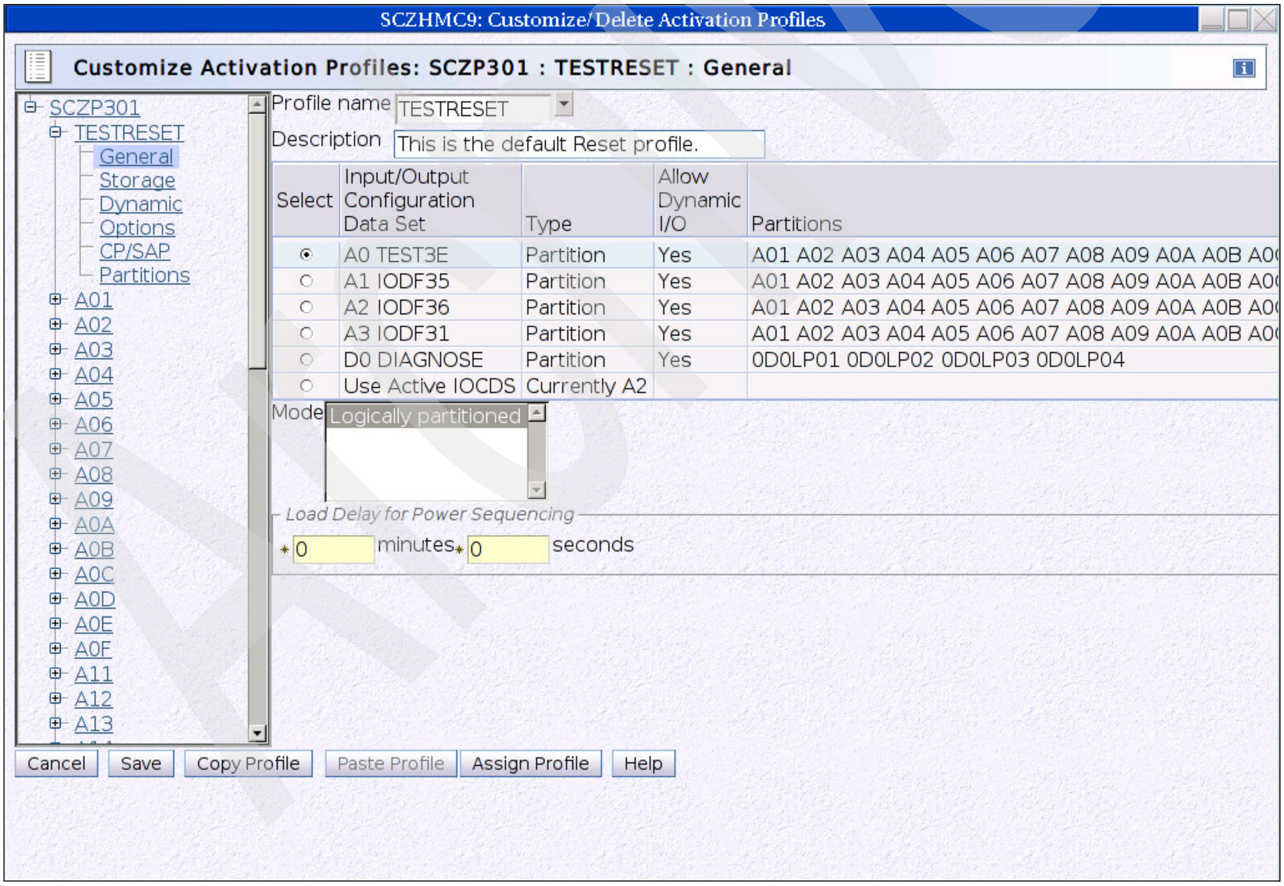
This is the %NAME Image profile.

☑ Use the selected profile as a template when automatically creating new image profiles :

DEFAULT

Figure 5-106 Image Profile automatic build options

11. Note the list of LPARs that have been retrieved and built based on the LPARs that were defined in the selected IOCDS. Click **Save** (Figure 5-107).


SCZHMC9: Customize/Delete Activation Profiles

Customize Activation Profiles: SCZP301 : TESTRESET : General

Profile name TESTRESET

Description This is the default Reset profile.

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
●	A0 TEST3E	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A1 IODF35	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A2 IODF36	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A3 IODF31	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	D0 DIAGNOSE	Partition	Yes	0D0LP01 0D0LP02 0D0LP03 0D0LP04
○	Use Active IOCDS	Currently A2		

Mode Logically partitioned

Load Delay for Power Sequencing

0 minutes 0 seconds

Figure 5-107 Reset and Image profile list

12. Review the items shown in 5.9.2, “Building/Verifying Image Profiles” on page 289 and 5.9.3, “Server Time Protocol configuration” on page 289.

5.9.2 Building/Verifying Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

Building/Verifying Load Profiles

Go through and create Load (IPL) Profiles using the “DEFAULTLOAD” Load profile as a skeleton for all the logical partitions for which you are performing an IPL on this processor.

Building/Verifying Load Members in SYS#.IPLPARM

You may require additional Load Members defined in SYS#.IPLPARM for this processor.

Additionally, if you used the HWNAME parameter to point to the Processor ID, then this should be updated to point to the new Processor ID (in this example, from SCZP201 to SCZP301).

5.9.3 Server Time Protocol configuration

The Server Time Protocol (STP) configuration should be reviewed to ensure that the correct External Time Source has been configured and that you are connected to the correct Coordinated Time Network.

Refer to Chapter 8, “Server Time Protocol setup” on page 415 for more detailed information about setting up your STP environment.

5.9.4 Performing a power-on reset (POR) of the 2817

When the 2094 or 2097 processor has been replaced with a 2817, the IBM service representative performs a power-on reset with a Diagnostic IOCDS.

After this process has been completed and the IBM service representative is satisfied with the state of the processor, the service representative hands over the processor to you. You perform another power-on reset using the Reset Profile created in the previous step.

The 2817 is now ready to be Activated (power-on reset) using the Production Reset Profile.

6

Installing a new IBM zEnterprise 196

In this chapter, we describe how to install an z196 into a new hardware environment.

Because a wide variety of environments exists, your environment will not contain exactly the same elements as the configuration described here. Nevertheless, the step-by-step process we explain in this chapter should provide enough information for you to replicate the approach in your own environment.

We discuss the following topics:

- Scenario overview
- HCD: Creating a 2817 work IODF
- HCD: Validating the 2817 work IODF
- CMT: Assigning PCHIDs to CHPIDs
- HCD: Updating the 2817 work IODF with PCHIDs
- HCD: Building the 2817 production IODF
- HCD/HMC: Loading the 2817 processor IOCDS
- HMC: Steps for profile activation

6.1 Scenario overview

Here is a description of the new installation scenario.

6.1.1 The configuration process

Figure 6-1 shows the general process that we followed in this example. The numbered steps are described in the steps that follow the figure.

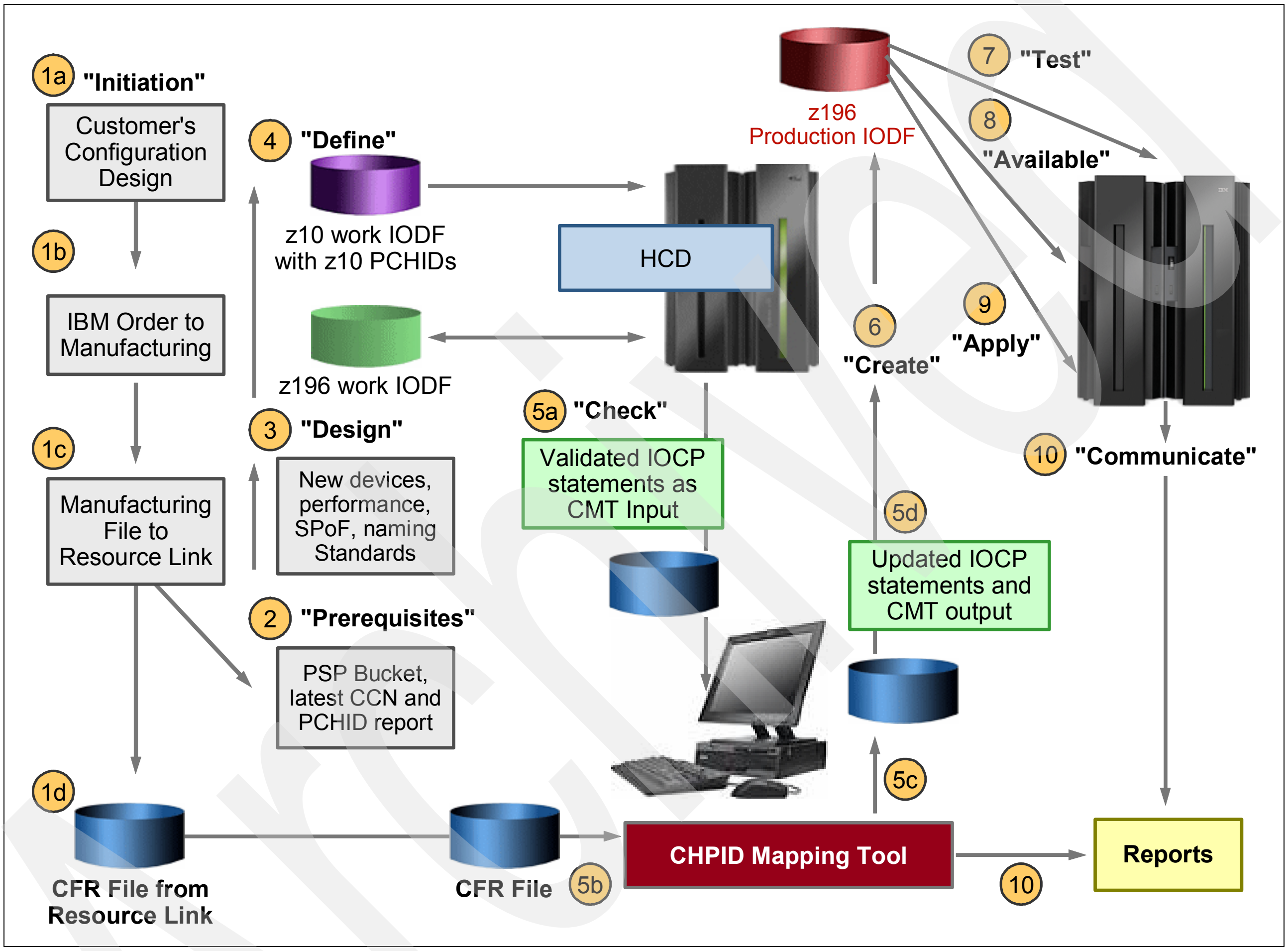


Figure 6-1 CMT: Overall process flow

1. Initiation
   a. When planning to migrate to a z196, the IBM Technical Support team can help you define a configuration design that meets your needs. The configuration is then used in the ordering process.
   b. The IBM order for the configuration is created and passed to the manufacturing process.
   c. The manufacturing process creates a configuration file that is stored at the IBM Resource Link website. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.

   d. A New Order report is created and shows the configuration summary of what is being ordered along with the Customer Control Number (CCN), which can be used to retrieve, from Resource Link the, `CFReport` (a data file that contains a listing of hardware configuration and changes for a CPC).

2. Prerequisites

   It is important that you check, for example, that you have the current PSP Bucket installed. You should also run the SMP/E report with fixcat exceptions to determine if any PTFs need to be applied. Also, ensure that you have the most current PCHID report and CCN from your IBM service representative.

3. Design

   When you plan your configuration, consider naming standards, FICON switch and port redundancy, adequate I/O paths to your devices for performance, OSA CHPID configuration for network and console communications, and coupling facility connections internally and to other machines.

   The way your sysplex receives its time source has changed. Now the External Time Reference (ETR) is no longer supported and only Server Time Protocol (STP) can be used on the z196. The z196 can be run at Stratum 3 or Stratum 2 when in a mixed Coordinated Timing Network (CTN) or Stratum 1 when in a non-mixed CTN.

4. Define

   An existing System z9 EC or System z10 EC I/O configuration can be used as a starting point for using HCD. The System z9 EC or System z10 EC production IODF is used as input to HCD to create a work IODF that will be the base of the new z196 configuration. Otherwise, the configuration must be created from scratch.

   When the new z196 configuration has been added, a validated version of the configuration is saved in a 2817 validated work IODF.

5. Check

   a. From the validated work IODF, create a file containing the z196 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT). HCM may also be used here to transfer the IOCP deck to and from the CMT.

   b. The configuration file created by the IBM Manufacturing process in step 1d is downloaded from Resource Link to the CMT workstation.

      The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z196 hardware.

      You might have to make decisions in response to situations that might arise, such as:

      i. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware to resolve some SPoF situations.

      ii. Prioritizing certain hardware items over others.

   c. After the CHPID Mapping Tool processing finishes, the IOCP statements contain the physical channels assignment to logical channels, based on the actual purchased hardware configuration.

      The CHPID Mapping Tool also creates configuration reports to be used by the IBM service representative and the installation team.

      The file containing the updated IOCP statements created by the CHPID Mapping Tool, which now contains the physical channels assignment, is transferred to the host system.

    d. Using HCD again, and using the validated work IODF file created in step 5a and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments created by the CMT to the configuration data in the work IODF.

6. Create

   After the physical channel data has been migrated into the work IODF, a 2817 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2817 production IODF when the final power-on reset is done, yielding a z196 with an I/O configuration ready to be used.

7. Test

   IODFs may be tested to verify that the IODF represents your configuration.

8. Available

   If you are not upgrading or cannot write an IOCDS in preparation for the upgrade, use HCD to produce an IOCP input file and download the input file to a USB memory stick.

9. Apply

   The new production IODF can be applied to the z196 in two ways:

   – Using the Power-on Reset process

   – Using the Dynamic IODF Activate process

10. Communicate

    It is important to communicate new and changed configurations to operations and the appropriate users and departments.

6.1.2 Planning considerations

The following I/O features can be ordered for a new z196:

- ESCON
- FICON Express8 LX (long wavelength - 10 km)
- FICON Express8 SX (short wavelength)
- OSA-Express3 10 GbE LR (long reach)
- OSA-Express3 10 GbE SR (short reach)
- OSA-Express3 GbE LX (long wavelength)
- OSA-Express3 GbE SX (short wavelength)
- OSA-Express3 1000BASE-T Ethernet
- Crypto Express3
- ISC-3 (peer mode only)

The following features may not be ordered for a z196, but if present in a z9 EC server or z10 EC server, may be carried forward when upgrading to a z196:

- FICON Express4 LX (4 km and 10 km)
- FICON Express4 SX
- OSA-Express2 LX (long wavelength)
- OSA-Express2 SX (short wavelength)
- OSA-Express2 1000BASE-T Ethernet

The following features are *not* supported on a z196:

- FICON Express2 (LX and SX)
- FICON Express (LX and SX)
- FICON (pre-FICON Express)
- OSA-Express2 10 GbE Long Reach
- OSA-Express

- ICB-2
- ICB-3
- ICB-4
- ISC-3 Links in Compatibility Mode
- Crypto Express2
- PCIXCC and PCICA
- Parallel channels (use an ESCON converter)

Table 6-1 lists the channel types described in an IOCDS that are supported with the z9 EC, z10 EC, and z196.

Table 6-1 Channels, links, and adapters with CHPID type and support

Channels	**CHPID type**	**2094 support**	**2097 support**	**2817 support**
ESCON channels: Connection Channel (ESCON architecture) Channel to Channel (connects to CNC) Converter Channel Path (for BL types) Converter Channel Path (for BY types)	CNC CTC CVC CBY	Yes Yes Yes Yes	Yes Yes Yes Yes	Up to 240 Up to 240 Up to 240 Up to 240
FICON bridge. A FICON channel that attaches to an ESCON Director Model 5.	FCV	Yes	Yes	No
FICON native channels that attach to FICON directors or directly to FICON control units: FICON Express 1 GbE SX and LX FICON Express 2 GbE SX and LX FICON Express 4 GbE SX and LX FICON Express 8 GbE SX and LX	FC FC FC FC	Yes Yes Yes No	Yes Yes Yes No	No No Carried forward up to 288
FICON channels that attach to Fibre Channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges	FCP	Yes	Yes	Yes
ISC-3 peer mode channels (connects to another CFP)	CFP	Yes	Yes	Up to 48
ICB-4 peer channels (connects to another ICB-4)	CBP	Yes	Yes	No
IC peer channels (connects to another ICP)	ICP	Yes	Yes	Up to 32
PSIFB InfiniBand host channel adapters (HCA)	CIB	Yes	Yes	Up to 32
HiperSocket (IQDIO) channels	IQD	Yes	Yes	Up to 32
OSA- Express2 GbE LX/SX	OSD and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 GbE LX/SX	OSD and OSN	No	Yes	Up to 96 ports
OSA- Express2 1000BASE-T	OSE, OSD, OSC, and OSN	Yes	Yes	Up to 48 ports carried forward

Channels	CHPID type	2094 support	2097 support	2817 support
OSA-Express3 1000BASE-T	OSE, OSD, OSC, OSN, and OSM	No	OSC, OSD, OSE, and OSN: Yes OSM: No	Up to 96 ports
OSA- Express2 10 GbE LR	OSD	Yes	Yes	No

Keep the following considerations in mind when planning your configuration.

Coupling links

Only the following Coupling Facility CHPIDs are supported:

- CHPID Type=CFP: ISC-3 links in peer mode
- CHPID Type=CIB: PSIFB links connecting to an HCA2-O (Optical) card
- CHPID Type=ICP: Internal Coupling links.

Note: Coupling links can be defined as both Coupling and STP links or STP-only links.

HMC

The HMC can appear either as the current HMC does, or as a HMC that can run code to manage an Ensemble. The current HMC is used to manage, monitor, and operate one or more IBM System z servers and their associated logical partitions. A HMC that has Ensemble code running is a HMC attached to one or more zEnterprise System(s) configured as Ensemble member(s). A particular Ensemble is managed by a pair of HMCs in primary and alternate roles.

The HMC has a global (Ensemble) management function, whereas the SE has local node management responsibility. When tasks are performed on the HMC, the commands are sent to one or more SEs, which then issue commands to their CPCs

The z196 requires HMC Application V2.11.0 (driver level 86) or higher and only uses Ethernet for its network connection. The HMC and the Service Elements do not contain a floppy disc drive, requiring the use of a USB flash memory drive to input and back up customer configuration data.

Software support

HCD V1.12 (or HCD V1.7 and later with Preventive Service Planning (PSP) bucket for 2817DEVICE and PTFs) is required to define and support some of the new features of the z196.

Open Systems Adapter - Integrated Console Controller

As support has now been withdrawn for the 2074 console controllers, you might consider using OSA-Express2 1000BASE-T or OSA-Express3 1000BASE-T CHPIDs defined as TYPE=OSC. These OSA cards allow you to set up console function supported by a configuration file defined on the Support Element for that processor.

Fibre Channel Protocol

When using CHPIDs defined as TYPE=FCP, you may want to consider N Port ID Virtualization (NPIV).

Refer to 2.1.6, “Worldwide Port Name tool” on page 32 for more information about FCP CHPIDs and the new WWPN prediction tool to manage them.

CPC name versus Processor ID

HCD allows you to define different processors (logical) to the same CPC (physical). The Processor ID needs to be unique within the same IODF, but the CPC name does not. Therefore, the CPC name does not need to match the Processor ID. This is useful where you might have several processor/logical partition/control unit setups that share the same physical CPC within the same IODF. Furthermore, the Processor ID is what is defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC name is coded in HCD Option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. It is the CPC name, and not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC over the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP301). These values are defined in the Support Element for the CPC and they need to match the values set in the IODF so that HCD Option 2.11 can find the CPC to write an IOCDS in the S/390 Microprocessor Cluster List.

Local system name

An additional system name, LSYSTEM, is used to identify the local system name of a server when defining PSIFB type=CIB coupling links.

This data field can be found when changing a CIB-capable processor using HCD Option 1.3.

The LSYSTEM field can be set or changed to any one to eight alphanumeric characters and also can begin with either an alpha or numeric character. All characters are upper case.

Here are the rules that will determine whether, and where, HCD sets the LSYSTEM keyword automatically:

1. If a CIB-capable processor is defined and the CPC name is set but the local system name is not set, HCD defaults the local system name to the CPC name.
2. If a CIB-capable processor that has not yet defined a CPC name is changed to obtain a CPC name but no local system name, HCD defaults the CPC name to the local system name.
3. If a non-CIB capable processor is changed to a support level that is CIB capable, and the processor has a CPC name set but no local system name, the local system name defaults to the CPC name.
4. If the processor definition is changed such that the local system name is explicitly removed, HCD does not do any defaulting.
5. If a processor has a local system name set (whether it has a CPC name or not), any change to the local system name has to be done explicitly. There will be no implicit name if the CPC name or the support level is changed.
6. During Build Production IODF, it is verified that a local system name has to be set for the processor if the processor has a CIB channel path defined. If this verification fails, an error message is given and the production IODF is not built.

We do, however, recommend that the local system name be the same as the CPC name.

Additional keywords on the ID statement in an IOCP deck include:

AID	Adapter ID.
Port	HCA port.
CPATH	Specifies the CCSID and CHPID on the connecting system.

6.1.3 Adding a new 2817 to a new hardware environment

In this scenario, we describe the configuration steps for installing a new 2817 system into a new environment. The 2817 is the first system on the floor and is being connected to new switches and control unit interfaces. Key considerations are as follows:

- HCD requires a new Processor ID for the 2817.
- We recommend defining a new CPC name for the 2817.
- The 2817 system connects to new switch ports and new control unit interfaces.
- The control unit interfaces connect to new switch ports.
- The starting IODF can be an existing production IODF from another data center, or can be a new work IODF.
- The target IODF is a new 2817 work IODF.

This example shows a new 2817-M32 with a Processor ID of SCZP301 and with four CSSs (CSS ID=0, CSS ID=1, CSS ID=2, and CSS ID=3). The CPC name of SCZP301 and serial number of 0B3BD5 is used for the 2817.

The following CHPID types are defined:

- OSD and OSC
- CTC and CNC
- FC
- CFP, ICP, and CIB
- IQD

The following hardware/CHPID types are not supported the 2817:

- PCIXCC and PCICA
- ICB-4 links
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

Table 6-2 summarizes the tool requirements. The step-by-step process is documented later in this chapter.

Table 6-2 New 2817 in a new installation

New 2817	New 2817 to connect to new switch ports and control units that do not currently exist (new installation)
Processor ID	Requires a new Processor ID.
CPC name	Requires a new CPC name.
Channel to switch port connections	New ports.

New 2817	New 2817 to connect to new switch ports and control units that do not currently exist (new installation)
Control Unit to switch port connections	New ports.
Starting IODF	Current active production IODF.
Target IODF	Create a new work IODF.
HCD action	Add a processor (see step 2 in 6.2, “HCD: Creating a 2817 work IODF” on page 299).
CHPID Mapping Tool (CMT) Program (needed or not)	Optional, but recommended.
CFReport File (CCN)	Required.
IOCP (import from validated work IODF)	Yes.
CHPID Mapping Tool Actions (PCHID reset)	Yes.
CHPID Mapping Tool IOCP Output	Yes.
CHPID Mapping Tool Reports	Yes (CHPID and CHPID to CU Report).

Note: As mentioned, you can have different Processor ID and CPC names.

However, if you do not need to support multiple processor images, we recommend that the Processor ID and CPC name match.

6.2 HCD: Creating a 2817 work IODF

The following steps explain how to define a new 2817 configuration using HCD:

1. Create a 2817 work IODF, either new or from an existing production IODF.
2. Add the processor.
3. Change the required partition names and usage from reserved.
4. Add CHPIDs.
5. Add FICON and ESCON Switches.
6. Add operating system configurations.
7. Create the Eligible Device Table (EDT).
8. Add esoteric names in the EDT.
9. Connect FICON and ESCON CHPIDs to new switches, spreading connections over as many switches and physical port cards as possible, where appropriate.
10. Create control units unique to this processor.
11. Create devices appropriate to the control units.
12. Define devices to the operating system configurations and any esoterics, where appropriate.
13. Connect control units to CHPIDs or switch ports, and then to CHPIDs.
14. Define all required coupling connections to other processors and any Internal coupling connections required.

15. Create CTCs.
16. Create the OSA configuration (OSC, OSD, OSE, OSN, OSX, and OSM).
17. Define Nucleus Initialization Program (NIP) consoles.
18. Build a validated Work IODF.
19. Create an IOCP statements file and transfer it to your CHPID Mapping Tool workstation. This step can be performed by using HCM.
20. Import CFReport and IOCP statements into the CMT.
21. Perform hardware resolution and PCHID/CHPID availability.
22. Create configuration reports for yourself and the IBM service representative.
23. Import IOCP statements updated with PCHIDs back into a validated work IODF.
24. Build the Production IODF
25. Remote write the IOCP to an IOCDS on the processor or, if not possible, copy the IOCP statements to a USB memory flash drive.
26. Run the Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2817 Service Element IOCDS.
27. Build Reset, Image, and Load Profiles if required.
28. Perform a power-on reset (activate) of 2817.

In the following sections, we describe some of these steps in more detail. For specific details about defining processors, partitions, switches, control units, devices, and so on in an IODF using HCD, refer to *z/OS HCD Users Guide*, SC33-7988 and *IOCP Users Guide*, SB10-7037.

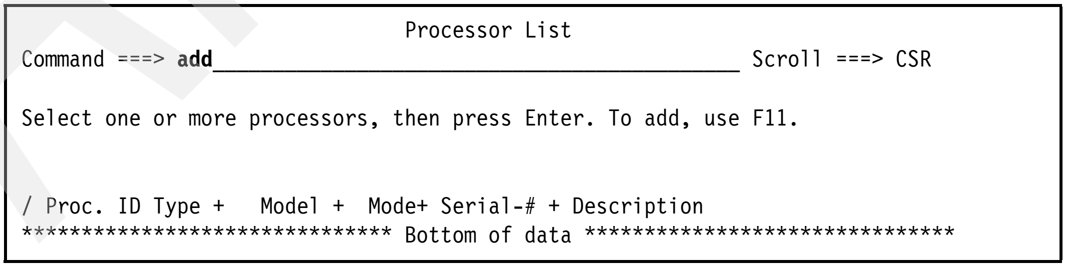
6.2.1 Creating a new work IODF

Create and select a new work IODF where you add the new 2817 processor definition (for example, ‘SYS6.IODF37.WORK’).

6.2.2 Adding a 2817 processor

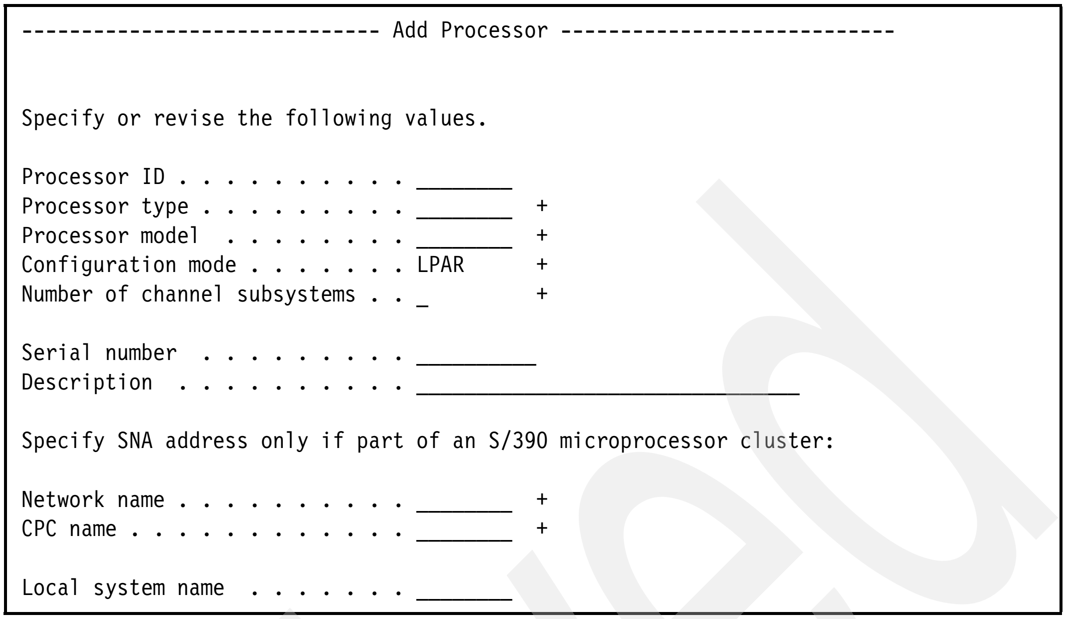
To add a 2817 processor, perform the following steps:

1. From the HCD main menu, select Option 1.3. Processor List (Figure 6-2) Press PF11 (or enter `add` on the command line) to add a new processor and press Enter. The Add Processor panel opens (Figure 6-3 on page 301).



```
                                Processor List
Command ===> add____________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
******************************* Bottom of data *******************************
```

Figure 6-2 Processor List (adding a processor)



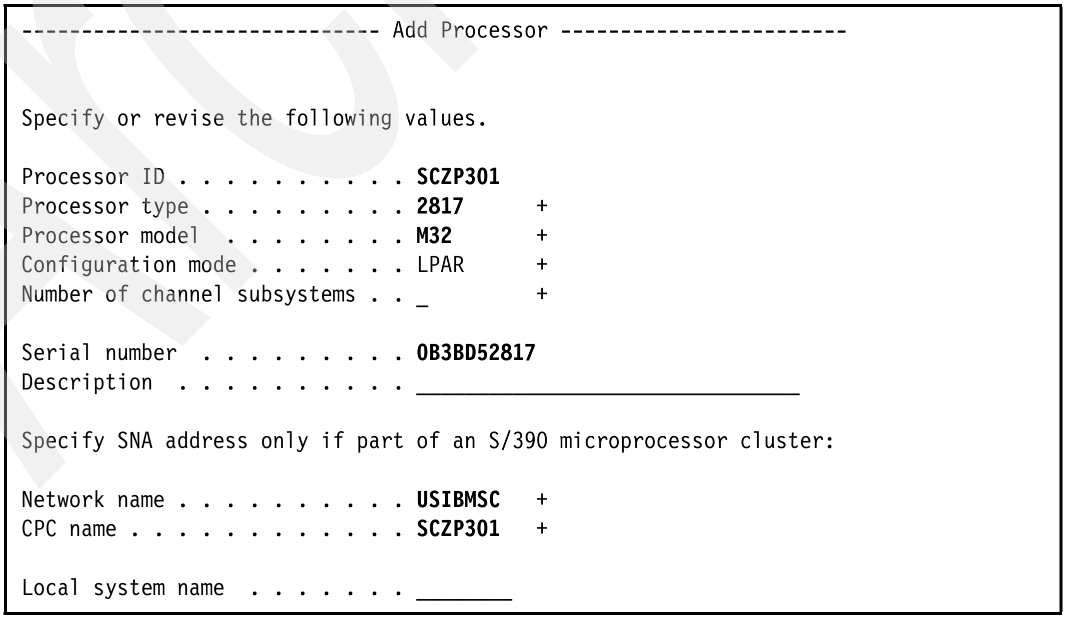
```
------------------------------ Add Processor ----------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . . ________
Processor type . . . . . . . . . ________  +
Processor model  . . . . . . . . ________  +
Configuration mode . . . . . . . LPAR      +
Number of channel subsystems . . _         +

Serial number  . . . . . . . . . __________
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . ________  +
CPC name . . . . . . . . . . . . ________  +

Local system name  . . . . . . . ________
```

Figure 6-3 Add Processor (blank values)

2. Enter the appropriate information on the Add Processor panel. For our example, we specified the following values:

Processor ID	`SCZP301`
Processor type	`2817`
Processor model	`M32`
Serial number	`0B3BD52817`
Network name	`USIBMSC`
CPC name	`SCZP301`

Figure 6-4 shows the values we added.

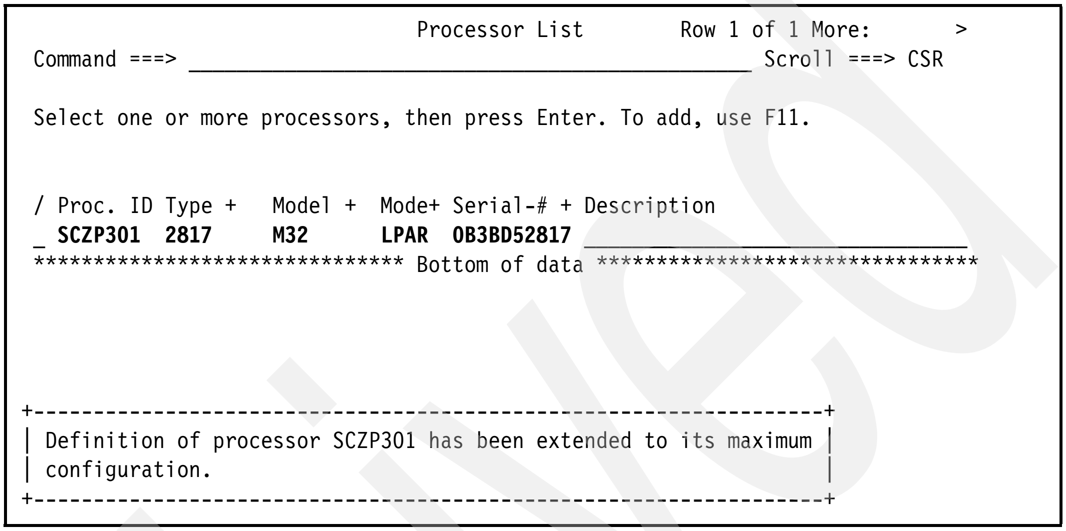


```
------------------------------ Add Processor ------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . . SCZP301
Processor type . . . . . . . . . 2817      +
Processor model  . . . . . . . . M32       +
Configuration mode . . . . . . . LPAR      +
Number of channel subsystems . . _         +

Serial number  . . . . . . . . . 0B3BD52817
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . USIBMSC   +
CPC name . . . . . . . . . . . . SCZP301   +

Local system name  . . . . . . . ________
```

Figure 6-4 Add Processor (adding values)

3. Press Enter. The Processor List panel opens, showing the additional 2817 processor named SCZP301 (Figure 6-5).

   Note the message displayed at the bottom of the panel indicating that the processor definition has been extended to its maximum configuration. Part of the main storage is allocated as a fixed-sized Hardware System Area, which is not addressable by application programs. In HCD, when you define as new or redefine a processor as a 2817, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

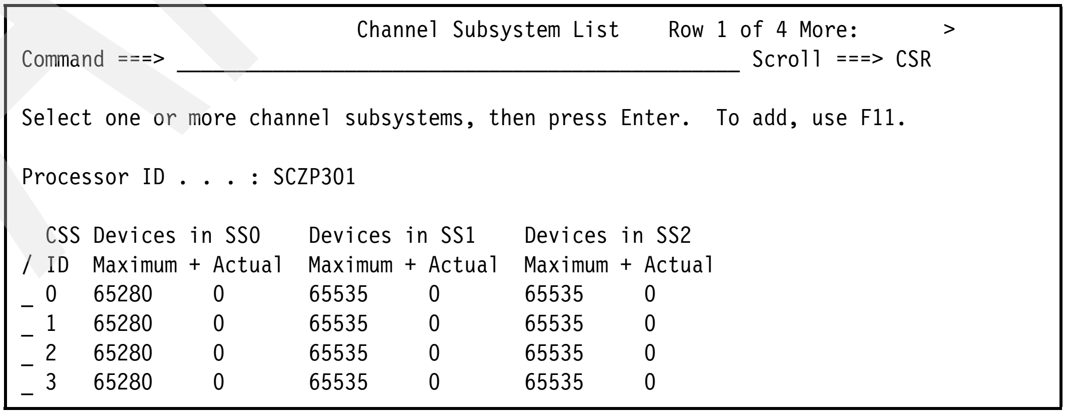


```
                                Processor List       Row 1 of 1 More:       >
 Command ===> _______________________________________________ Scroll ===> CSR

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


 / Proc. ID Type +   Model +  Mode+ Serial-# + Description
 _ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
 ******************************* Bottom of data ********************************





+------------------------------------------------------------------+
| Definition of processor SCZP301 has been extended to its maximum |
| configuration.                                                   |
+------------------------------------------------------------------+
```

Figure 6-5 Processor List (new process or added)

4. Enter s next to the SCZP301 and press Enter. The Channel Subsystem List is displayed. Here you can see four Channel Subsystems defined with the default MAXDEV values of 65280 set by HCD (Figure 6-6).

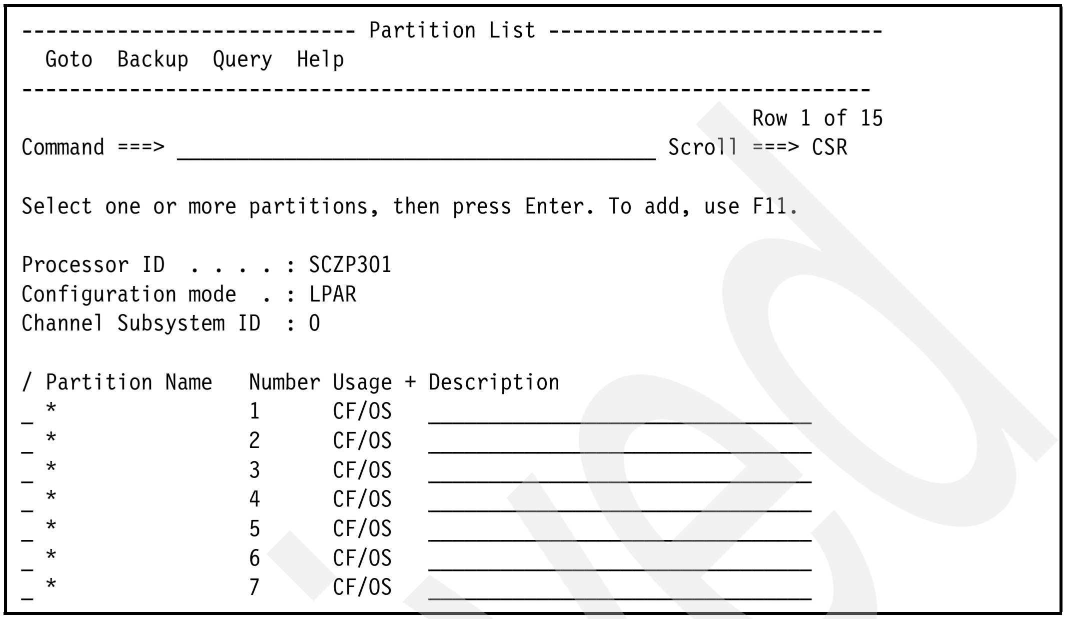
> **Note:** Starting with z196 processors (processor type 2817), users can define devices to a third subchannel set with ID 2 (SS 2). In this third subchannel set, users can configure a maximum of 64 K-1 devices. With z/OS V112, you can define Parallel Access Volume (PAV) alias devices (device types 3380A, 3390A) of the 2105, 2107, and 1750 DASD control units, PPRC secondary devices (3390D), and DB2 data backup volumes (3390S) to SS 2.



```
                           Channel Subsystem List    Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID . . . : SCZP301

  CSS Devices in SS0    Devices in SS1    Devices in SS2
/ ID  Maximum + Actual  Maximum + Actual  Maximum + Actual
_ 0   65280     0       65535     0       65535     0
_ 1   65280     0       65535     0       65535     0
_ 2   65280     0       65535     0       65535     0
_ 3   65280     0       65535     0       65535     0
```

Figure 6-6 Channel Subsystem List

5. Enter `p` next to any of the CSSs and observe that HCD also defines the maximum number of logical partitions, 15 per CSS or a total of 60, as Reserved (*) (Figure 6-7).



```
---------------------------- Partition List ----------------------------
  Goto  Backup  Query  Help
------------------------------------------------------------------------
                                                              Row 1 of 15
Command ===> ________________________________________ Scroll ===> CSR

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

Processor ID  . . . . : SCZP301
Configuration mode  . : LPAR
Channel Subsystem ID  : 0

/ Partition Name   Number Usage + Description
_ *                1      CF/OS   ________________________________
_ *                2      CF/OS   ________________________________
_ *                3      CF/OS   ________________________________
_ *                4      CF/OS   ________________________________
_ *                5      CF/OS   ________________________________
_ *                6      CF/OS   ________________________________
_ *                7      CF/OS   ________________________________
```

Figure 6-7 Partition List

Scroll down to see the remaining reserved logical partitions defined for this CSS.

6. Define the resources to the new 2817 processor:
   a. Change Reserved partitions for each desired CSS to the required partition name and usage. Not all partitions need to be changed at this point; they can be modified later with a Dynamic IODF Activate.
   b. Add CHPIDs to each CSS, with no PCHIDs assigned.
   c. Define a Partition Access list for these CHPIDs.
   d. Define a Partition Candidate list for these CHPIDs.

> **Note:** For specific details about defining processors, partitions, switches, control units, devices, and so on, refer to *z/OS HCD Users Guide,* SC33-7988 and *IOCP Users Guide,* SB10-7037.

7. Add FICON and ESCON switches.
8. Add operating system configurations:
   a. Create an Eligible Device Table (EDT) for each of these operating system configurations.
   b. Add esoteric names in each of these EDTs.
9. Connect FICON and ESCON CHPIDs to the new switches, spreading connections over as many switches and physical port cards as possible, where appropriate.
10. Create control units:
    a. Create devices appropriate to the control units.
    b. Define devices to operating system configurations and any esoterics, where appropriate.

c. Connect control units direct to FICON or ESCON CHPIDs or to switch ports, and then CHPIDs.

11. Define all required internal coupling links and peer coupling links to any other new processors you might be adding to the IODF.
12. Create ESCON and FICON CTCs.
13. Create OSA control units (OSC, OSD, OSE, OSN, OSM, and OSX).
14. Define Nucleus Initialization Program (NIP) consoles.

6.2.3 Overdefining channel paths on an XMP processor

Sometimes you may need to define a channel path that is not physically installed on the processor, which might be useful if you are planning to add additional channel cards to the processor in the future and want to have the definitions in the IODF before the hardware is installed.

HCD allows you to overdefine CHPIDs by using an asterisk (*) for the PCHID value. An overdefined CHPID must adhere to all validation rules, but it is not taken into account by an IOCDS download. Also, it is not included in the IOCP statements, in a CONFIGxx member, or during dynamic activation.

If a control unit contains only CHPIDs with a PCHID value of an asterisk (*), then 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 * with its valid PCHID.

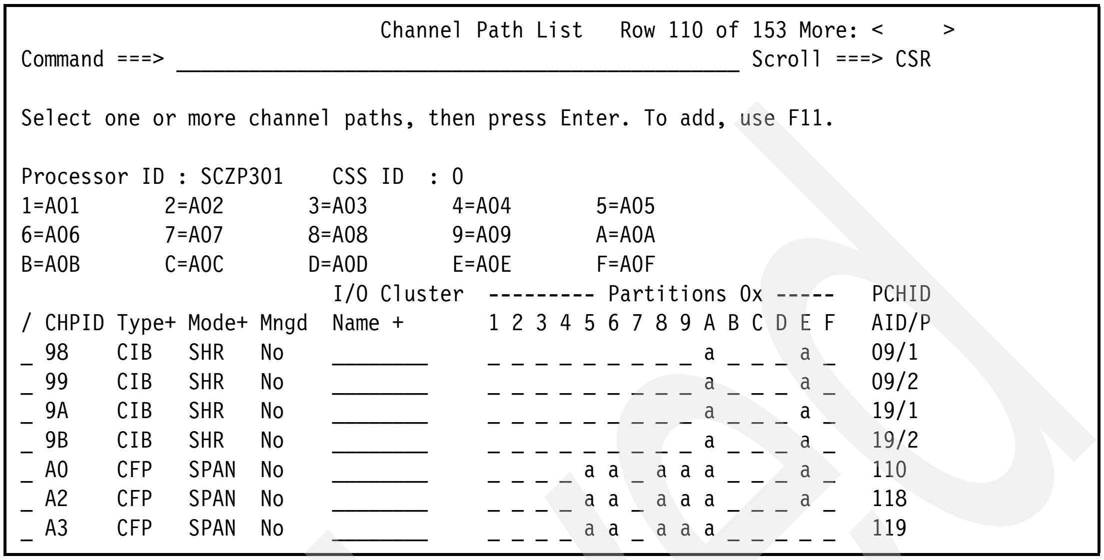
Note: This is not the case for CFP type CHPIDs, where these CHPIDs have connections to other CFP type CHPIDs.

Therefore, HCD only allows you to define CFP type CHPIDs as overdefined if they are unconnected.

Overdefining is now supported for CIB type CHPID definitions.

The 2817 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

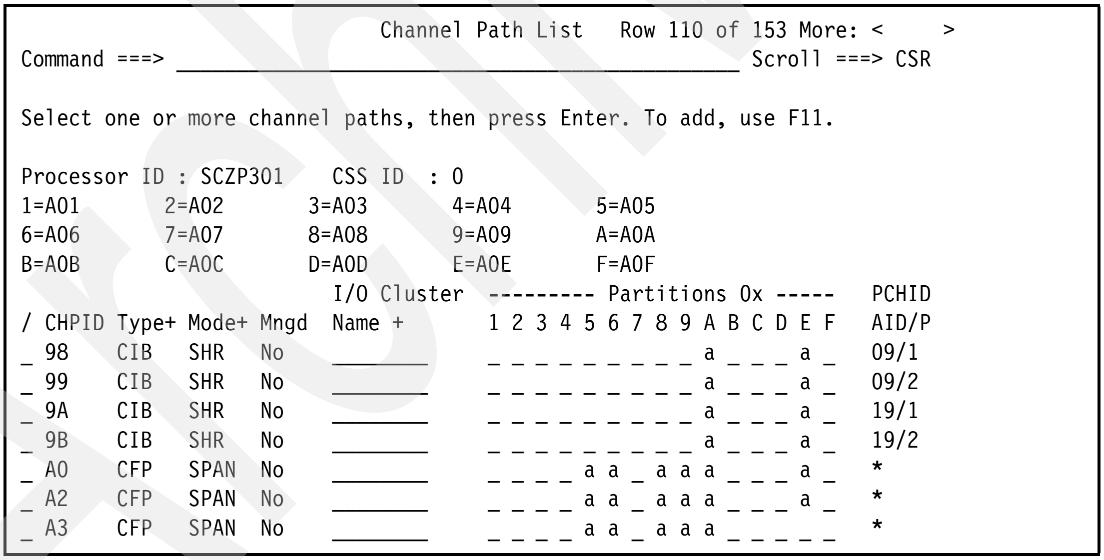
Figure 6-8 shows what the CHPID/PCHID definitions look like before being defined as overdefined. Press PF20 (right) in the Channel Path List.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   110
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   118
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   119
```

Figure 6-8 Channel Path List (Reserving CHPIDs)

Figure 6-9 shows what the CHPID/PCHID definitions look like after being defined as overdefined.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   *
```

Figure 6-9 Channel Path List (overdefined CHPIDs)

6.3 HCD: Validating the 2817 work IODF

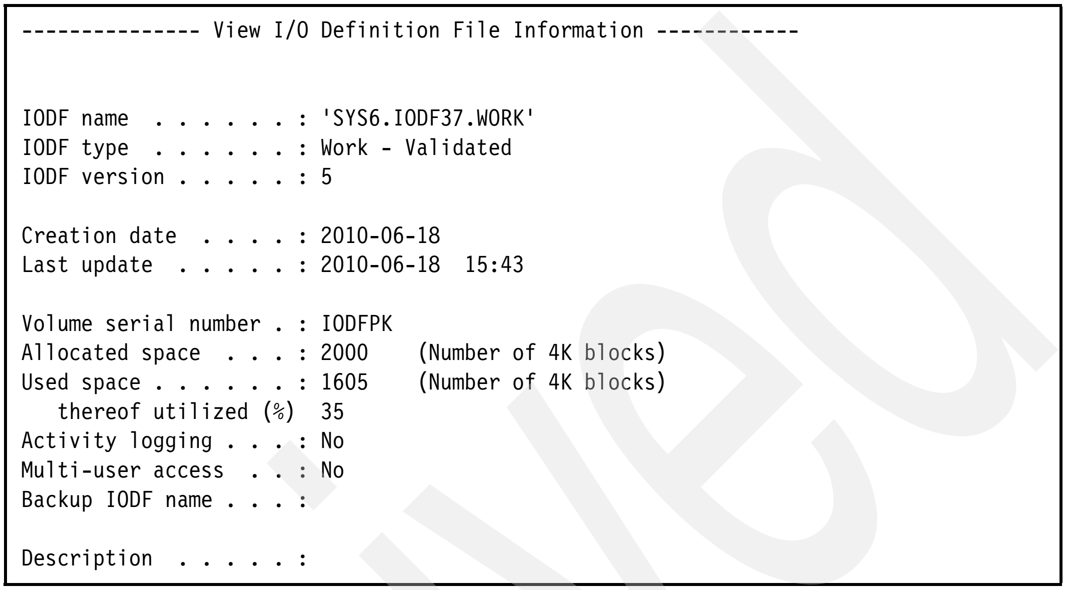
To validate the 2817 work IODF using HCD, perform the following steps:

1. Select HCD Option 2.12. Build validated work I/O definition file.
2. Review the message list.

3. Press PF3 to continue. You should receive the following message:

   `Requested action successfully processed`

4. Select HCD Option 6.4. View I/O Definition File Information (Figure 6-10). Note that the IODF type is now `Work - Validated`.



```
--------------- View I/O Definition File Information ------------


IODF name  . . . . . . : 'SYS6.IODF37.WORK'
IODF type  . . . . . . : Work - Validated
IODF version . . . . . : 5

Creation date  . . . . : 2010-06-18
Last update  . . . . . : 2010-06-18  15:43

Volume serial number . : IODFPK
Allocated space  . . . : 2000    (Number of 4K blocks)
Used space . . . . . . : 1605    (Number of 4K blocks)
   thereof utilized (%)  35
Activity logging . . . : No
Multi-user access  . . : No
Backup IODF name . . . :

Description  . . . . . :
```

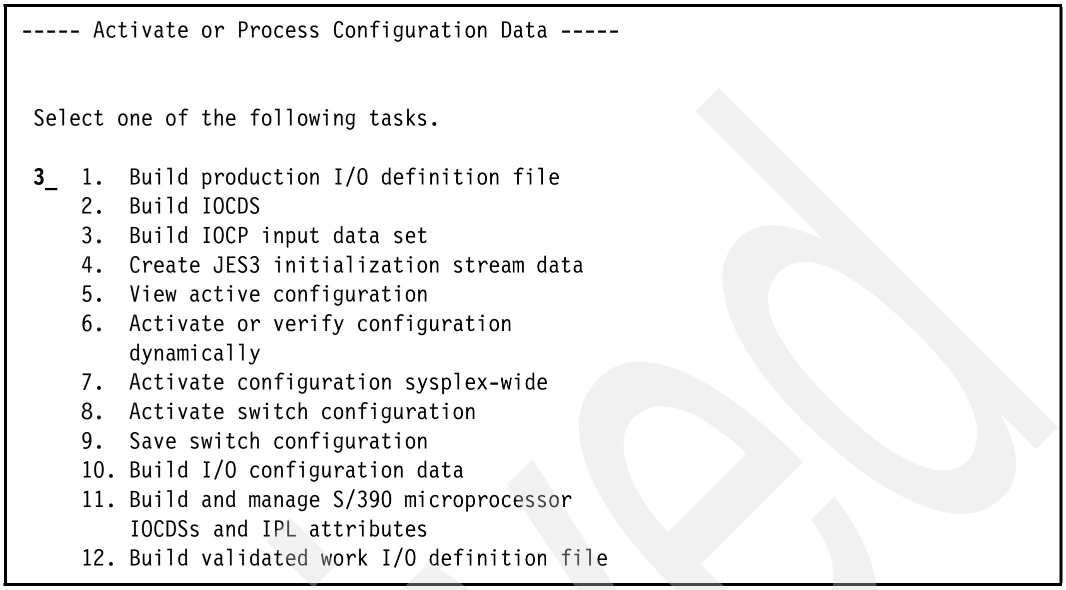
Figure 6-10 View I/O Definition File Information (validated work IODF)

6.3.1 Creating the IOCP for the CHPID Mapping Tool

> **Note:** You might prefer to use HCM to create the IOCP statements file and transfer the file to your workstation. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

To create the IOCP for the CHPID Mapping Tool, perform the following steps:

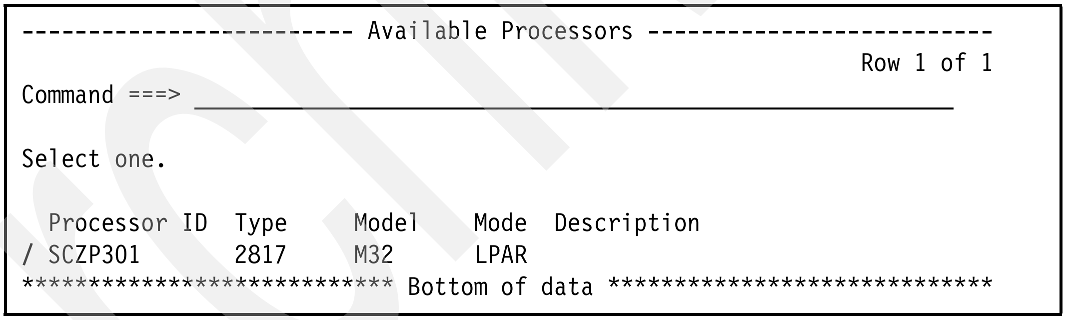
1. Select HCD Option 2.3. Build IOCP input data set, and press Enter (Figure 6-11).



```
----- Activate or Process Configuration Data -----


 Select one of the following tasks.

 3_  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 data
     11. Build and manage S/390 microprocessor
         IOCDSs and IPL attributes
     12. Build validated work I/O definition file
```

Figure 6-11 Activate or Process Configuration Data (Build IOCP for SCZP301)

2. HCD displays the list of available processors from which to chose. Select the processor SCZP301 by using a forward slash mark (/) and press Enter (Figure 6-12).



```
------------------------- Available Processors --------------------------
                                                                Row 1 of 1
Command ===> __________________________________________________________

Select one.

  Processor ID  Type     Model    Mode  Description
/ SCZP301       2817     M32      LPAR
*************************** Bottom of data ****************************
```

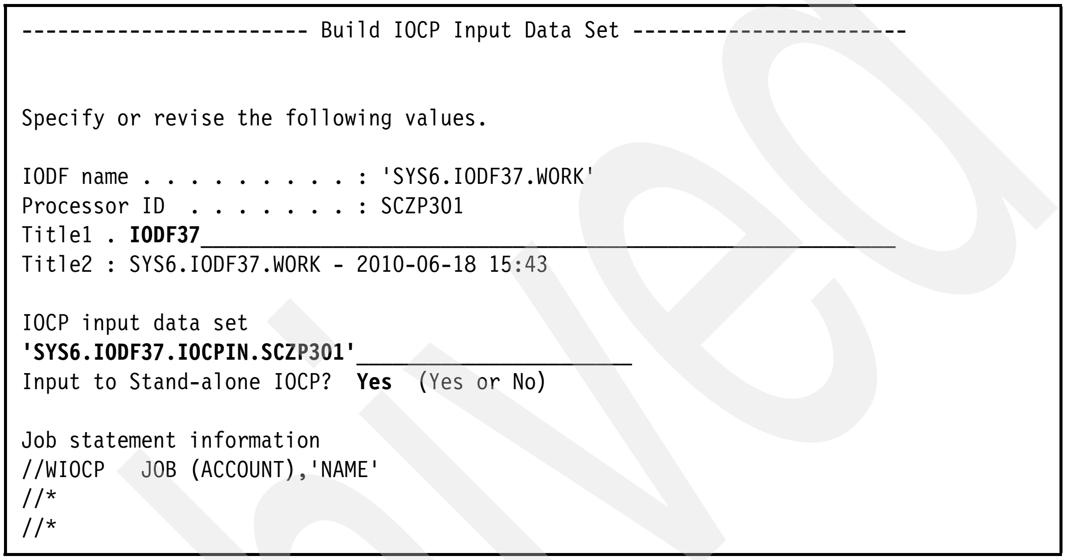
Figure 6-12 Available Processors (select processor for IOCP file)

3. HCD displays a panel where you enter information regarding the IOCP input data set to be created (Figure 6-13).

   Complete the following fields:

   - `Title1`
   - `IOCP input data set`
   - Enter `Yes` in the `Input to Stand-alone IOCP?` field.
   - The Job statement information for the installation

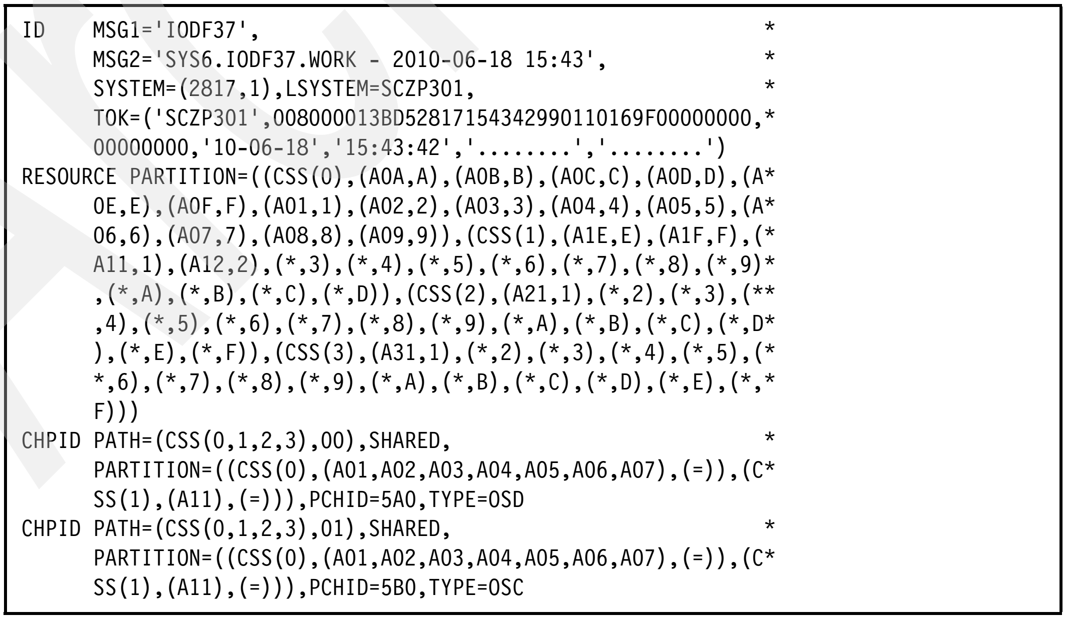
4. Press Enter. HCD submits a batch job to create the data set.



```
------------------------ Build IOCP Input Data Set -----------------------



Specify or revise the following values.

IODF name . . . . . . . . . . : 'SYS6.IODF37.WORK'
Processor ID  . . . . . . . . : SCZP301
Title1 . IODF37__________________________________________________
Title2 : SYS6.IODF37.WORK - 2010-06-18 15:43

IOCP input data set
'SYS6.IODF37.IOCPIN.SCZP301'_______________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
```

Figure 6-13 Build IOCP Input Data Set

5. Verify in TSO that the data set just created exists, and that it contains IOCP statements (Figure 6-14). This data set is used as input into the CHPID Mapping Tool.



```
ID     MSG1='IODF37',                                         *
       MSG2='SYS6.IODF37.WORK - 2010-06-18 15:43',            *
       SYSTEM=(2817,1),LSYSTEM=SCZP301,                       *
       TOK=('SCZP301',008000013BD52817154342990110169F00000000,*
       00000000,'10-06-18','15:43:42','........','........')
RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
       0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
       06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1E,E),(A1F,F),(*
       A11,1),(A12,2),(*,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
       ,(*,A),(*,B),(*,C),(*,D)),(CSS(2),(A21,1),(*,2),(*,3),(**
       ,4),(*,5),(*,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D*
       ),(*,E),(*,F)),(CSS(3),(A31,1),(*,2),(*,3),(*,4),(*,5),(*
       *,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,*
       F)))
CHPID PATH=(CSS(0,1,2,3),00),SHARED,                          *
       PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
       SS(1),(A11),(=))),PCHID=5A0,TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),01),SHARED,                          *
       PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
       SS(1),(A11),(=))),PCHID=5B0,TYPE=OSC
```

Figure 6-14 IOCP input data set contents (truncated)

Note that part of the TOK statement has been blanked out with dots (Example 6-1).

Example 6-1 IOCP file (TOK statement)

```
TOK=('SCZP301',008000013BD52817154342990110169F00000000,*
00000000,'10-06-18','15:43:42','........','........')
```

These dots are a safeguard to ensure that this IOCP file cannot be written to a processor and used for a power-on reset because this IOCP file was created from a validated work IODF and not a production IODF, which is something that can be done only for processors that contain PCHID definitions.

> **Important:** When an IOCP statement file is exported from a Validated Work IODF using HCD, it must be imported *back* to HCD for the process to be valid. The IOCP file cannot be used directly by the IOCP program.

6. Download this file from z/OS to your workstation. Use a workstation file transfer facility, such as the one in IBM Personal Communications Workstation Program, or any equivalent 3270 emulation program. Be sure to use TEXT as the transfer type. In this example, we call this file `SCZP301in.iocp`.

6.4 CMT: Assigning PCHIDs to CHPIDs

In the following steps, we take the output from the previous set of HCD steps (IOCP), as well as the output from the 2817 order process (CFReport). Using the CHPID Mapping Tool, we assign PCHIDs to each of the CHPIDs for the 2817.

Download and install the CHPID Mapping Tool (CMT). Refer to 2.1.5, “CHPID Mapping Tool” on page 28 for information about obtaining and installing the CMT. If you already have the CHPID Mapping Tool installed, verify that you have the latest updates installed.

Using the CHPID Mapping Tool, perform the following steps:

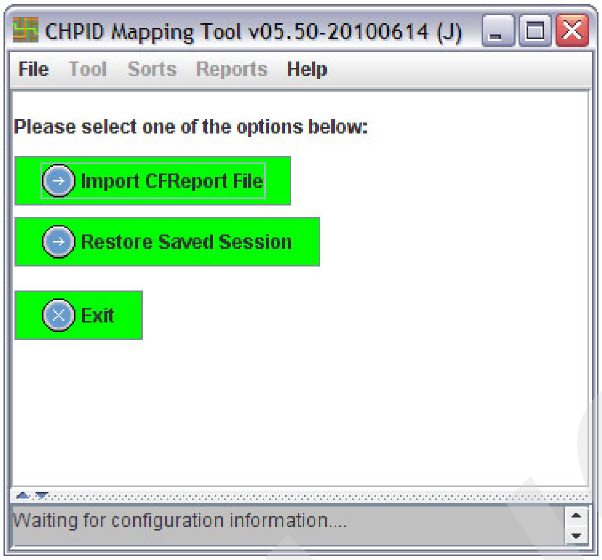
1. Import the IOCP statements file and the new 2817 CFReport file into the CHPID Mapping Tool. You can use the HCM to obtain the IOCP statements.
2. Resolve CHPIDs without associated hardware.
3. Resolve hardware resolution.
4. Set CU Priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
5. Run the CHPID Mapping Tool availability function.
6. Create the CHPID Mapping Tool reports.
7. Create updated IOCP statements file and transfer it back to the host. This step can be performed with HCM.

6.4.1 Importing the CFReport file into the CHPID Mapping Tool

To import the `CFReport` file into the CHPID Mapping Tool, perform the following steps:

1. Start the CHPID Mapping Tool on your workstation.

2. Import the `CFReport` file into the CHPID Mapping Tool by selecting **File** → **Import CFReport file** (Figure 6-15).

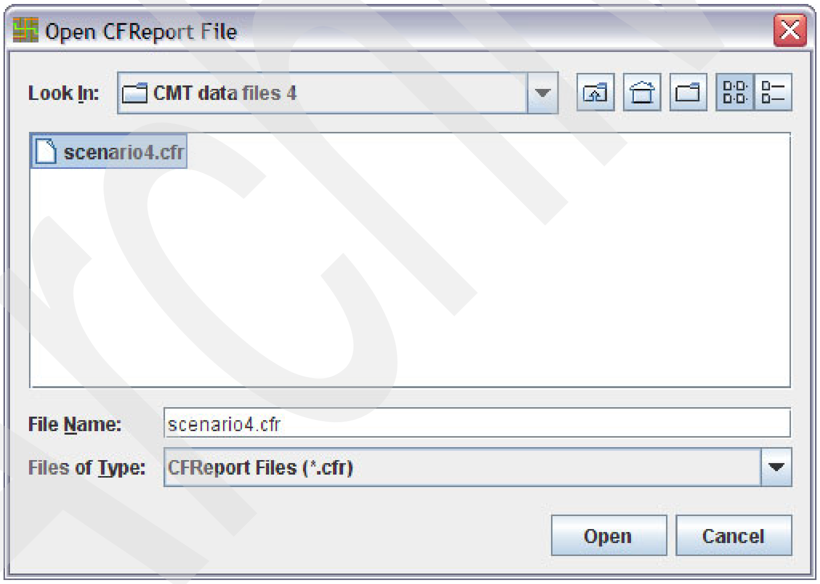


Please select one of the options below:

Waiting for configuration information....

Figure 6-15 Import CFReport file

3. Select the `CFReport` file on your workstation to import into the CHPID Mapping Tool and click **Open** (Figure 6-16).



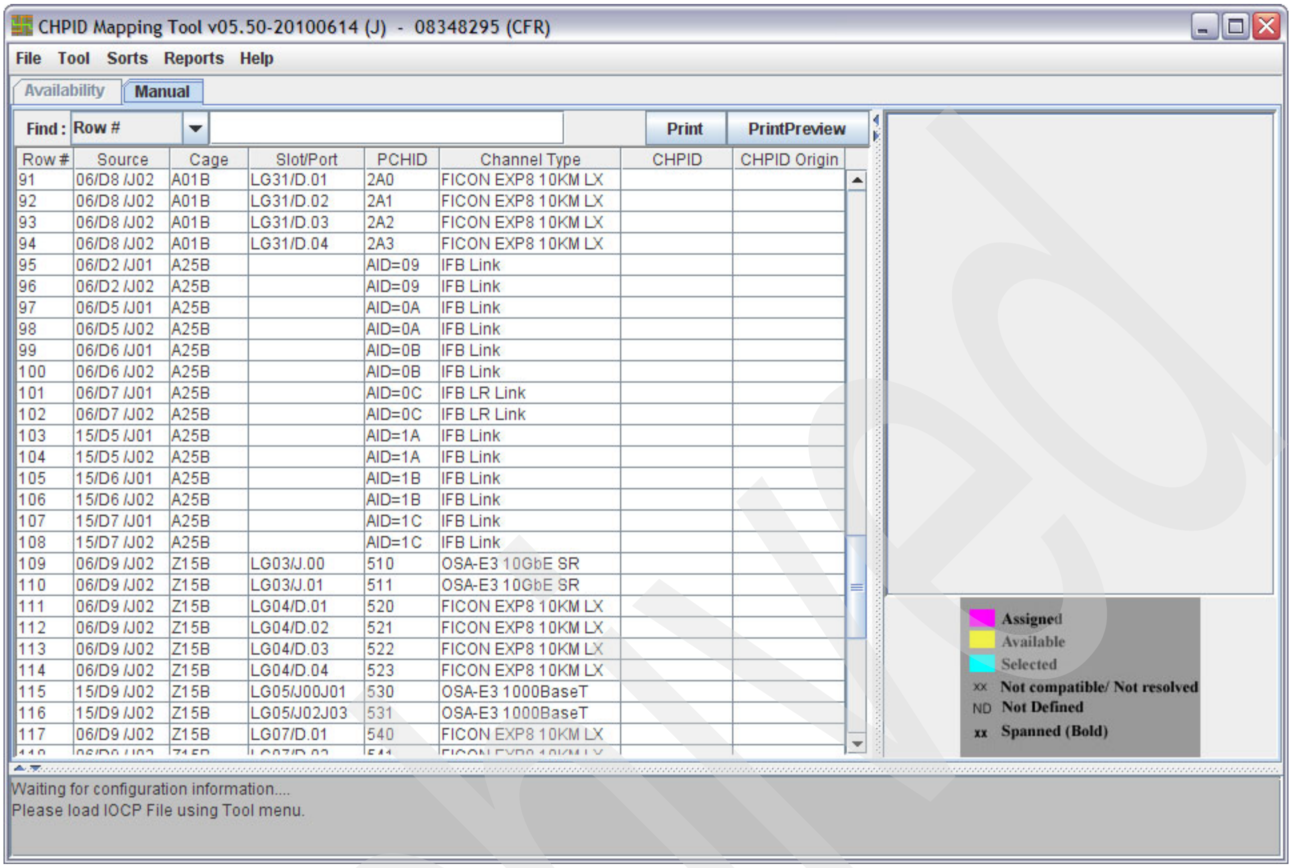
Look In: CMT data files 4

File Name: scenario4.cfr

Files of Type: CFReport Files (*.cfr)

Figure 6-16 Open CFReport file

The CHPID Mapping Tool displays the information from the `CFReport` file on the left side of the window (Figure 6-17).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
91	06/D8 /J02	A01B	LG31/D.01	2A0	FICON EXP8 10KM LX		
92	06/D8 /J02	A01B	LG31/D.02	2A1	FICON EXP8 10KM LX		
93	06/D8 /J02	A01B	LG31/D.03	2A2	FICON EXP8 10KM LX		
94	06/D8 /J02	A01B	LG31/D.04	2A3	FICON EXP8 10KM LX		
95	06/D2 /J01	A25B		AID=09	IFB Link		
96	06/D2 /J02	A25B		AID=09	IFB Link		
97	06/D5 /J01	A25B		AID=0A	IFB Link		
98	06/D5 /J02	A25B		AID=0A	IFB Link		
99	06/D6 /J01	A25B		AID=0B	IFB Link		
100	06/D6 /J02	A25B		AID=0B	IFB Link		
101	06/D7 /J01	A25B		AID=0C	IFB LR Link		
102	06/D7 /J02	A25B		AID=0C	IFB LR Link		
103	15/D5 /J01	A25B		AID=1A	IFB Link		
104	15/D5 /J02	A25B		AID=1A	IFB Link		
105	15/D6 /J01	A25B		AID=1B	IFB Link		
106	15/D6 /J02	A25B		AID=1B	IFB Link		
107	15/D7 /J01	A25B		AID=1C	IFB Link		
108	15/D7 /J02	A25B		AID=1C	IFB Link		
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR		
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR		
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX		
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX		
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX		
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX		
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT		
116	15/D9 /J02	Z15B	LG05/J02J03	531	OSA-E3 1000BaseT		
117	06/D9 /J02	Z15B	LG07/D.01	540	FICON EXP8 10KM LX		

```
Waiting for configuration information....
Please load IOCP File using Tool menu.
```

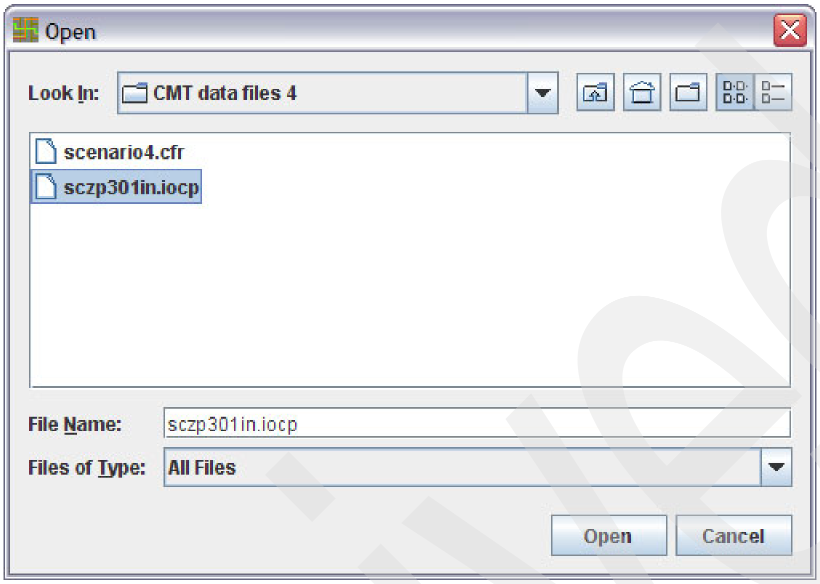
Figure 6-17 Importing the CFReport file

> **Note:** This display also shows the Adapter IDs for the four HCAs that have been ordered for this processor.

6.4.2 Importing the IOCP file into the CHPID Mapping Tool

To import the IOCP file into the CHPID Mapping Tool, perform the following steps:

1. Import the IOCP file by selecting **Tool** → **Import IOCP File** (Figure 6-18).



Look In: CMT data files 4

scenario4.cfr

sczp301in.iocp

File Name: sczp301in.iocp

Files of Type: All Files

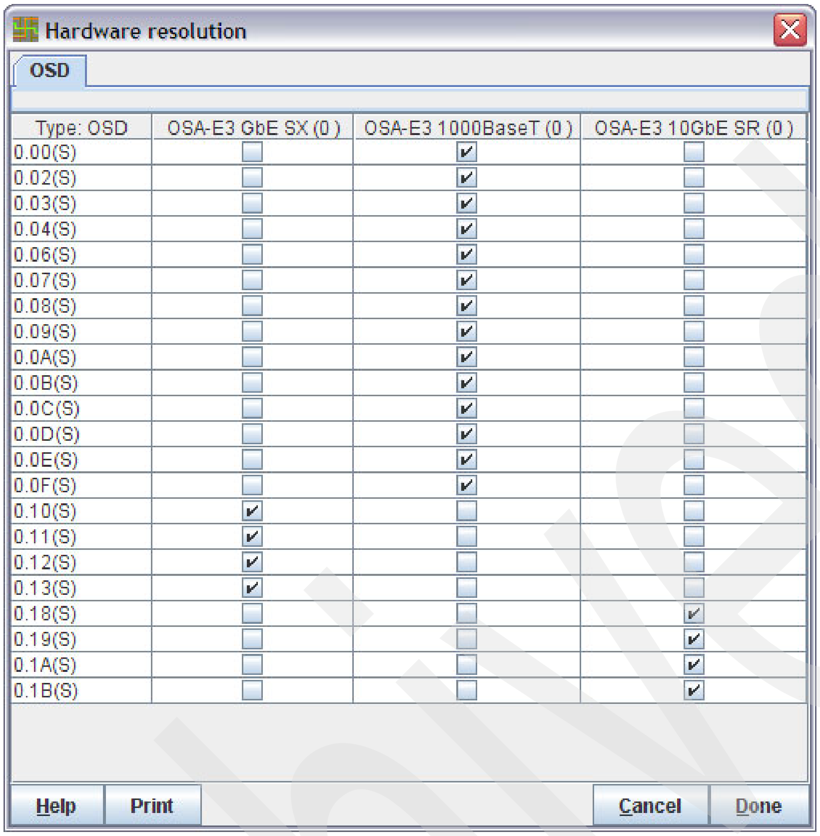
Figure 6-18 Import IOCP files

2. Select the IOCP file on your workstation to import it into the CHPID Mapping Tool and click **Open**.

6.4.3 Hardware resolution

The CHPID Mapping Tool might prompt you to resolve issues that might arise from importing the IOCP file. In our example, the CHPID Mapping Tool wanted clarification about the TYPE=OSD channels.

In each case, we must check off what each of the channels is used for (Figure 6-19).



Type: OSD	OSA-E3 GbE SX (0)	OSA-E3 1000BaseT (0)	OSA-E3 10GbE SR (0)
0.00(S)	☐	☑	☐
0.02(S)	☐	☑	☐
0.03(S)	☐	☑	☐
0.04(S)	☐	☑	☐
0.06(S)	☐	☑	☐
0.07(S)	☐	☑	☐
0.08(S)	☐	☑	☐
0.09(S)	☐	☑	☐
0.0A(S)	☐	☑	☐
0.0B(S)	☐	☑	☐
0.0C(S)	☐	☑	☐
0.0D(S)	☐	☑	☐
0.0E(S)	☐	☑	☐
0.0F(S)	☐	☑	☐
0.10(S)	☑	☐	☐
0.11(S)	☑	☐	☐
0.12(S)	☑	☐	☐
0.13(S)	☑	☐	☐
0.18(S)	☐	☐	☑
0.19(S)	☐	☐	☑
0.1A(S)	☐	☐	☑
0.1B(S)	☐	☐	☑

Figure 6-19 Hardware resolution after IOCP import

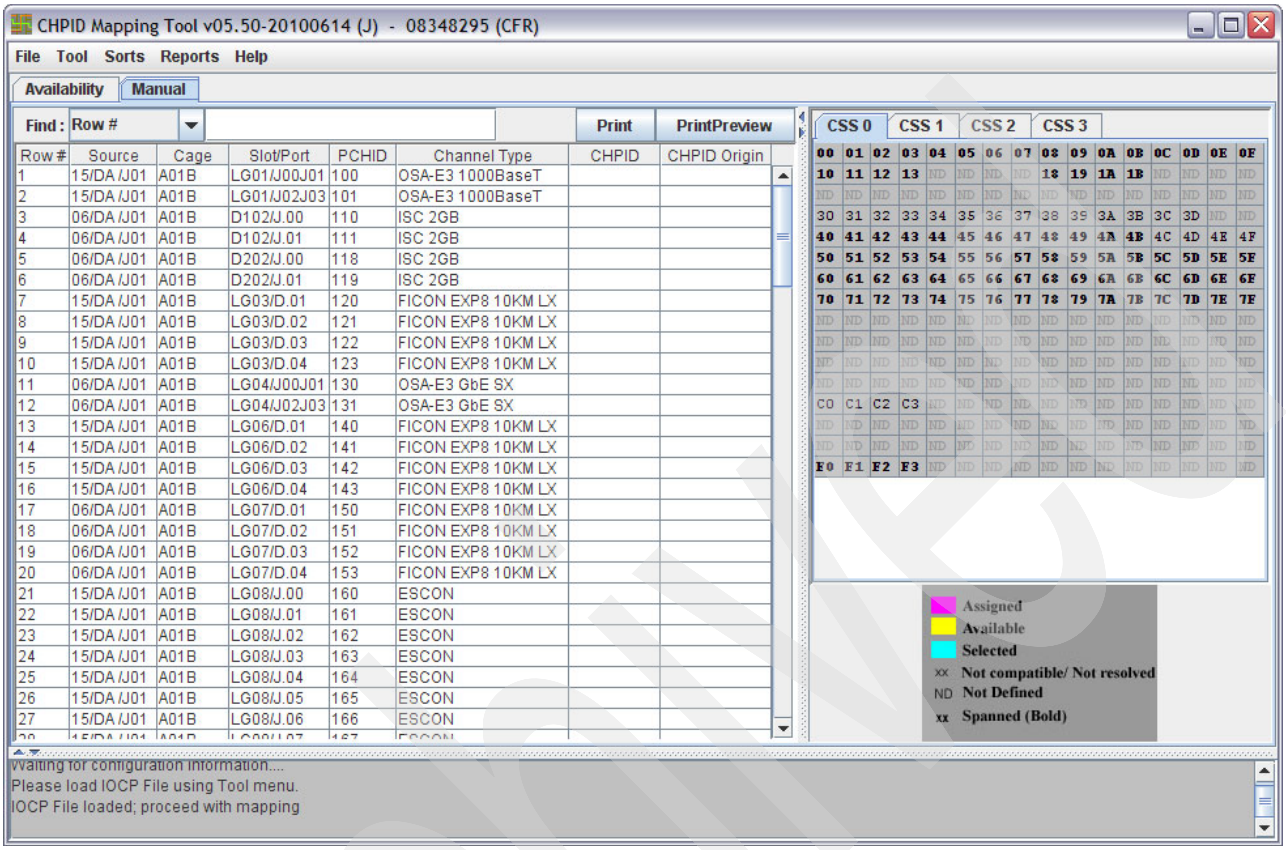
Perform the following steps:

1. Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the OSD CHPID definitions use between the OSA-Express3 GbE, OSA-Express3 100BaseT, and OSA-Express3 10 GbE. Check the desired box and move to the next tab until all CHPID definitions have hardware selected.

   The CHPID Mapping Tool displays all of the information that it currently knows.

2. Click **Done** when all the selections have been made.

The CHPID Mapping Tool displays all of the currently known information. Note that the CHPID column and the CHPID Origin column are filled in after the CHPID Mapping Tool assigns the CHPIDs to PCHIDs (Figure 6-20).



Find : Row #

Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB		
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB		
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB		
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB		
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX		
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX		
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON		
22	15/DA /J01	A01B	LG08/J.01	161	ESCON		
23	15/DA /J01	A01B	LG08/J.02	162	ESCON		
24	15/DA /J01	A01B	LG08/J.03	163	ESCON		
25	15/DA /J01	A01B	LG08/J.04	164	ESCON		
26	15/DA /J01	A01B	LG08/J.05	165	ESCON		
27	15/DA /J01	A01B	LG08/J.06	166	ESCON		

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

■ Assigned
■ Available
■ Selected
xx Not compatible/ Not resolved
ND Not Defined
xx Spanned (Bold)

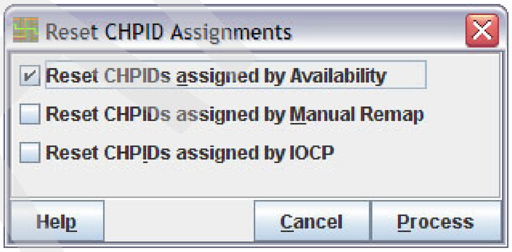
Waiting for configuration information....
Please load IOCP File using Tool menu.
IOCP File loaded; proceed with mapping

Figure 6-20 Manual tab

6.4.4 Setting the Control Unit Priority manually

To set the Control Unit Priority manually, perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click the **Process** CU Priority and a window opens (Figure 6-21).



☑ Reset CHPIDs assigned by Availability
☐ Reset CHPIDs assigned by Manual Remap
☐ Reset CHPIDs assigned by IOCP

Figure 6-21 Reset CHPID Assignments by Availability

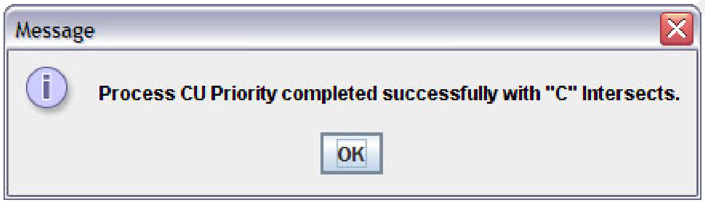
The Reset CHPID Assignment window allows you to change the CHPID values:

– Reset CHPIDs assigned by Availability.
– Reset CHPIDs assigned by Manual Remap.
– Reset CHPIDs assigned by IOCP.

In our example, we select **Reset CHPIDs assigned by Availability** because no PCHIDs were defined in the IOCP input and we did not assign any in the manual window.

3. Click **Process**.

After the CHPID Mapping Tool has assigned the CHPIDs, it displays a message indicating the results of the process (Figure 6-22).



Process CU Priority completed successfully with "C" Intersects.

Figure 6-22 Process CU Priority completion message

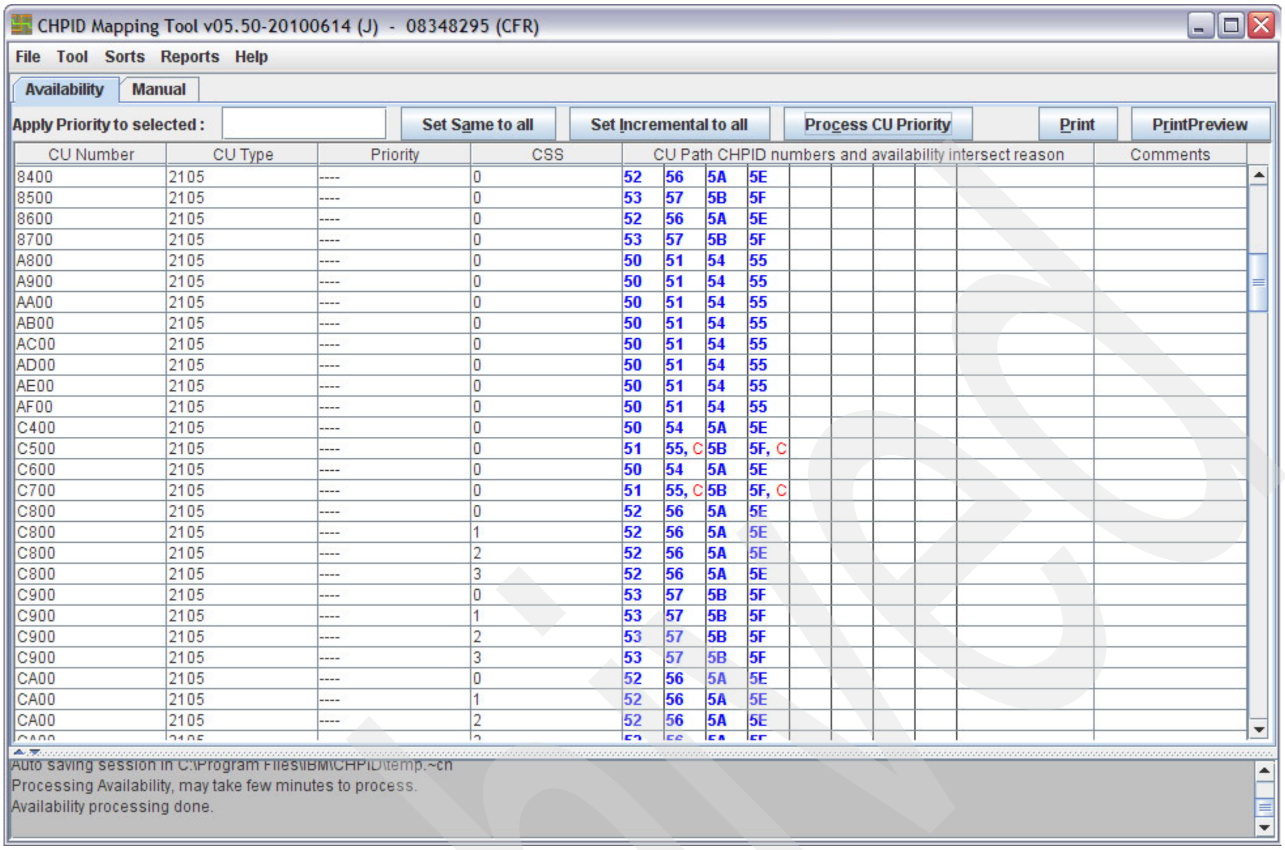
Our example returned C type intersects

The following list defines the possible intersects:

C	Two or more assigned channels use the same channel card.
S	Greater than half the assigned channels use the same STI.
M	All assigned channels are supported by the same MBA group.
B	More than half the assigned channels are supported by the same book.
D	Assigned channels are on the same daughter card.

> **Note:** Intersect messages inform you of a potential availability problem detected by the CMT, but do not necessarily indicate an error. It is *your* responsibility to evaluate whether the condition should be corrected or not.

4. Click **OK**. Figure 6-23 shows the C intersects under the Availability tab.

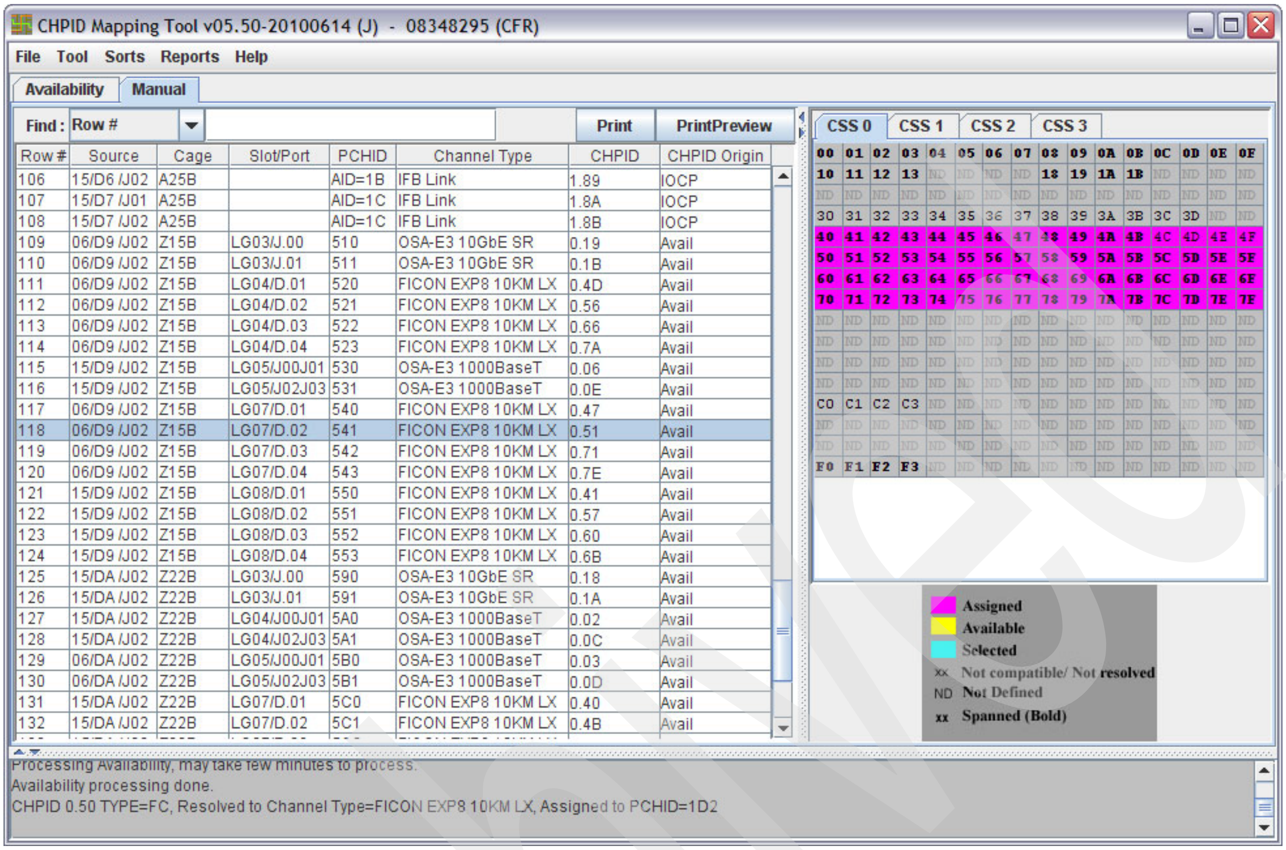


CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason				Comments
8400	2105	----	0	52	56	5A	5E	
8500	2105	----	0	53	57	5B	5F	
8600	2105	----	0	52	56	5A	5E	
8700	2105	----	0	53	57	5B	5F	
A800	2105	----	0	50	51	54	55	
A900	2105	----	0	50	51	54	55	
AA00	2105	----	0	50	51	54	55	
AB00	2105	----	0	50	51	54	55	
AC00	2105	----	0	50	51	54	55	
AD00	2105	----	0	50	51	54	55	
AE00	2105	----	0	50	51	54	55	
AF00	2105	----	0	50	51	54	55	
C400	2105	----	0	50	54	5A	5E	
C500	2105	----	0	51	55, C	5B	5F, C	
C600	2105	----	0	50	54	5A	5E	
C700	2105	----	0	51	55, C	5B	5F, C	
C800	2105	----	0	52	56	5A	5E	
C800	2105	----	1	52	56	5A	5E	
C800	2105	----	2	52	56	5A	5E	
C800	2105	----	3	52	56	5A	5E	
C900	2105	----	0	53	57	5B	5F	
C900	2105	----	1	53	57	5B	5F	
C900	2105	----	2	53	57	5B	5F	
C900	2105	----	3	53	57	5B	5F	
CA00	2105	----	0	52	56	5A	5E	
CA00	2105	----	1	52	56	5A	5E	
CA00	2105	----	2	52	56	5A	5E	

```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~cn
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 6-23 C type intersects in the Availability tab

5. Click the **Manual** tab and note the C intersects (Figure 6-24).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
106	15/D6 /J02	A25B		AID=1B	IFB Link	1.89	IOCP
107	15/D7 /J01	A25B		AID=1C	IFB Link	1.8A	IOCP
108	15/D7 /J02	A25B		AID=1C	IFB Link	1.8B	IOCP
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR	0.19	Avail
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR	0.1B	Avail
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX	0.4D	Avail
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX	0.56	Avail
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX	0.66	Avail
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX	0.7A	Avail
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT	0.06	Avail
116	15/D9 /J02	Z15B	LG05/J02J03	531	OSA-E3 1000BaseT	0.0E	Avail
117	06/D9 /J02	Z15B	LG07/D.01	540	FICON EXP8 10KM LX	0.47	Avail
118	06/D9 /J02	Z15B	LG07/D.02	541	FICON EXP8 10KM LX	0.51	Avail
119	06/D9 /J02	Z15B	LG07/D.03	542	FICON EXP8 10KM LX	0.71	Avail
120	06/D9 /J02	Z15B	LG07/D.04	543	FICON EXP8 10KM LX	0.7E	Avail
121	15/D9 /J02	Z15B	LG08/D.01	550	FICON EXP8 10KM LX	0.41	Avail
122	15/D9 /J02	Z15B	LG08/D.02	551	FICON EXP8 10KM LX	0.57	Avail
123	15/D9 /J02	Z15B	LG08/D.03	552	FICON EXP8 10KM LX	0.60	Avail
124	15/D9 /J02	Z15B	LG08/D.04	553	FICON EXP8 10KM LX	0.6B	Avail
125	15/DA /J02	Z22B	LG03/J.00	590	OSA-E3 10GbE SR	0.18	Avail
126	15/DA /J02	Z22B	LG03/J.01	591	OSA-E3 10GbE SR	0.1A	Avail
127	15/DA /J02	Z22B	LG04/J00J01	5A0	OSA-E3 1000BaseT	0.02	Avail
128	15/DA /J02	Z22B	LG04/J02J03	5A1	OSA-E3 1000BaseT	0.0C	Avail
129	06/DA /J02	Z22B	LG05/J00J01	5B0	OSA-E3 1000BaseT	0.03	Avail
130	06/DA /J02	Z22B	LG05/J02J03	5B1	OSA-E3 1000BaseT	0.0D	Avail
131	15/DA /J02	Z22B	LG07/D.01	5C0	FICON EXP8 10KM LX	0.40	Avail
132	15/DA /J02	Z22B	LG07/D.02	5C1	FICON EXP8 10KM LX	0.4B	Avail

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

```
Processing Availability, may take few minutes to process.
Availability processing done.
CHPID 0.50 TYPE=FC, Resolved to Channel Type=FICON EXP8 10KM LX, Assigned to PCHID=1D2
```

Figure 6-24 C type intersects in the Manual tab

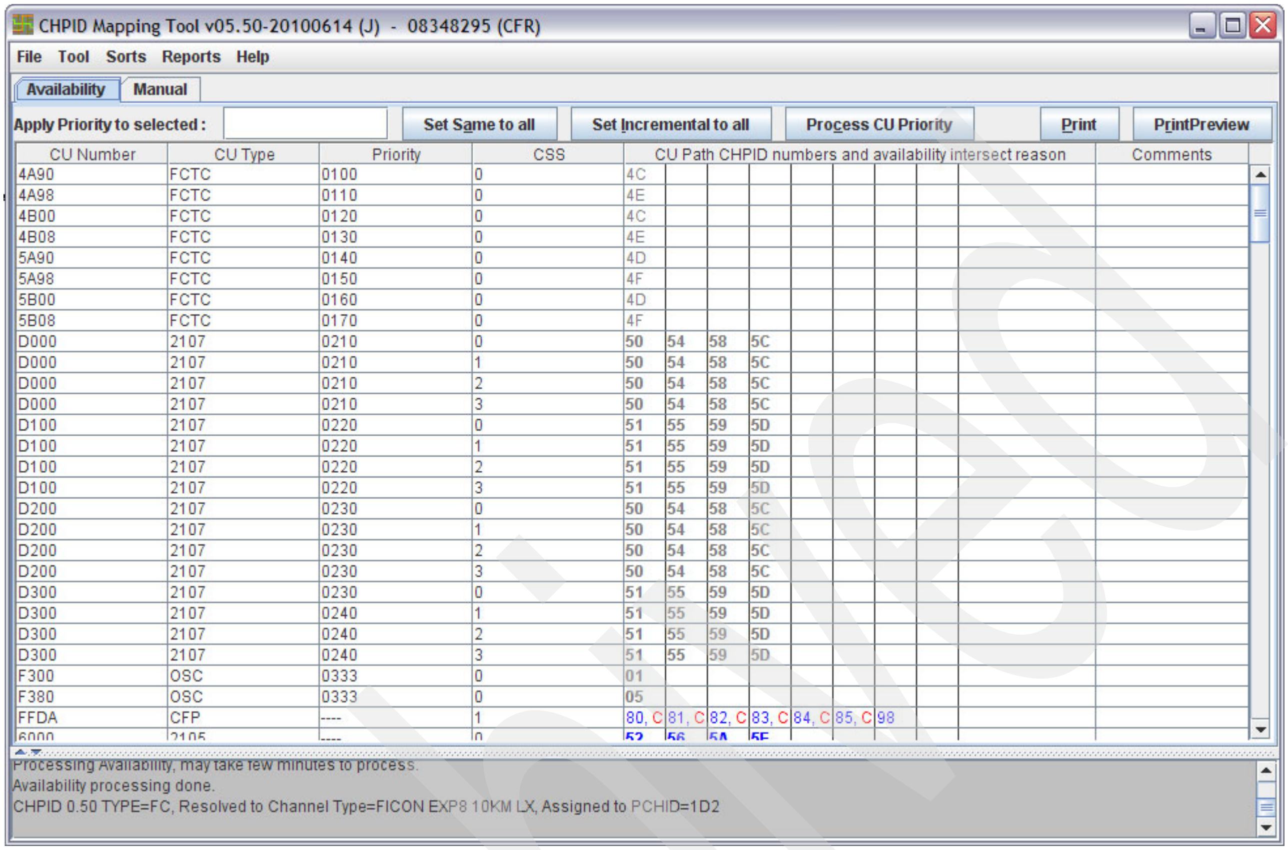
The CHPID Mapping Tool can only identify these intersects. You need to go back into HCD and redefine the PSIFB connections over different HCAs, run another validate and import the IOCP statements into CMT, and run the Process CU function again.

You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

Our example does not contain any control units set with CU Priority, but we do need to check and set values for items such as OSA-ICC CHPIDs and CTC CHPIDs to ensure that the CHPID Mapping Tool allocates these CHPIDs with high PCHID availability.

Go through the listing and search through the CU Number column for any control units for which you want to set priority.

In our example, we set the OSC type CU Numbers F300 and F380 to priority 333 plus a few FCTCs and a 2107 CU (Figure 6-25).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason									Comments
4A90	FCTC	0100	0	4C									
4A98	FCTC	0110	0	4E									
4B00	FCTC	0120	0	4C									
4B08	FCTC	0130	0	4E									
5A90	FCTC	0140	0	4D									
5A98	FCTC	0150	0	4F									
5B00	FCTC	0160	0	4D									
5B08	FCTC	0170	0	4F									
D000	2107	0210	0	50	54	58	5C						
D000	2107	0210	1	50	54	58	5C						
D000	2107	0210	2	50	54	58	5C						
D000	2107	0210	3	50	54	58	5C						
D100	2107	0220	0	51	55	59	5D						
D100	2107	0220	1	51	55	59	5D						
D100	2107	0220	2	51	55	59	5D						
D100	2107	0220	3	51	55	59	5D						
D200	2107	0230	0	50	54	58	5C						
D200	2107	0230	1	50	54	58	5C						
D200	2107	0230	2	50	54	58	5C						
D200	2107	0230	3	50	54	58	5C						
D300	2107	0230	0	51	55	59	5D						
D300	2107	0240	1	51	55	59	5D						
D300	2107	0240	2	51	55	59	5D						
D300	2107	0240	3	51	55	59	5D						
F300	OSC	0333	0	01									
F380	OSC	0333	0	05									
FFDA	CFP	----	1	80, C	81, C	82, C	83, C	84, C	85, C	98			
6000	2105	----	0	52	56	5A	5E						

Processing Availability, may take few minutes to process.
Availability processing done.
CHPID 0.50 TYPE=FC, Resolved to Channel Type=FICON EXP8 10KM LX, Assigned to PCHID=1D2

Figure 6-25 CMT: Set CU Priority

If they are coupling links used by a CF image, you should group these links.

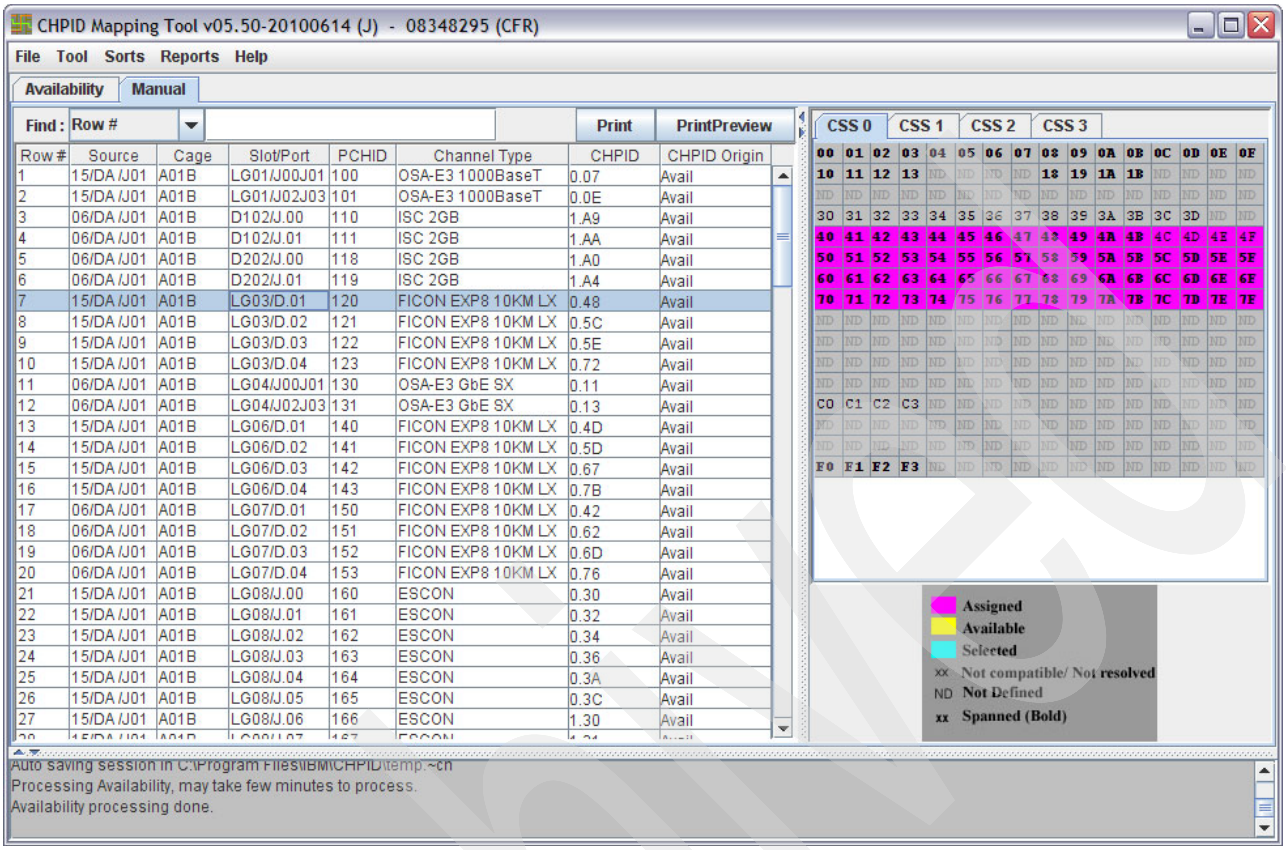
Each set of CHPIDs going to a different CPC should be grouped with a common priority. For example, suppose the CF image has four links (CHPIDs 40, 41, 42, and 43) and that 40 and 41 go to one CPC, and 42 and 43 go to a different CPC. In this case, you should give CHPIDs 40 and 41 one priority and CHPIDs 42 and 43 a different priority. The concept is the same regardless of the number of connecting CPCs or the number of links to each CPC.

To group CHPIDs with a common priority, perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority**. The Reset CHPID Assignment window opens, where you can change the CHPID values:
   - Reset CHPIDs assigned by Availability.
   - Reset CHPIDs assigned by Manual Remap.
   - Reset CHPIDs assigned by IOCP.

   In our example, we select **Reset CHPIDs assigned by Availability**.
3. Click **Process**.
4. Select **Sorts** → **By CU Priority** and note that the OSC type control units with priority of 333 have been sorted to the top of the list.

5. Select the **Manual** tab to view the results of mapping the CHPIDs (Figure 6-26).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.42	Avail
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX	0.62	Avail
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX	0.6D	Avail
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX	0.76	Avail
21	15/DA /J01	A01B	LG08/J.00	160	ESCON	0.30	Avail
22	15/DA /J01	A01B	LG08/J.01	161	ESCON	0.32	Avail
23	15/DA /J01	A01B	LG08/J.02	162	ESCON	0.34	Avail
24	15/DA /J01	A01B	LG08/J.03	163	ESCON	0.36	Avail
25	15/DA /J01	A01B	LG08/J.04	164	ESCON	0.3A	Avail
26	15/DA /J01	A01B	LG08/J.05	165	ESCON	0.3C	Avail
27	15/DA /J01	A01B	LG08/J.06	166	ESCON	1.30	Avail

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

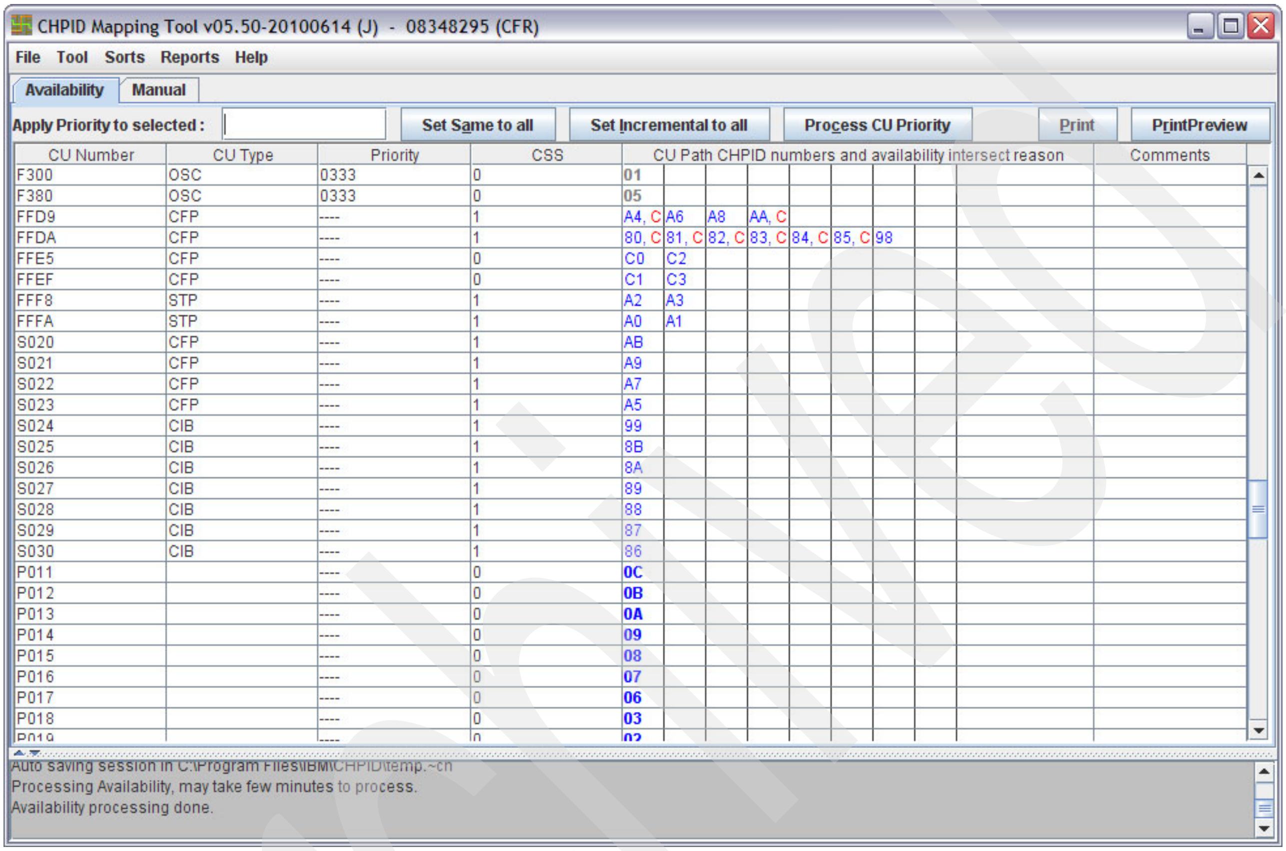
```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~cn
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 6-26 Manual (CHPIDs assigned)

Note that the CHPID column and the CHPID Origin columns are no longer blank. The CHPID Mapping Tool has assigned CHPIDs to PCHIDs and it has placed the Avail value in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

6.4.5 CHPIDs not connected to Control Units

Under the **Availability** tab, select **Sorts** → **By Control Unit**. The CHPID Mapping Tool shows, at the end of the list, all the CHPIDs defined in the IOCP input that are not connected to control units. All coupling CHPIDs in this list are preceded with an S in the CU Number column (not shown in Figure 6-27). All non-coupling CHPIDs are preceded with a P.



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason							Comments
F300	OSC	0333	0	01							
F380	OSC	0333	0	05							
FFD9	CFP	----	1	A4, C	A6	A8	AA, C				
FFDA	CFP	----	1	80, C	81, C	82, C	83, C	84, C	85, C	98	
FFE5	CFP	----	0	C0	C2						
FFEF	CFP	----	0	C1	C3						
FFF8	STP	----	1	A2	A3						
FFFA	STP	----	1	A0	A1						
S020	CFP	----	1	AB							
S021	CFP	----	1	A9							
S022	CFP	----	1	A7							
S023	CFP	----	1	A5							
S024	CIB	----	1	99							
S025	CIB	----	1	8B							
S026	CIB	----	1	8A							
S027	CIB	----	1	89							
S028	CIB	----	1	88							
S029	CIB	----	1	87							
S030	CIB	----	1	86							
P011		----	0	0C							
P012		----	0	0B							
P013		----	0	0A							
P014		----	0	09							
P015		----	0	08							
P016		----	0	07							
P017		----	0	06							
P018		----	0	03							
P019		----	0	02							

```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~cn
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 6-27 Sort by Control Unit

You should review the list because:

- You might have forgotten to add a CHPID to a control unit and might need to update the IOCP source before continuing with the CHPID Mapping Tool.
- The unconnected CHPIDs might be extra channels you are ordering in anticipation of new control units.
- The unconnected CHPIDs might be coupling links that are being used in coupling facility (CF) images (these do not require control units).

If there are extra CHPIDs for anticipated new control units, you may want to group these CHPIDs with a common priority, which allows the availability mapping function to pick PCHIDs that can afford your new control unit availability.

6.4.6 Creating reports for the hardware team

The CHPID Mapping Tool has built-in reports, which are available from the Reports drop-down menu. You can also print the information on the Availability tab or the Manual tab by clicking the **Print** button. When in the Availability tab, you can also enter information in the Comments column that might be useful at a later date.

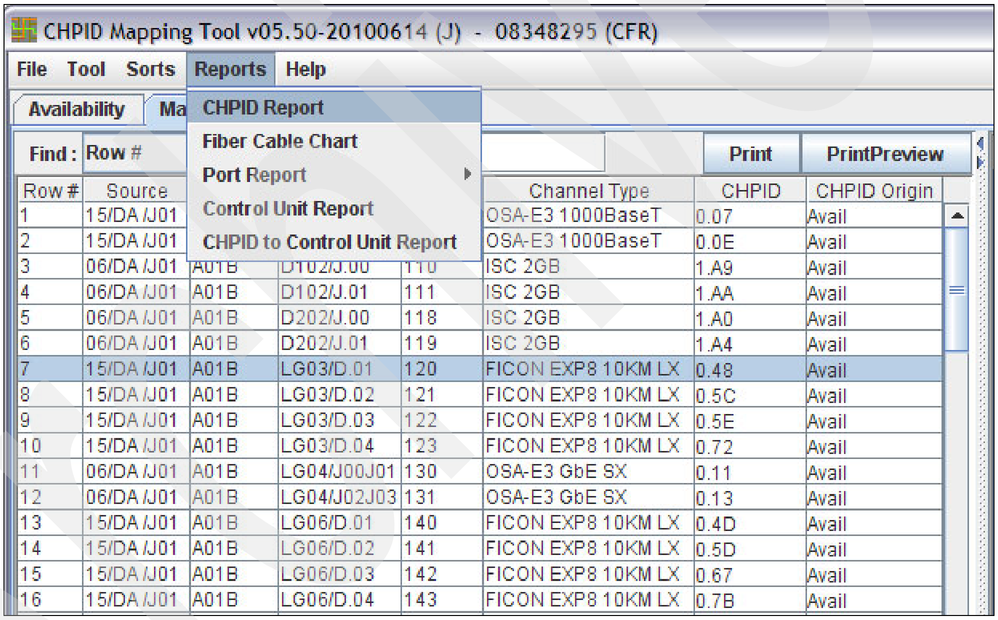
For simplicity, we only describe how to print three reports in this example (the CHPID Report, the Port Report, Sorted by Location, and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way.

The person who installs the I/O cables during system installation needs one of these reports. The Port Report, Sorted by Location is recommended. The installer can use this report to help label the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

CHPID Report

To create the CHPID Report, perform the following steps:

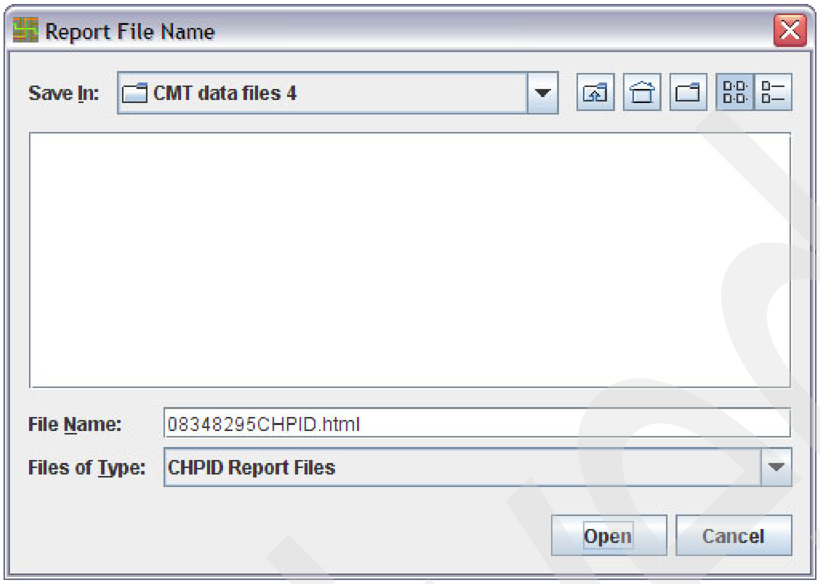
1. Select **Reports** → **CHPID Report** (Figure 6-28).



Row #	Source				Channel Type	CHPID	CHPID Origin
1	15/DA /J01				OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01				OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail

Figure 6-28 Select CHPID Report

2. Enter the report's file name (or accept the name that the CHPID Mapping Tool enters) and click **Save** (Figure 6-29).



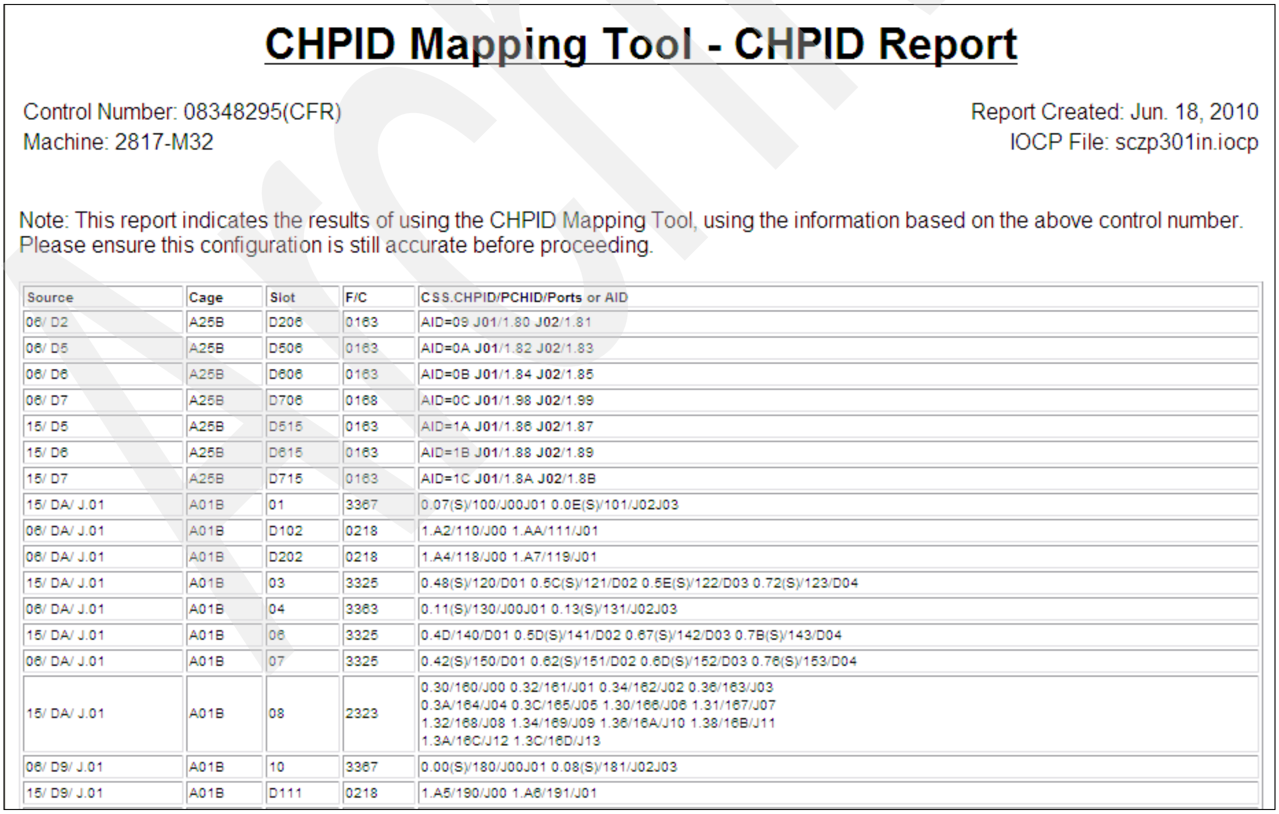
Save In: CMT data files 4

File Name: 08348295CHPID.html

Files of Type: CHPID Report Files

Figure 6-29 Report File Name

3. The CHPID Mapping Tool opens a browser window that contains the CHPID report (Figure 6-30). You might be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 18, 2010
IOCP File: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

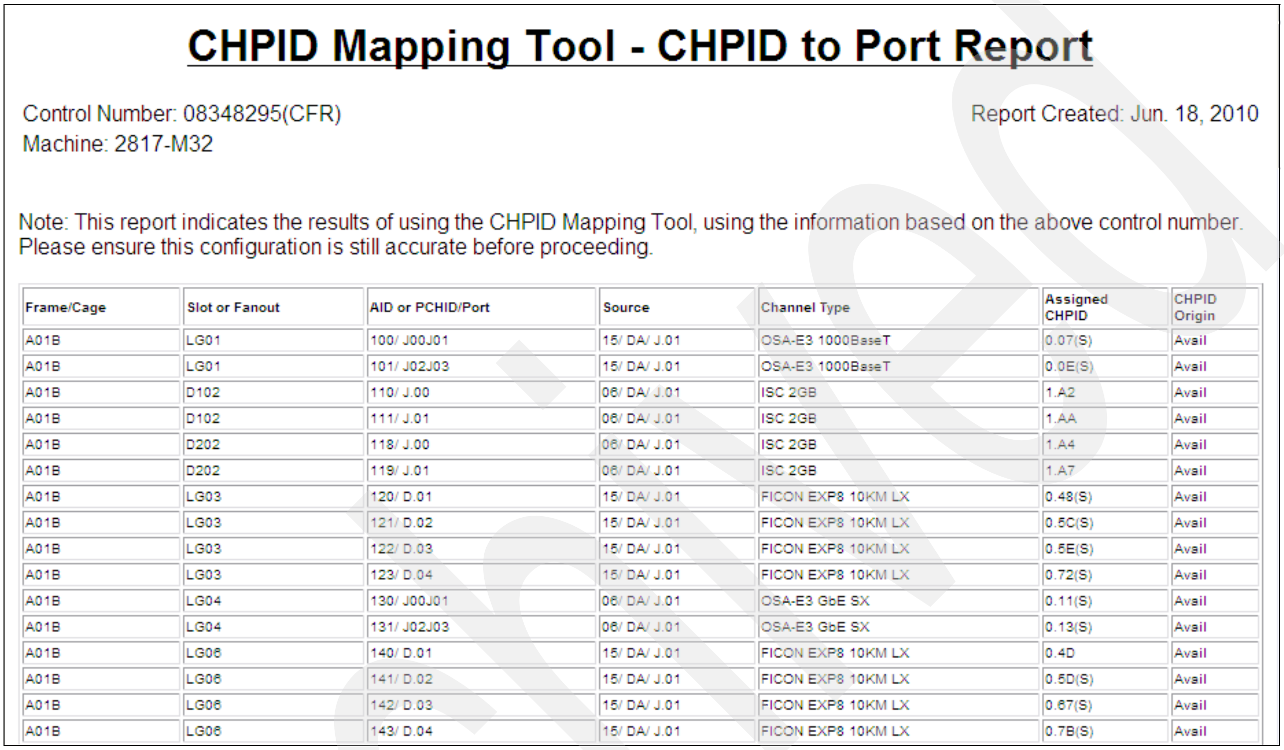
Source	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports or AID
06/ D2	A25B	D206	0163	AID=09 **J01**/1.80 **J02**/1.81
06/ D5	A25B	D506	0163	AID=0A **J01**/1.82 **J02**/1.83
06/ D6	A25B	D606	0163	AID=0B **J01**/1.84 **J02**/1.85
06/ D7	A25B	D706	0168	AID=0C **J01**/1.98 **J02**/1.99
15/ D5	A25B	D515	0163	AID=1A **J01**/1.86 **J02**/1.87
15/ D6	A25B	D615	0163	AID=1B **J01**/1.88 **J02**/1.89
15/ D7	A25B	D715	0163	AID=1C **J01**/1.8A **J02**/1.8B
15/ DA/ J.01	A01B	01	3367	0.07(S)/100/J00J01 0.0E(S)/101/J02J03
06/ DA/ J.01	A01B	D102	0218	1.A2/110/J00 1.AA/111/J01
06/ DA/ J.01	A01B	D202	0218	1.A4/118/J00 1.A7/119/J01
15/ DA/ J.01	A01B	03	3325	0.48(S)/120/D01 0.5C(S)/121/D02 0.5E(S)/122/D03 0.72(S)/123/D04
06/ DA/ J.01	A01B	04	3363	0.11(S)/130/J00J01 0.13(S)/131/J02J03
15/ DA/ J.01	A01B	06	3325	0.4D/140/D01 0.5D(S)/141/D02 0.67(S)/142/D03 0.7B(S)/143/D04
06/ DA/ J.01	A01B	07	3325	0.42(S)/150/D01 0.62(S)/151/D02 0.6D(S)/152/D03 0.76(S)/153/D04
15/ DA/ J.01	A01B	08	2323	0.30/160/J00 0.32/161/J01 0.34/162/J02 0.36/163/J03 0.3A/164/J04 0.3C/165/J05 1.30/166/J06 1.31/167/J07 1.32/168/J08 1.34/169/J09 1.36/16A/J10 1.38/16B/J11 1.3A/16C/J12 1.3C/16D/J13
06/ D9/ J.01	A01B	10	3367	0.00(S)/180/J00J01 0.08(S)/181/J02J03
15/ D9/ J.01	A01B	D111	0218	1.A5/190/J00 1.A6/191/J01

Figure 6-30 CHPID Report

Port Report, Sorted by Location

To create a Port Report, Sorted by Location report, perform the following steps:

1. Select **Reports** → **Port Report** → **Sorted by Location** and then click **Save** (assuming that you accept the CHPID Mapping Tool report name).
2. The CHPID Mapping Tool opens a browser window with the CHPID to Port Report (Figure 6-31). You may be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to Port Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 18, 2010

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Frame/Cage	Slot or Fanout	AID or PCHID/Port	Source	Channel Type	Assigned CHPID	CHPID Origin
A01B	LG01	100/ J00J01	15/ DA/ J.01	OSA-E3 1000BaseT	0.07(S)	Avail
A01B	LG01	101/ J02J03	15/ DA/ J.01	OSA-E3 1000BaseT	0.0E(S)	Avail
A01B	D102	110/ J.00	06/ DA/ J.01	ISC 2GB	1.A2	Avail
A01B	D102	111/ J.01	06/ DA/ J.01	ISC 2GB	1.AA	Avail
A01B	D202	118/ J.00	06/ DA/ J.01	ISC 2GB	1.A4	Avail
A01B	D202	119/ J.01	06/ DA/ J.01	ISC 2GB	1.A7	Avail
A01B	LG03	120/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.48(S)	Avail
A01B	LG03	121/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	0.5C(S)	Avail
A01B	LG03	122/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	0.5E(S)	Avail
A01B	LG03	123/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX	0.72(S)	Avail
A01B	LG04	130/ J00J01	06/ DA/ J.01	OSA-E3 GbE SX	0.11(S)	Avail
A01B	LG04	131/ J02J03	06/ DA/ J.01	OSA-E3 GbE SX	0.13(S)	Avail
A01B	LG06	140/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.4D	Avail
A01B	LG06	141/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	0.5D(S)	Avail
A01B	LG06	142/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	0.67(S)	Avail
A01B	LG06	143/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX	0.7B(S)	Avail

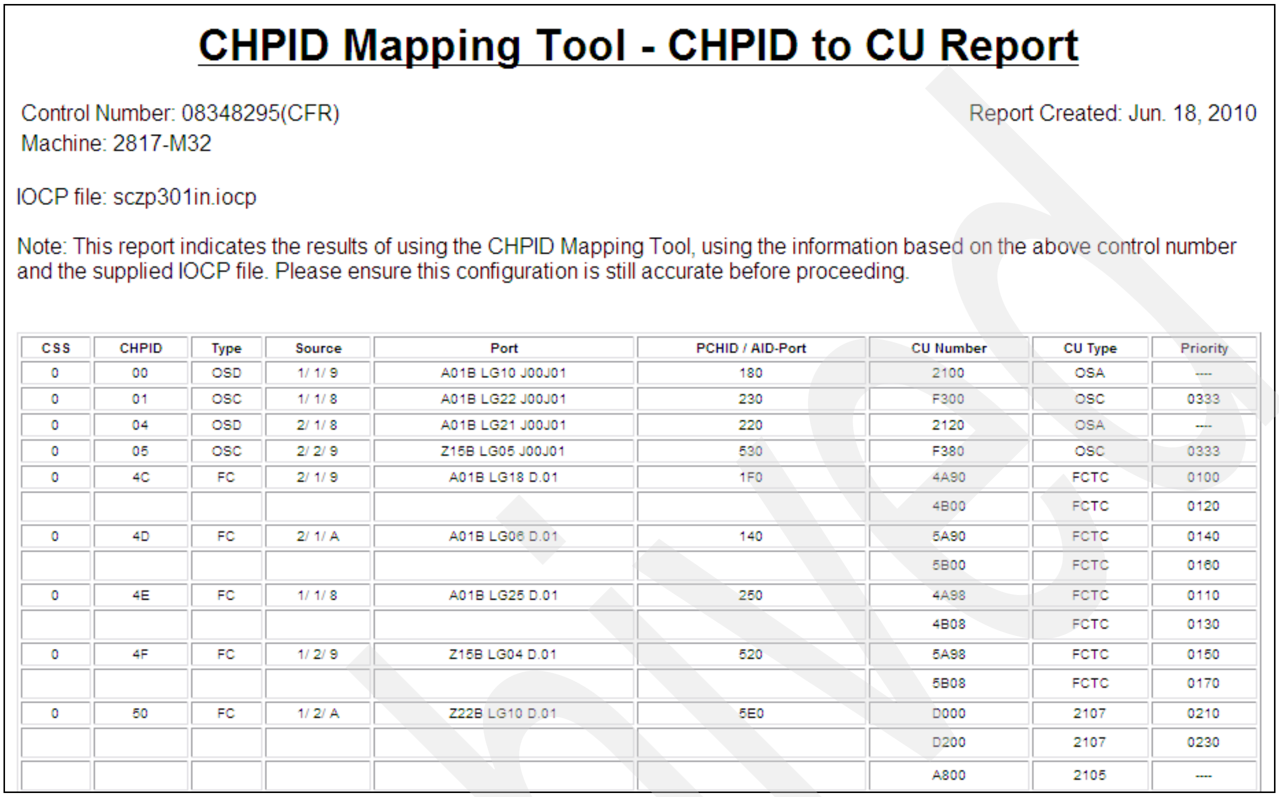
Figure 6-31 CHPID to Port Report

CHPID to Control Unit Report

To create the CHPID to Control Unit Report, perform the following steps:

1. Select **Reports** → **CHPID to Control Unit Report**, and then click **Save** (assuming that you accept the CHPID Mapping Tool report name).

2. The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report (Figure 6-32). You might be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 18, 2010

IOCP file: sczp301in.iocp

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the supplied IOCP file. Please ensure this configuration is still accurate before proceeding.

CSS	CHPID	Type	Source	Port	PCHID / AID-Port	CU Number	CU Type	Priority
0	00	OSD	1/ 1/ 9	A01B LG10 J00J01	180	2100	OSA	----
0	01	OSC	1/ 1/ 8	A01B LG22 J00J01	230	F300	OSC	0333
0	04	OSD	2/ 1/ 8	A01B LG21 J00J01	220	2120	OSA	----
0	05	OSC	2/ 2/ 9	Z15B LG05 J00J01	530	F380	OSC	0333
0	4C	FC	2/ 1/ 9	A01B LG18 D.01	1F0	4A90	FCTC	0100
						4B00	FCTC	0120
0	4D	FC	2/ 1/ A	A01B LG06 D.01	140	5A90	FCTC	0140
						5B00	FCTC	0160
0	4E	FC	1/ 1/ 8	A01B LG25 D.01	250	4A98	FCTC	0110
						4B08	FCTC	0130
0	4F	FC	1/ 2/ 9	Z15B LG04 D.01	520	5A98	FCTC	0150
						5B08	FCTC	0170
0	50	FC	1/ 2/ A	Z22B LG10 D.01	5E0	D000	2107	0210
						D200	2107	0230
						A800	2105	----

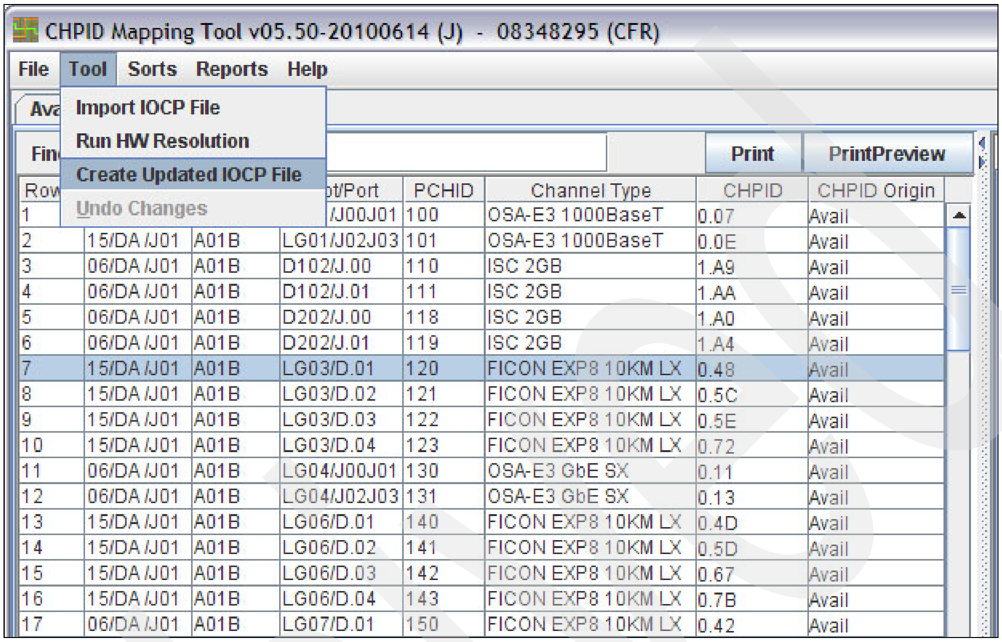
Figure 6-32 CHPID to CU Report

6.4.7 Creating an updated IOCP

Note: You might prefer to use HCM to transfer the updated IOCP statements file back to the host. Before doing so, however, first use the CHPID Mapping Tool to create the updated IOCP file.

Create an IOCP statements file for input back into the IODF by HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs. You can accomplish this task by performing the following steps:

1. Select **Tool** → **Create Updated IOCP File** (Figure 6-33).

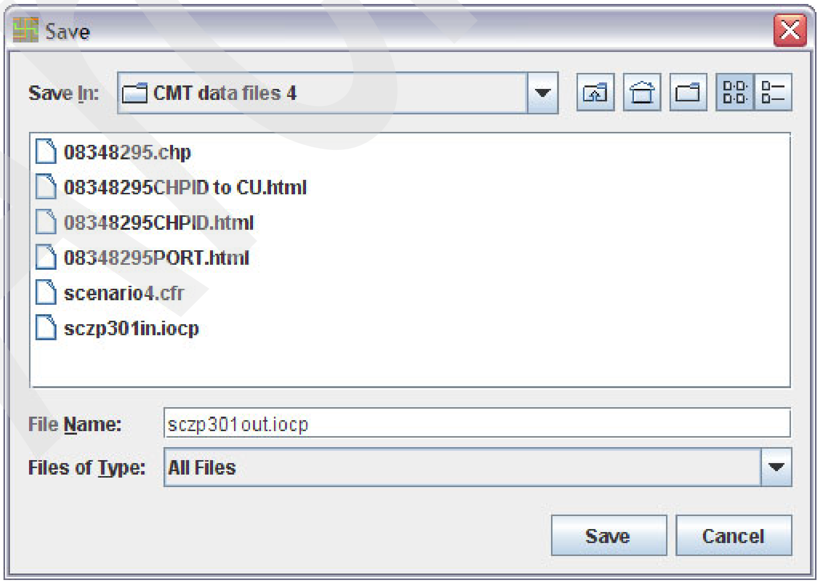


Row			ot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1			/J00J01	100	OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.42	Avail

Figure 6-33 Create Updated IOCP file

2. Enter the file name and location for the IOCP output file and click **Save** (Figure 6-34).

> **Note:** This file must be uploaded to the z/OS image on which you have the work IODF used previously to create the IOCP input data set.



Save In: CMT data files 4

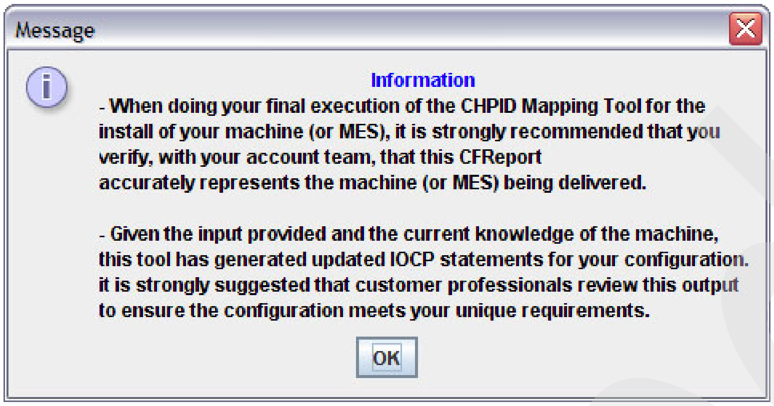
08348295.chp
08348295CHPID to CU.html
08348295CHPID.html
08348295PORT.html
scenario4.cfr
sczp301in.iocp

File Name: sczp301out.iocp

Files of Type: All Files

Figure 6-34 Save IOCP output file

3. The CHPID Mapping Tool displays an informational message regarding what to do for the final execution of the tool (Figure 6-35).



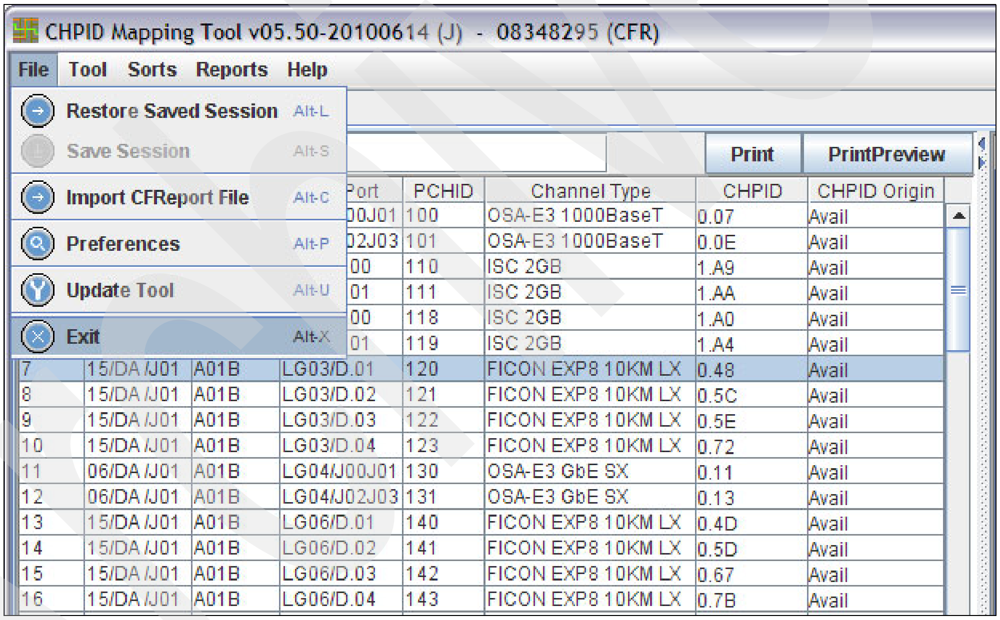
Information

- When doing your final execution of the CHPID Mapping Tool for the install of your machine (or MES), it is strongly recommended that you verify, with your account team, that this CFReport accurately represents the machine (or MES) being delivered.

- Given the input provided and the current knowledge of the machine, this tool has generated updated IOCP statements for your configuration. it is strongly suggested that customer professionals review this output to ensure the configuration meets your unique requirements.

Figure 6-35 Informational message

4. The CHPID Mapping Tool program can be shut down now. Select **File** → **Exit** (Figure 6-36).



			Port	PCHID	Channel Type	CHPID	CHPID Origin
			00J01	100	OSA-E3 1000BaseT	0.07	Avail
			02J03	101	OSA-E3 1000BaseT	0.0E	Avail
			00	110	ISC 2GB	1.A9	Avail
			01	111	ISC 2GB	1.AA	Avail
			00	118	ISC 2GB	1.A0	Avail
			01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail

Figure 6-36 Exit program

6.5 HCD: Updating the 2817 work IODF with PCHIDs

After mapping the PCHIDs to CHPIDs using the CHPID Mapping Tool, this information needs to be transferred back in HCD by performing the following steps:

1. Upload the IOCP file created by the CMT (`sczp301out.iocp`, in our example) to the z/OS image. Use a file transfer facility, such as the one in IBM Personal Communications or an equivalent FTP program. Be sure to use TEXT as the transfer type.

   Looking at the updated IOCP statements file, note that the CMT has left a reference to the CCN. Also note the CU Priority values added for the OSC control units.

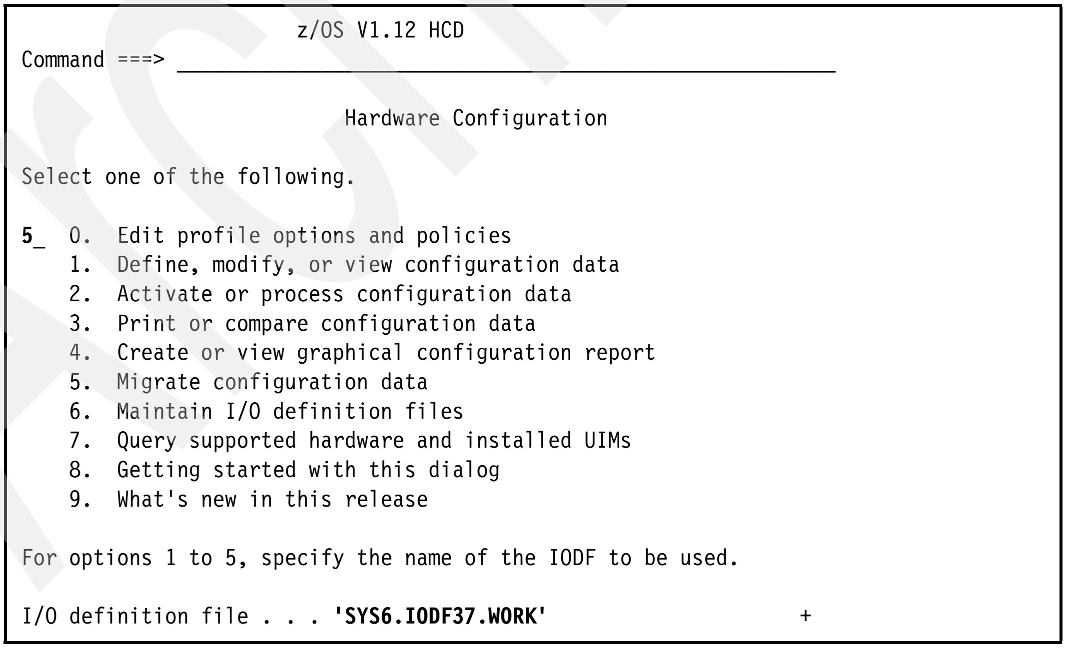
Note: Control unit priorities are stored in the IOCP output file created by the CHPID Mapping Tool that is migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck. They are in the form of commented lines at the end of the IOCP deck (Example 6-2).

Example 6-2 Updated IOCP statements file (with CMT statements)

```
IODEVICE ADDRESS=(FF74,007),CUNUMBR=(FFEF),UNIT=CFP
         CNTLUNIT CUNUMBR=FFF8,PATH=((CSS(1),A2,A3)),UNIT=STP
         CNTLUNIT CUNUMBR=FFFA,PATH=((CSS(1),A0,A1)),UNIT=STP
*CMT* VERSION=000
*CMT* CCN=08348295(CFR)
*CMT* 4A90.0=0100,4A98.0=0110,4B00.0=0120,4B08.0=0130,5A90.0=0140
*CMT* 5A98.0=0150,5B00.0=0160,5B08.0=0170,D000.0=0210,D000.1=0210
*CMT* D000.2=0210,D000.3=0210,D100.0=0220,D100.1=0220,D100.2=0220
*CMT* D100.3=0220,D200.0=0230,D200.1=0230,D200.2=0230,D200.3=0230
*CMT* D300.0=0230,D300.1=0240,D300.2=0240,D300.3=0240,F300.0=0333
*CMT* F380.0=0333
******************************* Bottom of Data ************************
```

Important: The CMT comments contained in the IOCP output file should not be edited manually. If priorities need to be changed, it should always be done within the CHPID Mapping Tool.

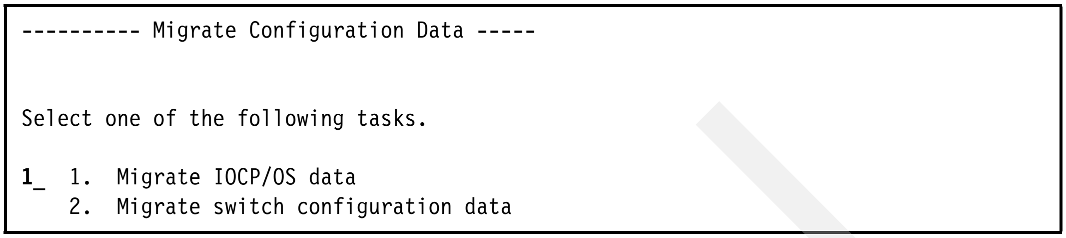
2. On the HCD main menu, enter the work IODF name that you used to create the IOCP input data set for the CHPID Mapping Tool. Select Option 5. Migrate configuration data (Figure 6-37).



```
                       z/OS V1.12 HCD
Command ===> _______________________________________________________

                           Hardware Configuration

Select one of the following.

5_  0.  Edit profile options and policies
    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 . . . 'SYS6.IODF37.WORK'                    +
```

Figure 6-37 Main menu: Select Migrate configuration data

3. The Migrate Configuration Data panel opens (Figure 6-38). Select Option 1. Migrate IOCP/OS data and press Enter.

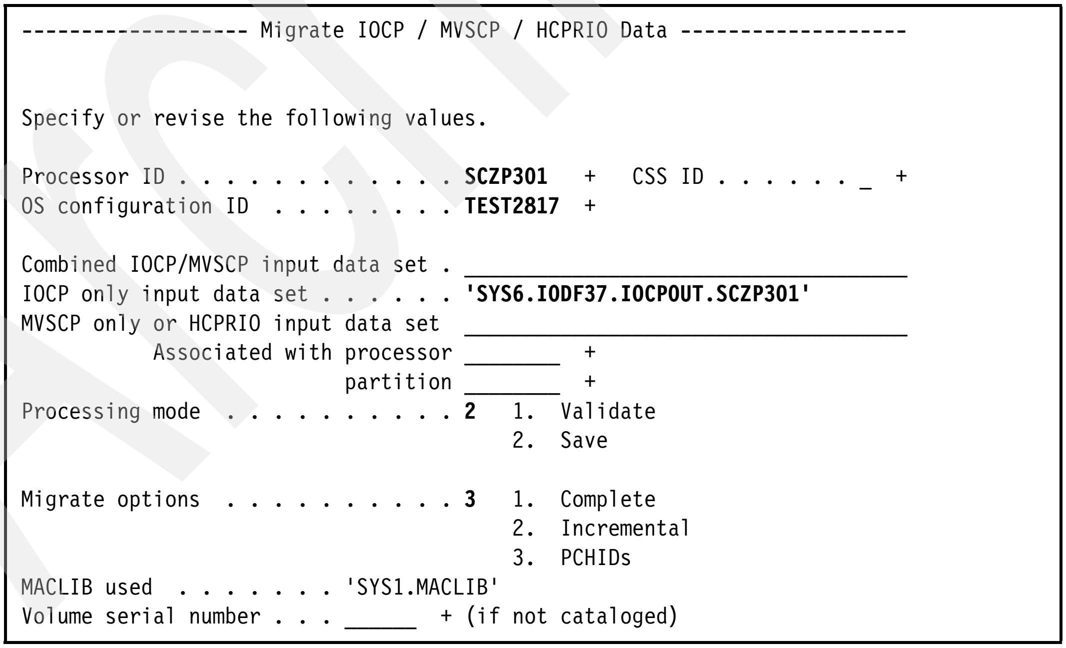


```
---------- Migrate Configuration Data -----


Select one of the following tasks.

1_  1.  Migrate IOCP/OS data
    2.  Migrate switch configuration data
```

Figure 6-38 Migrate Configuration Data

4. HCD opens the Migrate IOCP Data panel. Complete the following fields and then press Enter:

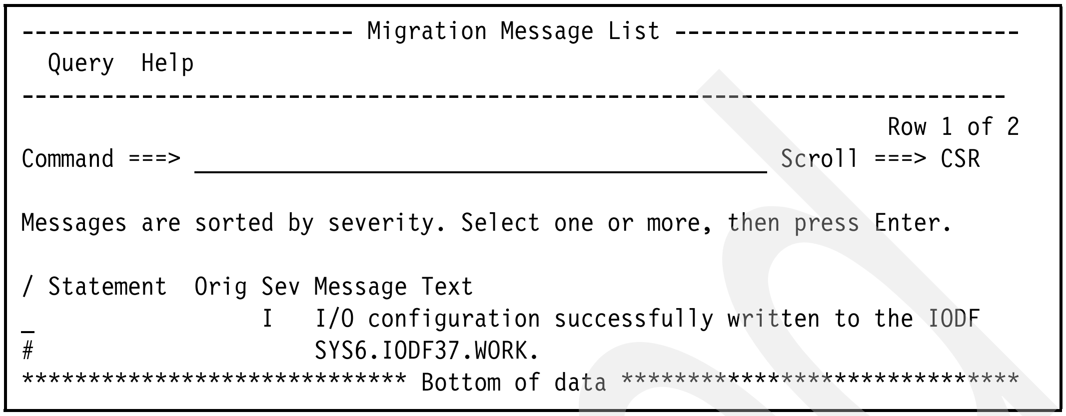
Processor ID	Use the same ID used to create the IOCP input deck.
OS configuration ID	This configuration is the OS configuration associated with the processor.
IOCP only input data set	This is the data set name specified when the `iocpout.txt` file was uploaded to z/OS (see 6.5, “HCD: Updating the 2817 work IODF with PCHIDs” on page 326).
Processing mode	Select Option 2 to save the results of the migration. (Prior to using Option 2, try to migrate using Option 1 to validate the operation.
Migrate options	Select Option 3 for PCHIDS. Only the PCHIDs are migrated into the work IODF.



```
------------------- Migrate IOCP / MVSCP / HCPRIO Data -------------------



Specify or revise the following values.

Processor ID . . . . . . . . . . . . SCZP301   +   CSS ID . . . . . . _  +
OS configuration ID  . . . . . . . . TEST2817  +

Combined IOCP/MVSCP input data set . _____________________________________
IOCP only input data set . . . . . . 'SYS6.IODF37.IOCPOUT.SCZP301'
MVSCP only or HCPRIO input data set  _____________________________________
           Associated with processor ________  +
                           partition ________  +
Processing mode  . . . . . . . . . . 2   1.  Validate
                                         2.  Save

Migrate options  . . . . . . . . . . 3   1.  Complete
                                         2.  Incremental
                                         3.  PCHIDs
MACLIB used  . . . . . . . 'SYS1.MACLIB'
Volume serial number . . . ______  + (if not cataloged)
```

Figure 6-39 Migrate IOCP / MVSCP / HCPRIO Data

5. HCD displays any errors or warning messages as a result of the migration action. In our example, we did not receive any messages other than the one indicating that the migration was successful (Figure 6-40).



```
------------------------- Migration Message List --------------------------
  Query  Help
--------------------------------------------------------------------------
                                                                Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Statement  Orig Sev Message Text
_                 I   I/O configuration successfully written to the IODF
#                     SYS6.IODF37.WORK.
***************************** Bottom of data ******************************
```

Figure 6-40 Migration Message List

This is the message that you should get. At this point, the work IODF contains both the CHPID definitions and the mapping to PCHIDs that was done using the CHPID Mapping Tool.

6. Press PF3 and you should receive the following message:

```
IOCP/Operating system deck migration processing complete, return code = 0.
```

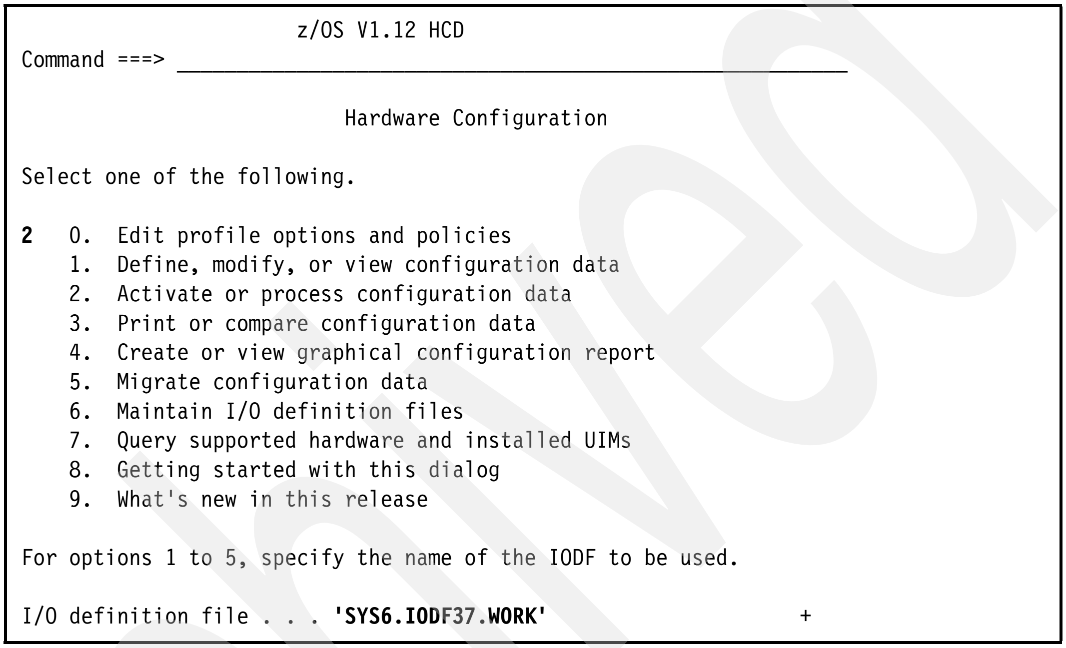
7. Press PF3 again.

6.6 HCD: Building the 2817 production IODF

To make use of the definitions that were updated in HCD, we must create a production IODF from the work IODF.

Perform the following steps:

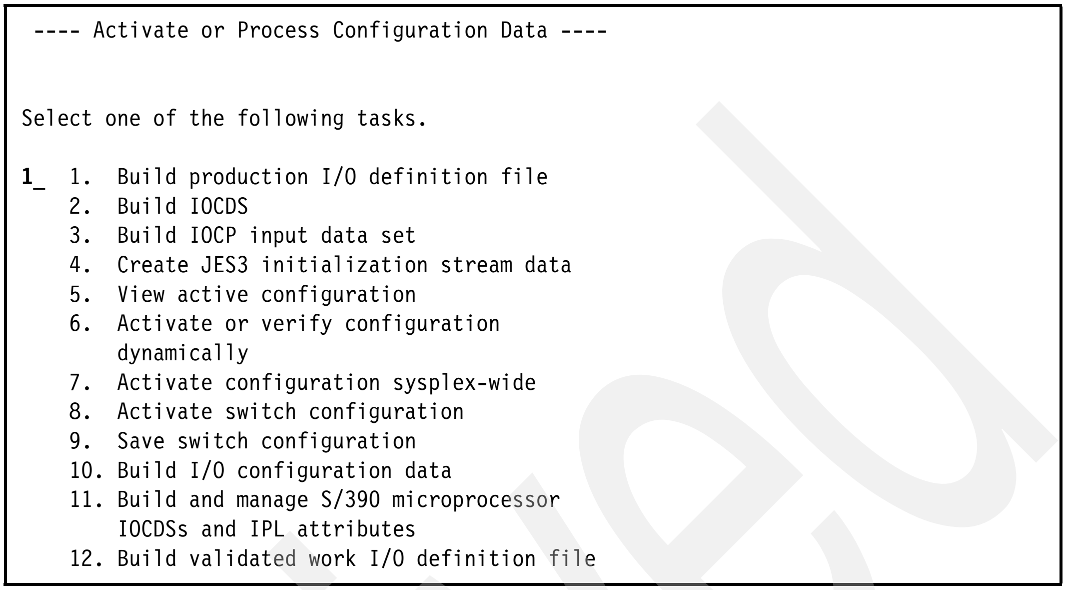
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 6-41).



```
                       z/OS V1.12 HCD
Command ===> ________________________________________________________

                           Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF37.WORK'                     +
```

Figure 6-41 Main menu: Select Activate or process configuration data

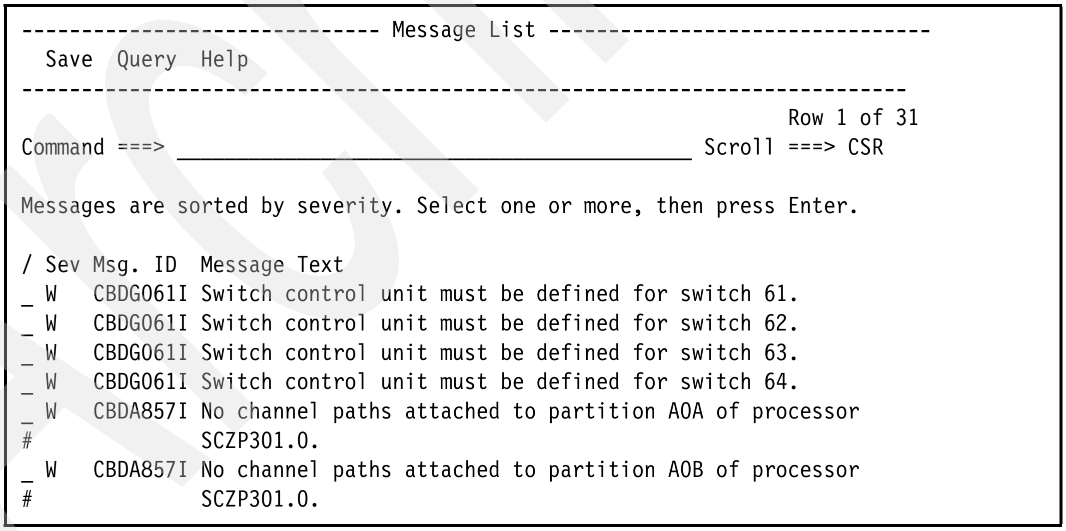
2. The Activate or Process Configuration Data panel opens (Figure 6-42). Select Option 1. Build production I/O definition file and press Enter.



```
 ---- Activate or Process Configuration Data ----


Select one of the following tasks.

1_  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

Figure 6-42 Activate or Process Configuration Data: Select Build production IODF

3. The Message List panel opens (Figure 6-43). Verify that you have only Severity W warning messages, and that they are normal for your configuration. Correct any messages that should not occur and try to build the production IODF again. Continue this process until you have no messages that indicate problems.



```
------------------------------ Message List --------------------------------
  Save  Query  Help
---------------------------------------------------------------------------
                                                                Row 1 of 31
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ W   CBDG061I Switch control unit must be defined for switch 61.
_ W   CBDG061I Switch control unit must be defined for switch 62.
_ W   CBDG061I Switch control unit must be defined for switch 63.
_ W   CBDG061I Switch control unit must be defined for switch 64.
_ W   CBDA857I No channel paths attached to partition A0A of processor
#              SCZP301.0.
_ W   CBDA857I No channel paths attached to partition A0B of processor
#              SCZP301.0.
```

Figure 6-43 Message List (building Production IODF)

4. Press PF3 to continue.

5. The Build Production I/O Definition File panel opens (Figure 6-44). Complete the `Production IODF name` and `Volume serial number` fields and press Enter.

```
------------- Build Production I/O Definition File ---------


Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS6.IODF37.WORK'

Production IODF name . 'SYS6.IODF37'_______________________
Volume serial number . IODFPK  +

Continue using as current IODF:
2   1.  The work IODF in use at present
    2.  The new production IODF specified above
```

Figure 6-44 Build Production I/O Definition File

6. The Define Descriptor Fields panel opens (Figure 6-45). Press Enter to accept the descriptor fields selected by HCD, or enter different values and then press Enter.

```
------------------- Define Descriptor Fields ---------


Specify or revise the following values.

Production IODF name  . : 'SYS6.IODF37'

Descriptor field 1  . . . SYS6
Descriptor field 2  . . . IODF37
```

Figure 6-45 Define Descriptor Fields

7. HCD displays the following message, indicating that the production IODF was successfully created:

   `Production IODF SYS6.IODF37 created.`

6.7 HCD/HMC: Loading the 2817 processor IOCDS

At this point, we have a production IODF called SYS6.IODF37. Now the IOCDS component of the IODF needs to be updated on the new CPC that is being installed (for example, SCZP301) and activated (POR) using this IOCDS. The final step is to power-on reset the processor using this IOCDS. Describing how to power-on reset the new hardware is beyond the scope of this book.

There are two possible ways to load the IOCP statements onto the 2817 Service Element IOCDS:

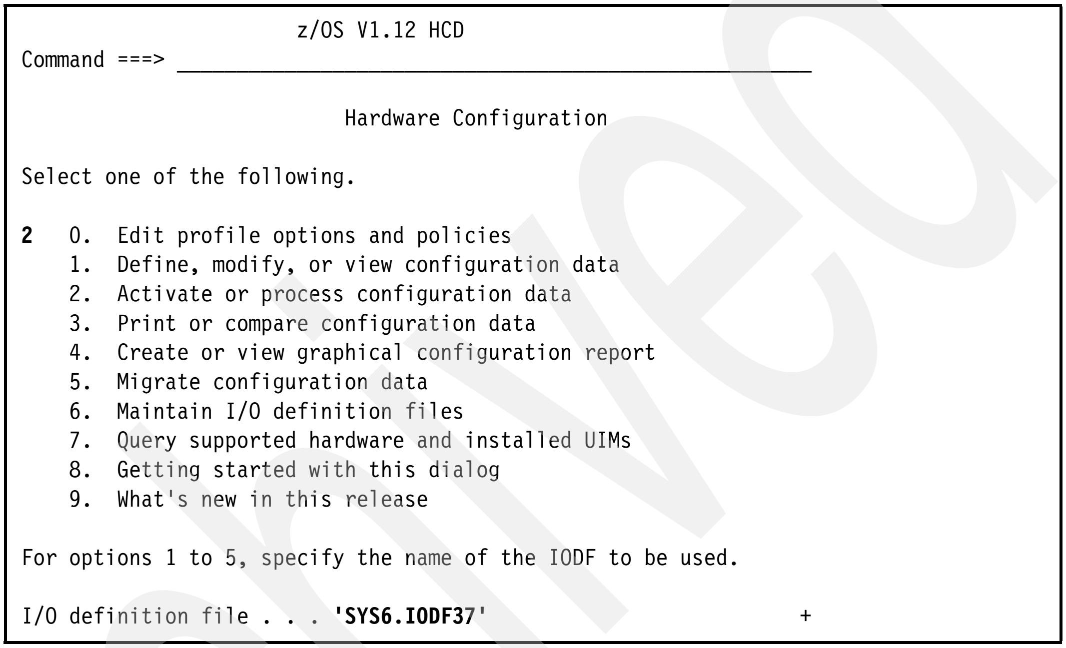
- HCD, using Option 2.11
- HMC/SE, using the Stand-Alone Input/Output Configuration Program

While both are valid methods to write the new configuration to the IOCDS, we recommend using HCD Option 2.11. However, your new 2817 processor and Service Element may not be connected to the system where the configuration was generated or cannot be connected to any system where HCD is running. In that case, you need to use the Stand-Alone IOCP process.

6.7.1 Updating the IOCDS using HCD Option 2.11

To update the IOCDS using HCD Option 2.11, perform the following steps:

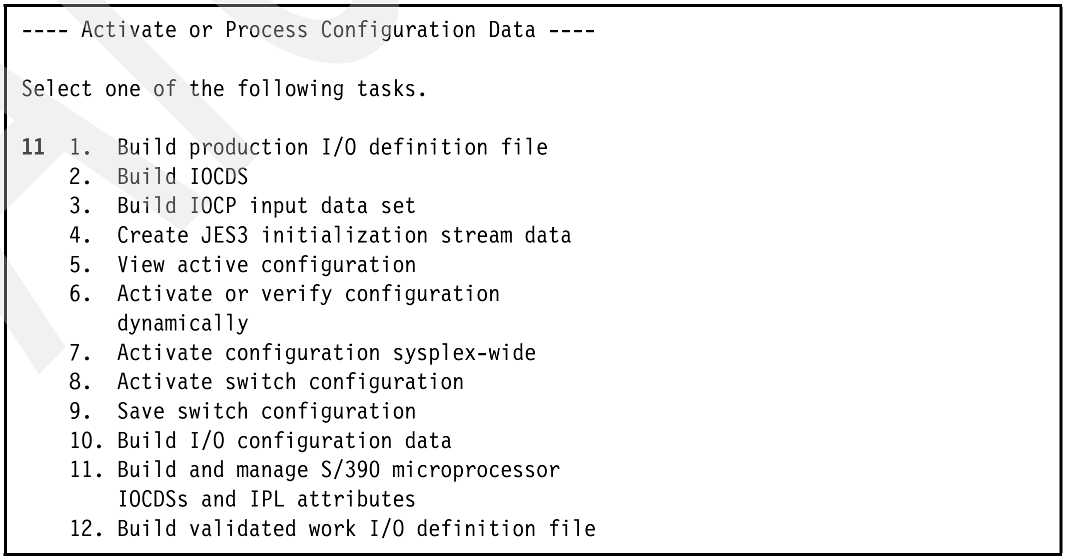
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 6-46). Ensure that the IODF is the production one created in 6.6, “HCD: Building the 2817 production IODF” on page 330. Press Enter.



```
                       z/OS V1.12 HCD
Command ===> _____________________________________________________

                           Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF37'                        +
```

Figure 6-46 Main menu: Select Activate or process configuration data

2. The Activate or Process Configuration Data panel opens (Figure 6-47). Select Option 11. Build and manage S/390 microprocessor IOCDSs and IPL attributes.



```
---- Activate or Process Configuration Data ----

Select one of the following tasks.

11  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

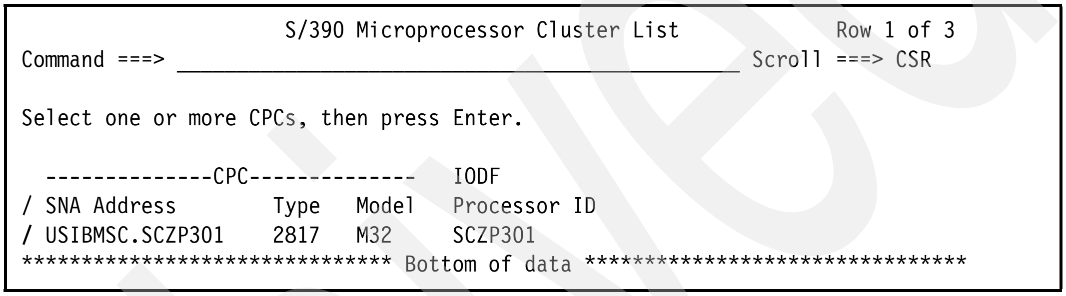
Figure 6-47 Activate or Process Configuration Data: Select Build IOCDSs

Note: In this example, we assume that we have connectivity to the new 2817 over the HMC LAN to create an IOCDS from which we power-on reset.

If the new 2817 is not accessible from the HMC LAN, we need to copy the IOCP statements onto a USB flash memory drive and import them on to the 2817 HMC to run a Stand-Alone IOCP. Creating a file on a USB flash memory drive can be done using the same process that is used to create an IOCP input file for the CHPID Mapping Tool.

Tip: The Support Element can now read an IOCP file that has been written to a USB flash memory drive.

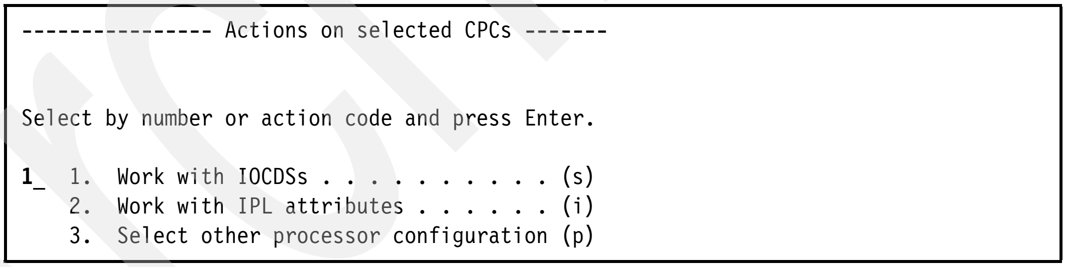
3. The S/390 Microprocessor Cluster List panel opens (Figure 6-48). Use a forward slash (/) to select the new 2817 from the list to update one of its IOCDSs. Press Enter.



```
                      S/390 Microprocessor Cluster List             Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address       Type   Model   Processor ID
/ USIBMSC.SCZP301    2817   M32     SCZP301
******************************* Bottom of data ********************************
```

Figure 6-48 S/390 Microprocessor Cluster List

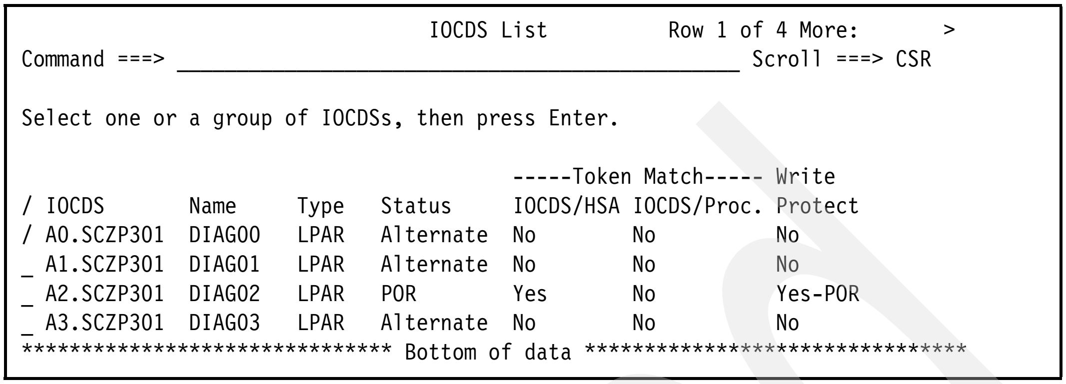
4. The Actions on selected CPCs panel opens (Figure 6-49). Select Option 1. Work with IOCDSs and press Enter.



```
---------------- Actions on selected CPCs -------


Select by number or action code and press Enter.

1_  1.  Work with IOCDSs . . . . . . . . . . (s)
    2.  Work with IPL attributes . . . . . . (i)
    3.  Select other processor configuration (p)
```

Figure 6-49 Actions on selected CPCs, Work with IOCDSs

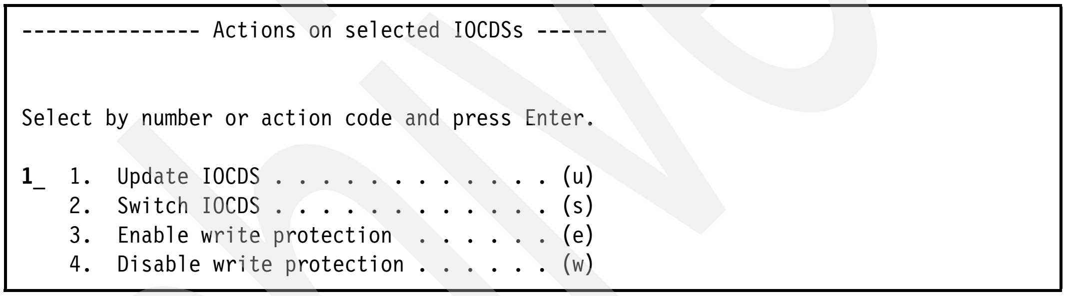
5. The IOCDS List panel opens (Figure 6-50). Select the IOCDS that you want to update for the 2817 install by typing a slash (/) and then press Enter.



```
                                  IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                         -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
/ A0.SCZP301  DIAG00   LPAR   Alternate  No        No          No
_ A1.SCZP301  DIAG01   LPAR   Alternate  No        No          No
_ A2.SCZP301  DIAG02   LPAR   POR        Yes       No          Yes-POR
_ A3.SCZP301  DIAG03   LPAR   Alternate  No        No          No
****************************** Bottom of data *******************************
```

Figure 6-50   IOCDS List

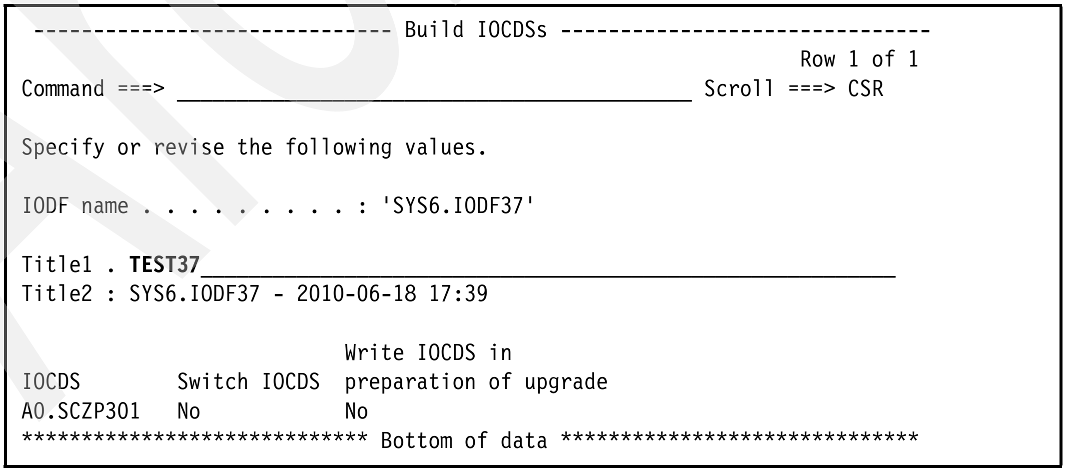
6. The Actions on selected IOCDSs panel opens (Figure 6-51). Select Option 1. Update IOCDS and press Enter.



```
--------------- Actions on selected IOCDSs ------


Select by number or action code and press Enter.

1_  1.  Update IOCDS . . . . . . . . . . . . (u)
    2.  Switch IOCDS . . . . . . . . . . . . (s)
    3.  Enable write protection  . . . . . . (e)
    4.  Disable write protection . . . . . . (w)
```

Figure 6-51   Actions on selected IOCDSs

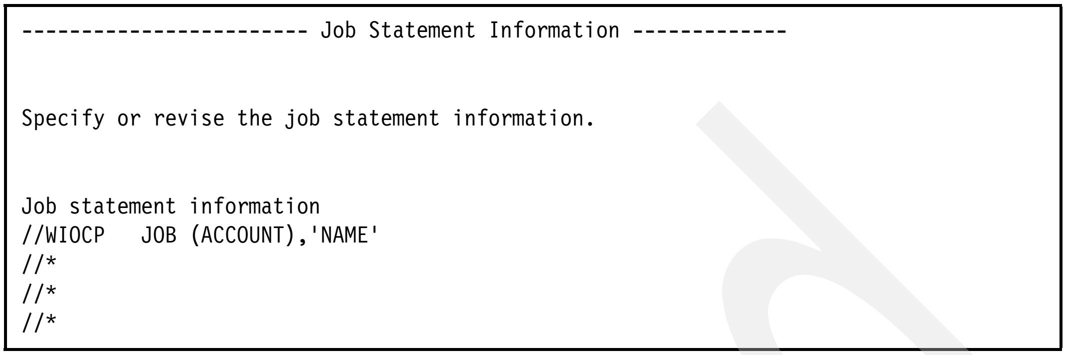
7. The Build IOCDSs panel opens (Figure 6-52). Verify that all the information is correct. Complete the `Title1` field and press Enter.



```
 ------------------------------ Build IOCDSs ------------------------------
                                                                Row 1 of 1
Command ===> ___________________________________________ Scroll ===> CSR

Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF37'

Title1 . TEST37__________________________________________________________
Title2 : SYS6.IODF37 - 2010-06-18 17:39

                           Write IOCDS in
IOCDS        Switch IOCDS  preparation of upgrade
A0.SCZP301   No            No
***************************** Bottom of data *****************************
```

Figure 6-52   Build IOCDSs

8. The Job Statement Information panel opens (Figure 6-53). Enter the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.



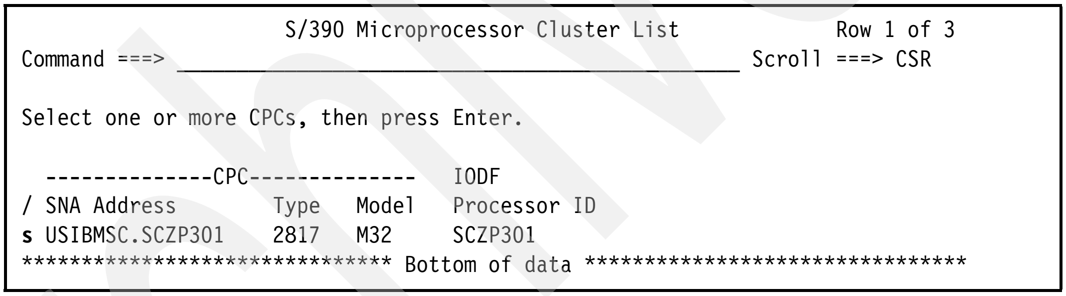
```
------------------------ Job Statement Information -------------


Specify or revise the job statement information.


Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
//*
```

Figure 6-53 Job Statement Information

9. Verify the job output to ensure that the IOCDS was written without error and to the correct IOCDS. You should receive a message like the following one:

   `ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A0 IOCDS REPLACED.`

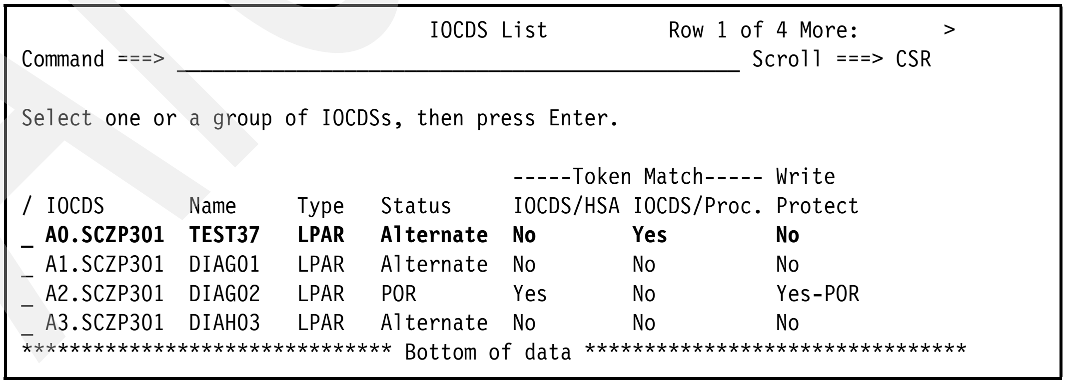
   If you return to HCD Option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP301` (Figure 6-54).



```
                      S/390 Microprocessor Cluster List            Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
s USIBMSC.SCZP301    2817   M32     SCZP301
******************************* Bottom of data ********************************
```

Figure 6-54 IOCDS with replacement IODF

Figure 6-55 shows the Alternate status.



```
                                  IOCDS List          Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                         -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP301  TEST37   LPAR   Alternate  No        Yes         No
_ A1.SCZP301  DIAG01   LPAR   Alternate  No        No          No
_ A2.SCZP301  DIAG02   LPAR   POR        Yes       No          Yes-POR
_ A3.SCZP301  DIAH03   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 6-55 IOCDS showing Alternate status

6.7.2 Updating the IOCDS using the Stand-Alone Input/Output Config Program

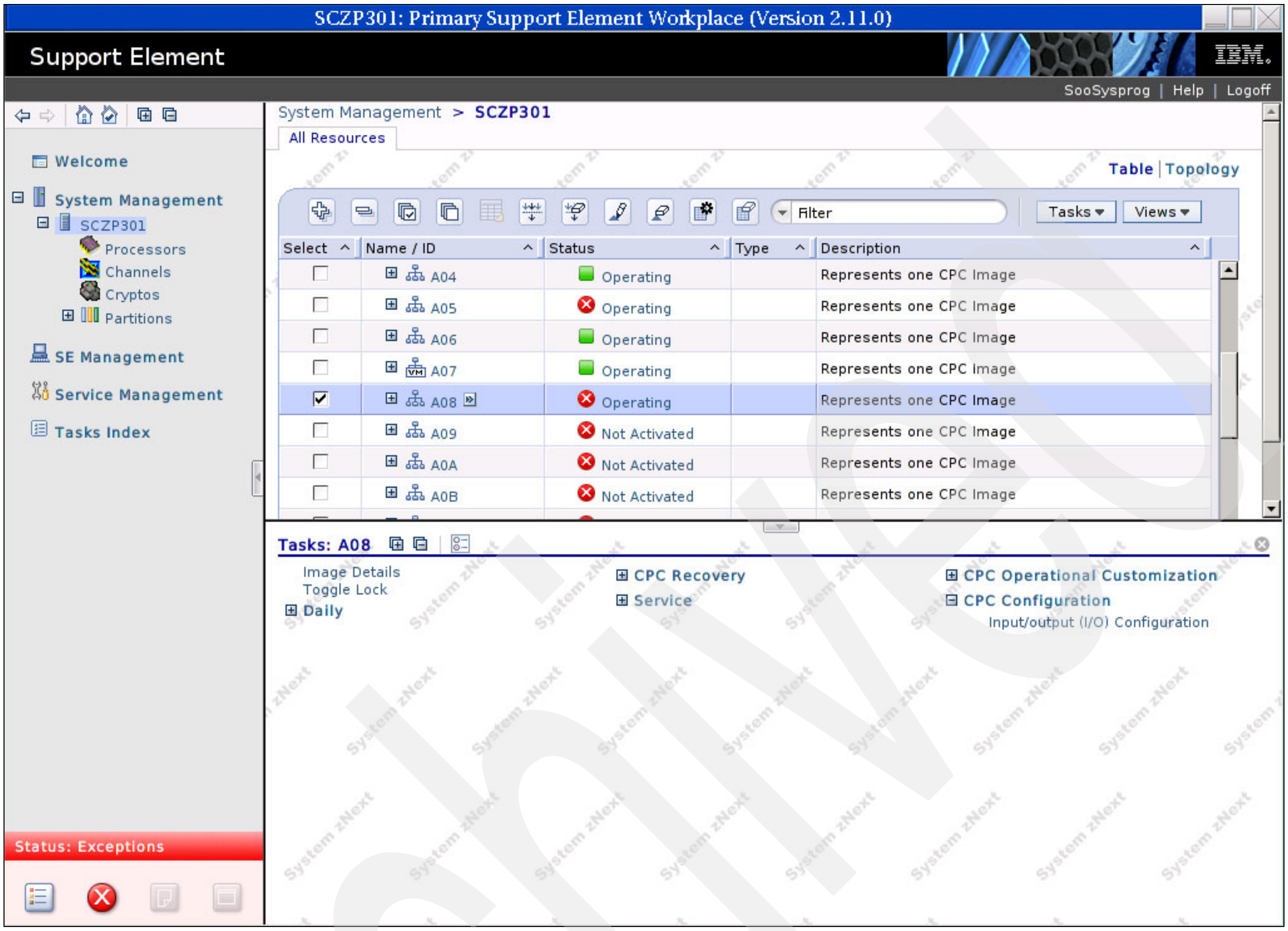
> **Note:** Refer to the *Stand-Alone Input/Output Configuration Program User's Guide*, SB10-7152 for detailed information about the following steps.

Copy the IOCP statements that were generated using HCD Option 2.3. Build IOCP input data set onto a USB flash memory drive and retain it.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817, as opposed to a remote web browser, and select the new 2817, assuming it has been defined to the Defined CPCs Work Area.
2. Perform a power-on reset using one of the Reset profiles and Starter IOCDSs provided on the processor during installation. This POR creates an environment on the processor that allows you to run the Stand-Alone IOCP process.
3. When the power-on reset is complete, activate one of the logical partitions with at least 128 MB of storage and use this partition to run the I/O Configuration Program.
4. Under Systems Management, click **Systems** to expand the list.
5. Under Systems, click the system to select it (in this example, SCZP301).
6. On the Tasks pad, select **Recovery** → **Single Object Operations** → **Yes**.
7. Under Systems Management, click the system to select it (in this example, SCZP301).

8. Under Partitions, check the LPAR you want to use to run the Stand-Alone IOCP program (in this example, A08) (Figure 6-56).

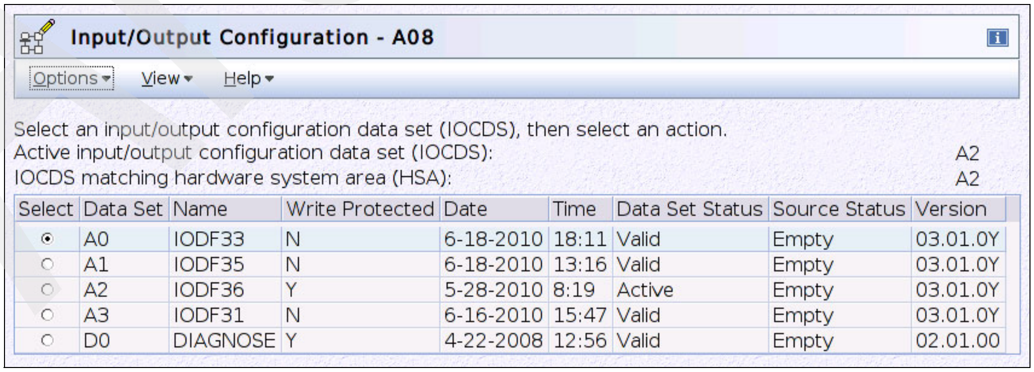


Select	Name / ID	Status	Type	Description
☐	A04	🟩 Operating		Represents one CPC Image
☐	A05	☒ Operating		Represents one CPC Image
☐	A06	🟩 Operating		Represents one CPC Image
☐	A07	🟩 Operating		Represents one CPC Image
☑	A08	☒ Operating		Represents one CPC Image
☐	A09	☒ Not Activated		Represents one CPC Image
☐	A0A	☒ Not Activated		Represents one CPC Image
☐	A0B	☒ Not Activated		Represents one CPC Image

Figure 6-56 Support Element partition selected for SAIOCP program load

9. On the Tasks tab, select **CPC Configuration** → **Input/output (I/O) Configuration**.

10. Click the radio button for the Data Set in which you want to load the IOCDS (in this example, A1) (Figure 6-57).

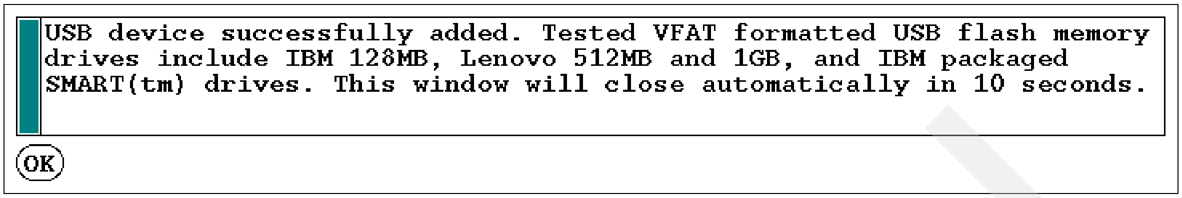


Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	IODF33	N	6-18-2010	18:11	Valid	Empty	03.01.0Y
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 6-57 SAIOCP IOCDS selection for build

11. Insert the USB flash memory drive that contains the IOCP text. Wait for the drive insertion message to be displayed (Figure 6-58).

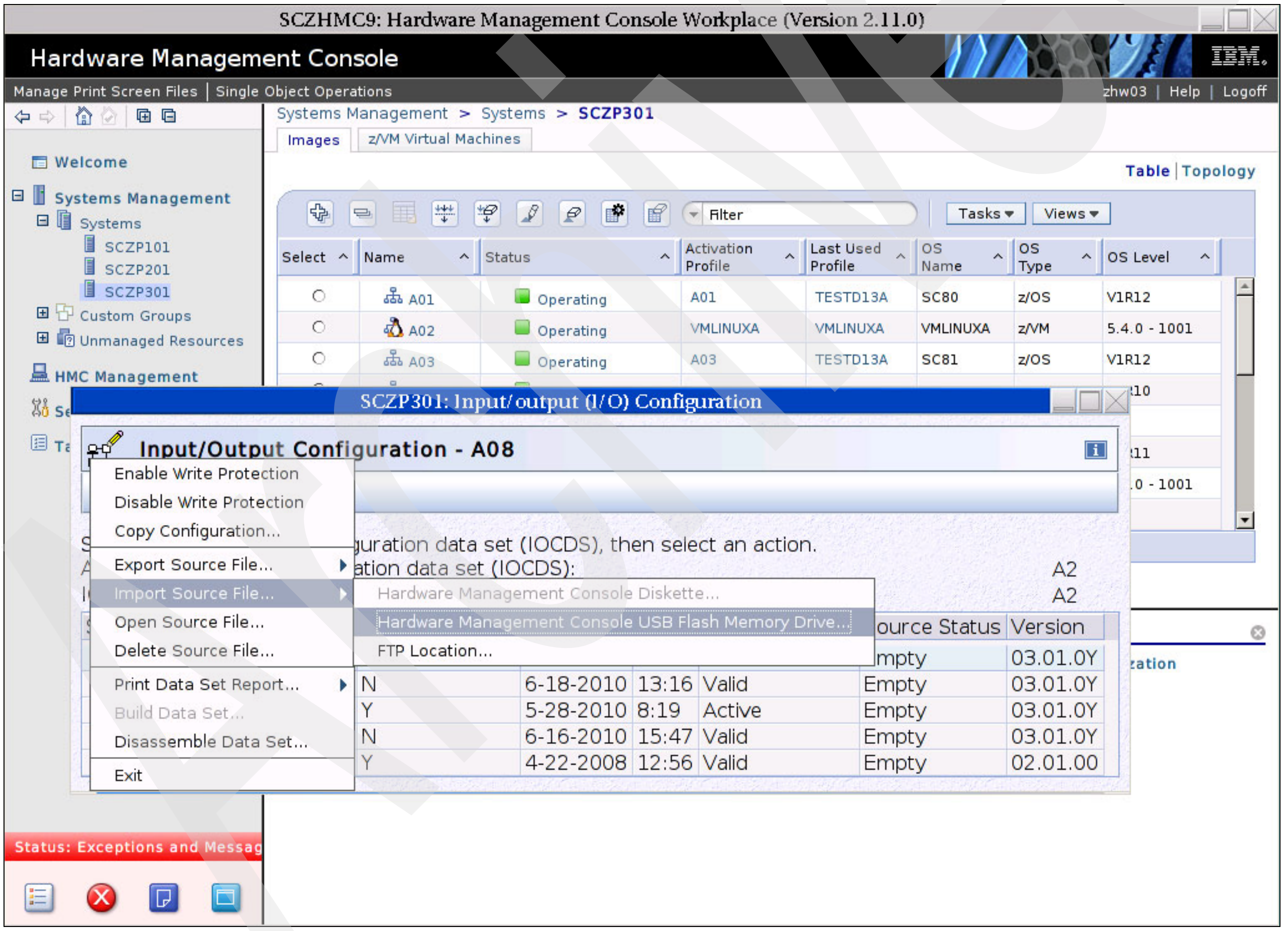


```
USB device successfully added. Tested VFAT formatted USB flash memory
drives include IBM 128MB, Lenovo 512MB and 1GB, and IBM packaged
SMART(tm) drives. This window will close automatically in 10 seconds.
```

Figure 6-58 SAIOCP USB drive insertion message

> **Tip:** Only files in the root directory of the USB Drive can be read by the HMC; any folders or their content will not be read.

12. Select **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive** (Figure 6-59).



Select	Name	Status	Activation Profile	Last Used Profile	OS Name	OS Type	OS Level
○	A01	Operating	A01	TESTD13A	SC80	z/OS	V1R12
○	A02	Operating	VMLINUXA	VMLINUXA	VMLINUXA	z/VM	5.4.0 - 1001
○	A03	Operating	A03	TESTD13A	SC81	z/OS	V1R12

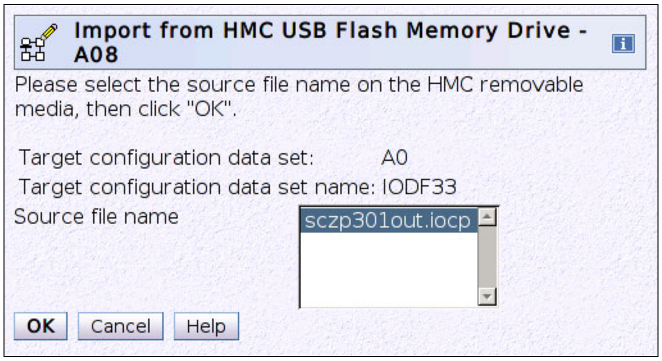
...uration data set (IOCDS), then select an action.

...ation data set (IOCDS): A2 A2

				Source Status	Version
				...mpty	03.01.0Y
N	6-18-2010	13:16	Valid	Empty	03.01.0Y
Y	5-28-2010	8:19	Active	Empty	03.01.0Y
N	6-16-2010	15:47	Valid	Empty	03.01.0Y
Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 6-59 SAIOCP Import Source File

13. Select the source file name and click **OK** (Figure 6-60).

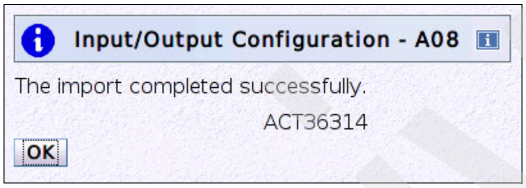


Please select the source file name on the HMC removable media, then click "OK".

Target configuration data set: A0
Target configuration data set name: IODF33
Source file name: sczp301out.iocp

Figure 6-60 SAIOCP Select source file

14. The source file is now read from the USB flash memory drive. Click **OK** (Figure 6-61).

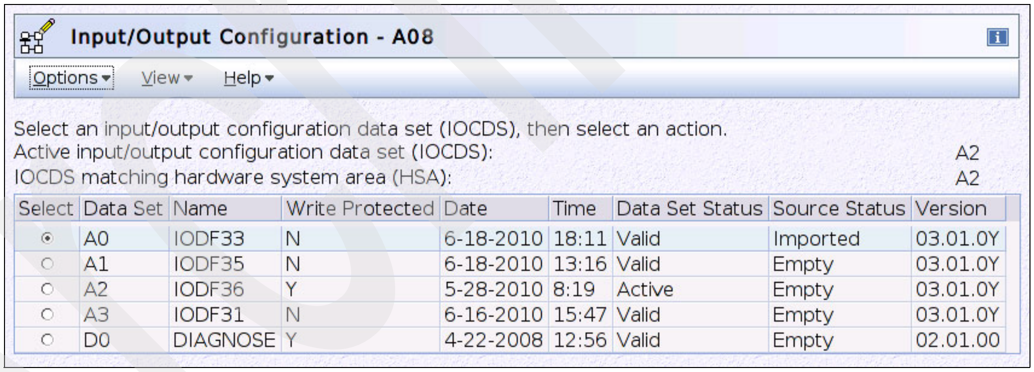


The import completed successfully.

ACT36314

Figure 6-61 SAIOCP Source file imported

15. .Note that the Source Status says Imported (Figure 6-62).

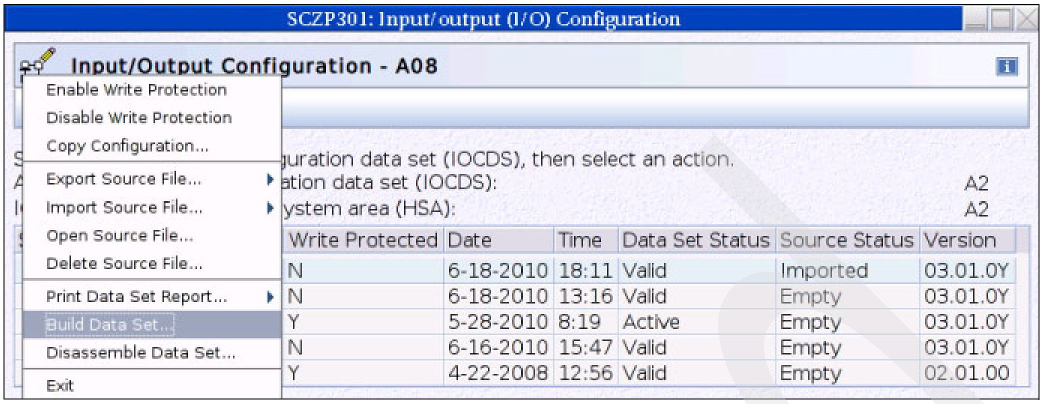


Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	IODF33	N	6-18-2010	18:11	Valid	Imported	03.01.0Y
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 6-62 SAIOCP IOCDS Source status changed to Imported

16. Select **Options** → **Build Data Set** (Figure 6-63).



juration data set (IOCDS), then select an action.

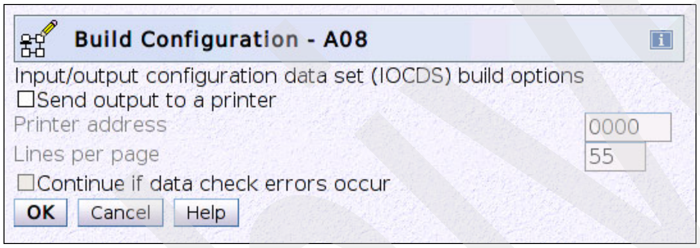
ation data set (IOCDS): A2

ystem area (HSA): A2

Write Protected	Date	Time	Data Set Status	Source Status	Version
N	6-18-2010	18:11	Valid	Imported	03.01.0Y
N	6-18-2010	13:16	Valid	Empty	03.01.0Y
Y	5-28-2010	8:19	Active	Empty	03.01.0Y
N	6-16-2010	15:47	Valid	Empty	03.01.0Y
Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 6-63 SAIOCP Building the IOCDS

17. Select your desired build options and click **OK** (Figure 6-64).



Input/output configuration data set (IOCDS) build options

☐ Send output to a printer

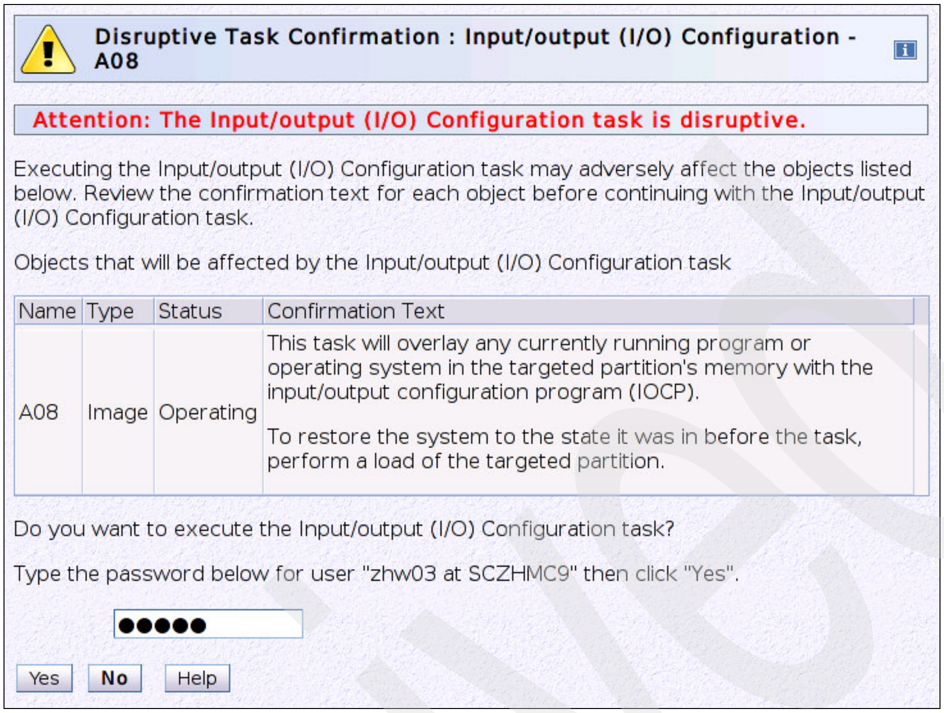
Printer address 0000

Lines per page 55

☐ Continue if data check errors occur

Figure 6-64 SAIOCP Build options

18. Note the Build warning message. Enter your HMC password, and click **Yes** (Figure 6-65).



Disruptive Task Confirmation : Input/output (I/O) Configuration - A08

Attention: The Input/output (I/O) Configuration task is disruptive.

Executing the Input/output (I/O) Configuration task may adversely affect the objects listed below. Review the confirmation text for each object before continuing with the Input/output (I/O) Configuration task.

Objects that will be affected by the Input/output (I/O) Configuration task

Name	Type	Status	Confirmation Text
A08	Image	Operating	This task will overlay any currently running program or operating system in the targeted partition's memory with the input/output configuration program (IOCP). To restore the system to the state it was in before the task, perform a load of the targeted partition.

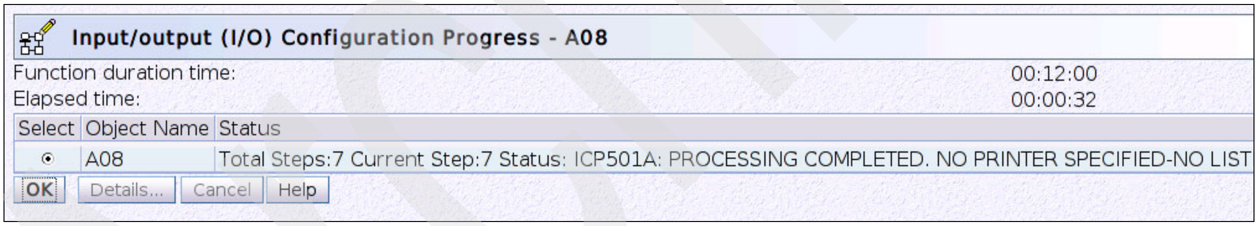
Do you want to execute the Input/output (I/O) Configuration task?

Type the password below for user "zhw03 at SCZHMC9" then click "Yes".

●●●●●

Figure 6-65 SAIOCP Build warning window

19. Status messages are displayed during the build process. After the build has completed successfully, the message shown in Figure 6-66 opens. Click **OK**.



Input/output (I/O) Configuration Progress - A08

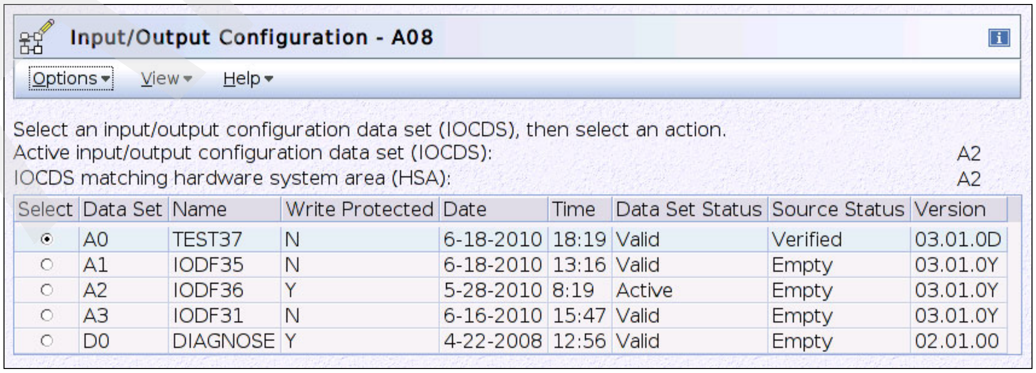
Function duration time: 00:12:00

Elapsed time: 00:00:32

Select	Object Name	Status
●	A08	Total Steps:7 Current Step:7 Status: ICP501A: PROCESSING COMPLETED. NO PRINTER SPECIFIED-NO LIST

Figure 6-66 SAIOCP build process status message

20. Note that the Source Status says Verified (Figure 6-67).



Input/Output Configuration - A08

Select an input/output configuration data set (IOCDS), then select an action.

Active input/output configuration data set (IOCDS): A2

IOCDS matching hardware system area (HSA): A2

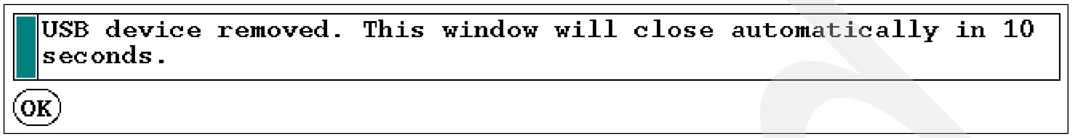
Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
●	A0	TEST37	N	6-18-2010	18:19	Valid	Verified	03.01.0D
○	A1	IODF35	N	6-18-2010	13:16	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 6-67 SAIOCP IOCDS Source status changed to Verified

21. Select **Options** → **Exit** to end the IOCDS build process and deactivate the LPAR if it is no longer required.

This IOCDS is now ready to be selected from a Reset Profile and the 2817 may be activated (power-on reset) with the Production IODF.

The USB flash memory drive may also now be removed. A drive remove message opens (Figure 6-68).



USB device removed. This window will close automatically in 10 seconds.

Figure 6-68 SAIOCP USB drive removal message

6.8 HMC: Steps for profile activation

In this section, we provide the steps that are needed to activate your profile.

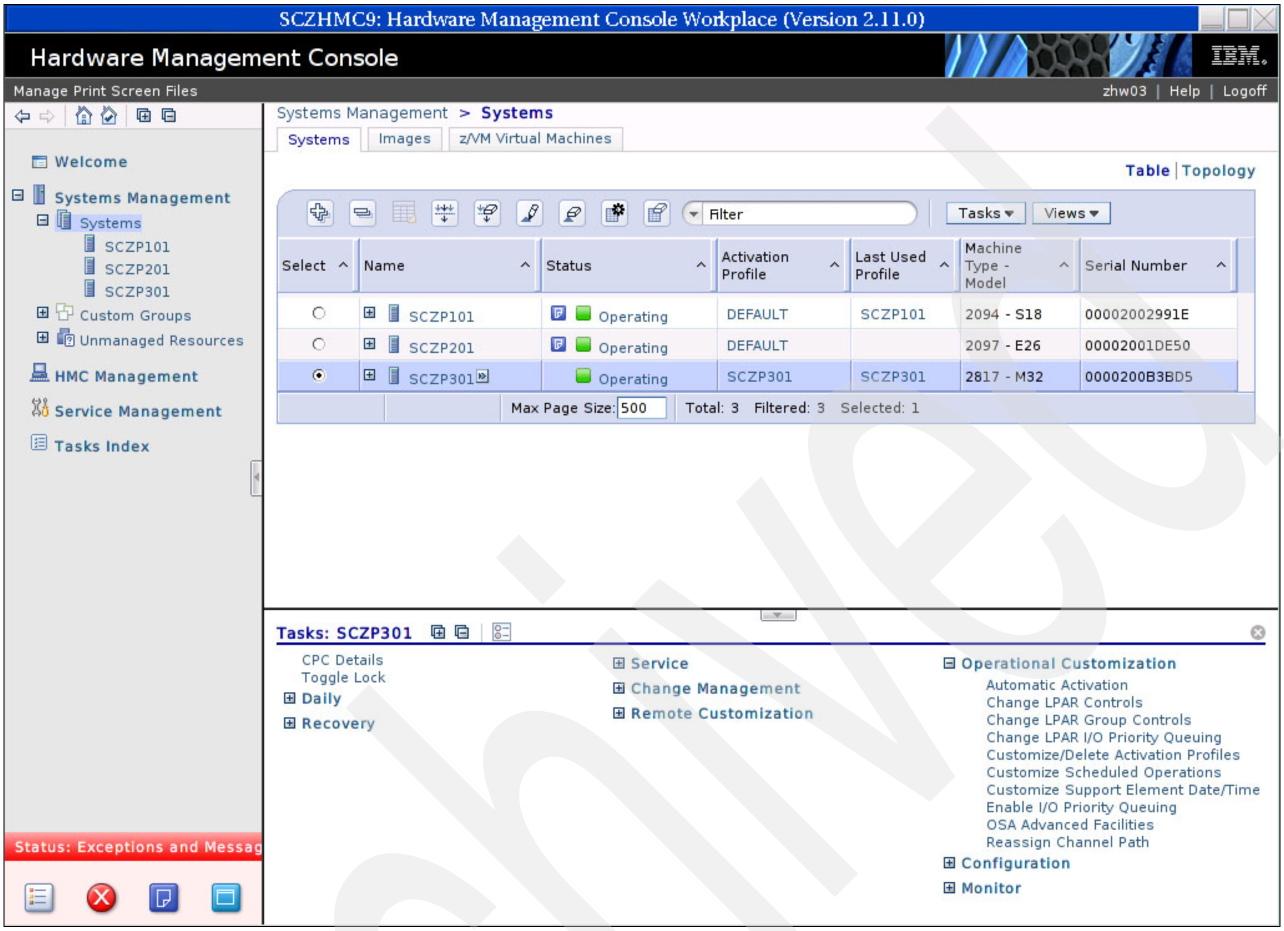
6.8.1 Building the Production Reset Profile and pointing it to the required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (power-on reset) Profile needs to be built to point to that IOCDS. This Reset Profile is used to power-on reset the new 2817 after it has been handed over from the IBM service representative.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817 or use a remote web browser and select the new 2817.
2. Under Systems Management, click **Systems** to expand the list.
3. Under Systems, click the system to select it (in this example, SCZP301).

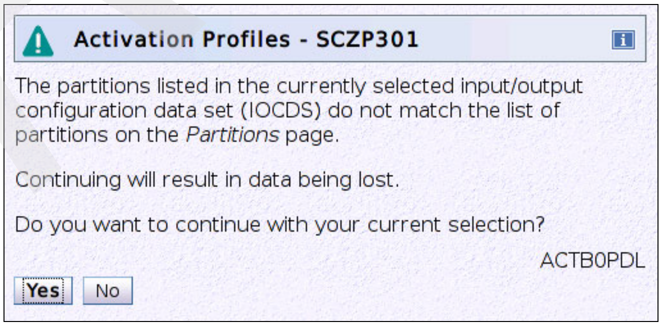
4. On the Tasks tab, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles** (Figure 6-69).



Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
○	SCZP201	Operating	DEFAULT		2097 - E26	00002001DE50
●	SCZP301	Operating	SCZP301	SCZP301	2817 - M32	0000200B3BD5

Figure 6-69 Customize Activation Profile

5. Select the DEFAULT Reset Profile and click **Customize profile**.
6. Save this DEFAULT profile with a new profile name to be referred to when the power-on reset is required (for example, TESTRESET).
7. Select the new profile and click **Customize profile**.
8. Click the IOCDS that you just updated. The ACTB0PDL message is displayed (Figure 6-70).



The partitions listed in the currently selected input/output configuration data set (IOCDS) do not match the list of partitions on the *Partitions* page.

Continuing will result in data being lost.

Do you want to continue with your current selection?

ACTB0PDL

Figure 6-70 Activation Profiles: ACTB0PDL message

9. Depending on the circumstances, you may want to click Yes or No because you want to review the Partition Activation List. In our example, we clicked **Yes**.

10. HMC retrieves any Image profiles that match the LPAR names defined in the IOCDS that was selected and gives us the option to create new Image profiles for ones that it could not retrieve. We selected the last option. Click **OK**. (Figure 6-71).

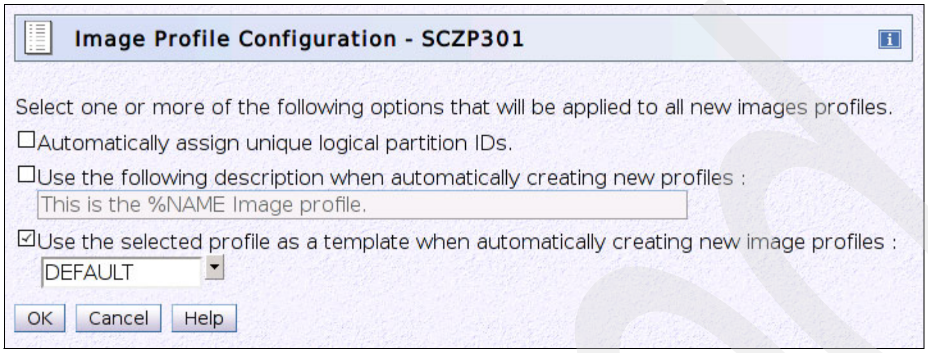


Image Profile Configuration - SCZP301

Select one or more of the following options that will be applied to all new images profiles.

☐ Automatically assign unique logical partition IDs.

☐ Use the following description when automatically creating new profiles :

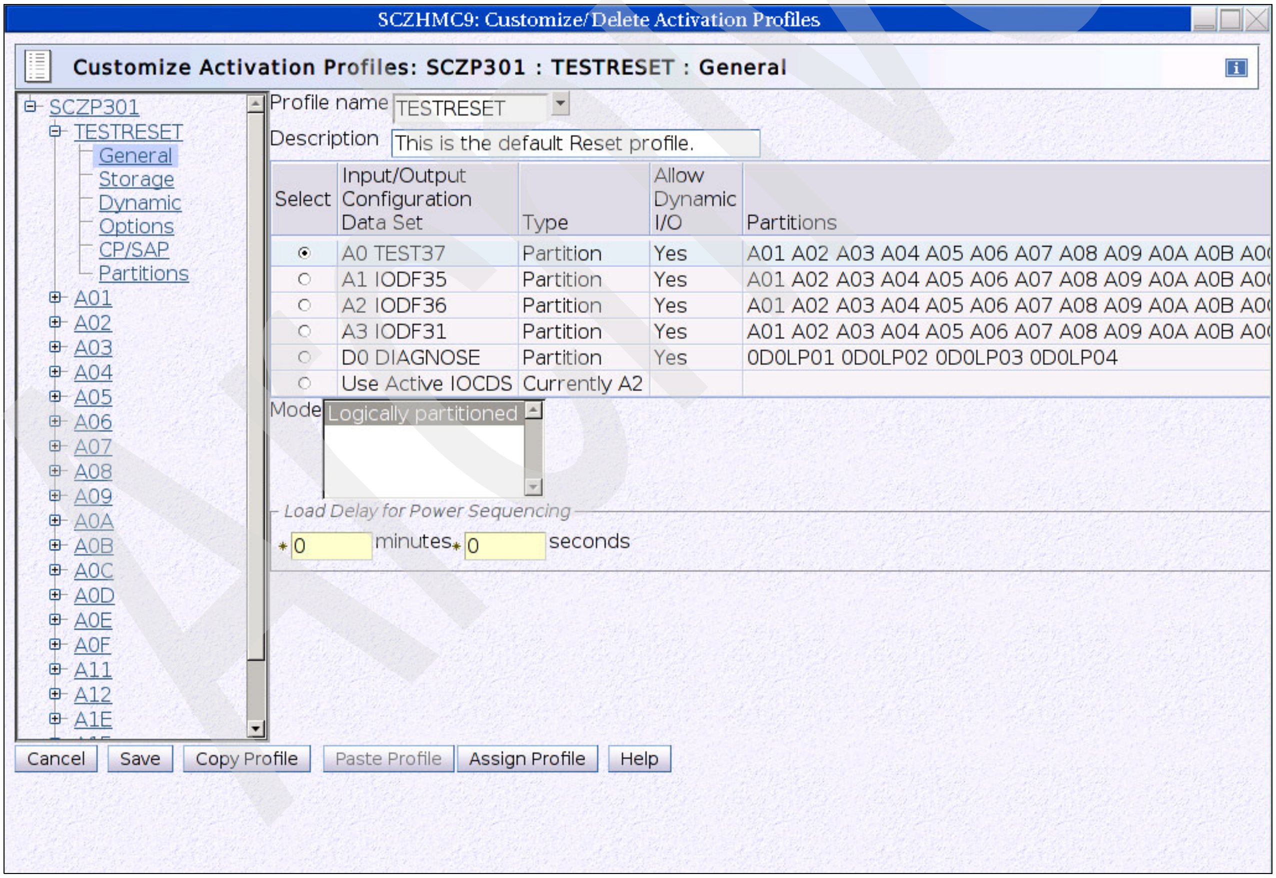
This is the %NAME Image profile.

☑ Use the selected profile as a template when automatically creating new image profiles :

DEFAULT

Figure 6-71 Image Profile automatic build options

11. Note the list of LPARs that have been retrieved and built based on the LPARs that were defined in the selected IOCDS. Click **Save** (Figure 6-72).



SCZHMC9: Customize/Delete Activation Profiles

Customize Activation Profiles: SCZP301 : TESTRESET : General

Profile name: TESTRESET

Description: This is the default Reset profile.

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
●	A0 TEST37	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A1 IODF35	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A2 IODF36	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A3 IODF31	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	D0 DIAGNOSE	Partition	Yes	0D0LP01 0D0LP02 0D0LP03 0D0LP04
○	Use Active IOCDS	Currently A2		

Mode: Logically partitioned

Load Delay for Power Sequencing

* 0 minutes * 0 seconds

Figure 6-72 Reset and Image profile list

6.8.2 Building/Verifying Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

6.8.3 Building/Verifying Load Profiles

Create Load (IPL) Profiles using the “DEFAULTLOAD” Load profile as a skeleton for all the logical partitions for which you are performing an IPL on this processor.

6.8.4 Building/Verifying Load Members in SYS#.IPLPARM

You might require additional Load Members defined in SYS#.IPLPARM for this processor.

Additionally, if you used the HWNAME parameter to point to the Processor ID, then this parameter should be updated to point to the new Processor ID (in this example, from SCZP201 to SCZP301).

6.8.5 Server Time Protocol configuration

Server Time Protocol (STP) configuration should be reviewed to ensure that the correct External Time Source has been configured and that you are connected to the correct Coordinated Time Network.

Refer to Chapter 8, “Server Time Protocol setup” on page 415 for more detailed information about setting up your STP environment.

6.8.6 Performing a power-on reset of the 2817

When the new 2817 installation has been completed, the IBM service representative performs a power-on reset with a Diagnostic IOCDS.

After this POR has been completed and the IBM service representative is satisfied with the state of the processor, the service representative hands over the processor to you. You perform another power-on reset using the Reset Profile created in the previous step.

The 2817 is now ready to be activated (power-on reset) using the Production Reset Profile.

7

Installing an additional IBM zEnterprise 196

In this chapter, we describe how to add a new z196 into an existing IBM System z environment.

Because a wide variety of environments exists, your environment may not contain exactly the same elements as the configuration described here. Nevertheless, the step-by-step process we explain in this chapter should provide enough information for you to replicate the approach in your own environment.

This chapter also shows how to define a coupling link connection between a IBM System z10 EC and a z196 using CHPID type = CIB.

We discuss the following topics:

- Scenario overview
- HCD: Creating a 2817 work IODF
- HCD: Validating the 2817 work IODF
- CMT: Assigning PCHIDs to CHPIDs
- HCD: Updating the 2817 work IODF with PCHIDs
- HCD: Building the 2817 production IODF
- HCD/HMC: Loading the 2817 processor IOCDS
- HMC: Steps for profile activation

7.1 Scenario overview

Here is a description of the scenario to add a new system.

7.1.1 The configuration process

Figure 7-1 shows the general process that we followed in this example. The numbered steps are described in the steps that follow the figure.

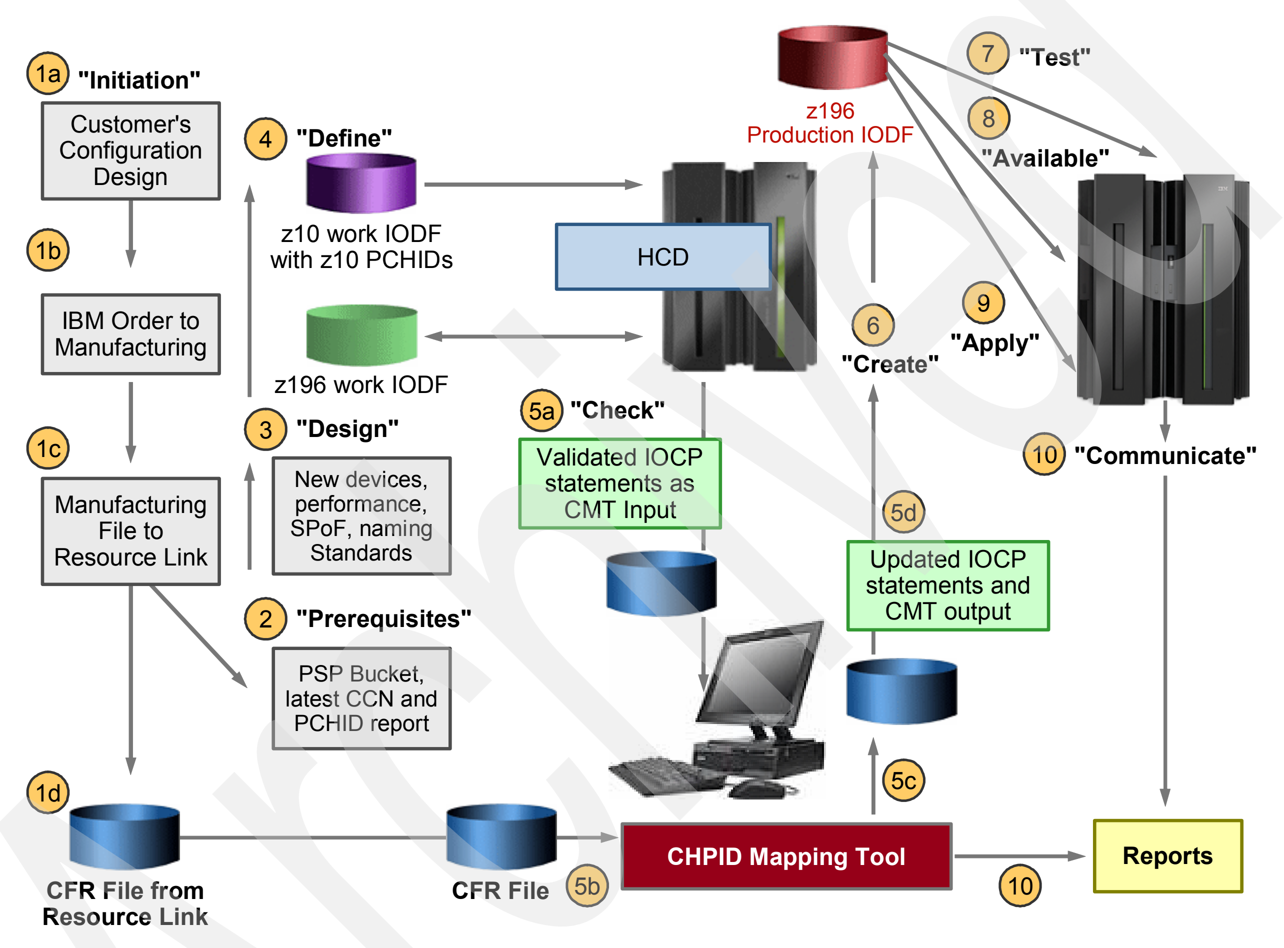


Figure 7-1 CMT: Overall process flow

1. Initiation
   a. When planning to migrate to a z196, the IBM Technical Support team can help you define a configuration design that meets your needs. The configuration is then used in the ordering process.
   b. The IBM order for the configuration is created and passed to the manufacturing process.
   c. The manufacturing process creates a configuration file that is stored at the IBM Resource Link website. This configuration file describes the hardware being ordered. This data is available for download by the client installation team.

   d. A New Order report is created and shows the configuration summary of what is being ordered along with the Customer Control Number (CCN), which can be used to retrieve, from Resource Link the, `CFReport` (a data file that contains a listing of hardware configuration and changes for a CPC).

2. Prerequisites

   It is important that you check, for example, that you have the current PSP Bucket installed. You should also run the SMP/E report with fixcat exceptions to determine if any PTFs need to be applied. Also, ensure that you have the most current PCHID report and CCN from your IBM service representative.

3. Design

   When you plan your configuration, consider naming standards, FICON switch and port redundancy, adequate I/O paths to your devices for performance, OSA CHPID configuration for network and console communications, and coupling facility connections internally and to other machines.

   Additional changes to the way your sysplex receives its time source now that External Time Reference (ETR) is no longer supported and only Server Time Protocol (STP) can be used on the z196 may be required. The z196 can be run at Stratum 3 or Stratum 2 when in a mixed Coordinated Timing Network (CTN) or Stratum 1 when in a non-mixed CTN.

4. Define

   The existing System z9 EC or System z10 EC I/O configuration is used as a starting point for using HCD. The System z9 EC or System z10 EC production IODF is used as input to HCD to create a work IODF that will be the base of the new z196 configuration.

   When the new z196 configuration has been added and the obsolete hardware has been deleted, a validated version of the configuration is saved in a 2817 validated work IODF.

5. Check

   a. From the validated work IODF, create a file containing the z196 IOCP statements. This IOCP statements file is transferred to the workstation used for the CHPID Mapping Tool (CMT). HCM may also be used here to transfer the IOCP deck to and from the CMT.

   b. The configuration file created by the IBM Manufacturing process in step 1d is downloaded from Resource Link to the CMT workstation.

      The CHPID Mapping Tool uses the input data from files to map logical channels to physical ones on the new z196 hardware.

      You might have to make decisions in response to situations that might arise, such as:

      i. Resolving situations in which the limitations on the purchased hardware cause a single point of failure (SPoF). You may need to purchase additional hardware to resolve some SPoF situations.

      ii. Prioritizing certain hardware items over others.

   c. After the CHPID Mapping Tool processing finishes, the IOCP statements contain the physical channels assignment to logical channels, based on the actual purchased hardware configuration.

      The CHPID Mapping Tool also creates configuration reports to be used by the IBM service representative and the installation team.

      The file containing the updated IOCP statements created by the CHPID Mapping Tool, which now contains the physical channels assignment, is transferred to the host system.

   d. Using HCD again, and using the validated work IODF file created in step 5a and the IOCP statements updated by the CHPID Mapping Tool, apply the physical channel assignments created by the CMT to the configuration data in the work IODF.

6. Create

   After the physical channel data has been migrated into the work IODF, a 2817 production IODF is created and the final IOCP statements can be generated. The installation team uses the configuration data from the 2817 production IODF when the final power-on reset is done, yielding a z196 with an I/O configuration ready to be used.

7. Test

   IODFs that are modifying existing configurations may be tested in most cases to verify that the IODF is changing what is intended.

8. Available

   a. If you are upgrading an existing 2094 or 2097, you may be able to use HCD to write an IOCDS to your current 2094 or 2097 in preparation for the upgrade. If you can write an IOCDS to your current 2094 or 2097 in preparation for upgrading it to a 2817, do so and let the IBM service representative know which IOCDS to use.

   > **Note:** Using the HCD option Write IOCDS in preparation of an upgrade is the preferred method for writing the initial IOCDS when upgrading from a 2094 or a 2097 to a 2817. This scenario will use the HCD option Write IOCDS process.

   b. If the 2817 is not network connected to the CPC where HCD is running, or if you are not upgrading or cannot write an IOCDS in preparation for the upgrade, use HCD to produce an IOCP input file and download the input file to a USB memory stick.

9. Apply

   The new production IODF can be applied to the z196 in two ways:

   – Using the Power-on Reset process

   – Using the Dynamic IODF Activate process

10. Communicate

   It is important to communicate new and changed configurations to operations and the appropriate users and departments.

7.1.2 Planning considerations

The following I/O features can be ordered for a new z196:

- ESCON
- FICON Express8 LX (long wavelength - 10 km)
- FICON Express8 SX (short wavelength)
- OSA-Express3 10 GbE LR (long reach)
- OSA-Express3 10 GbE SR (short reach)
- OSA-Express3 GbE LX (long wavelength)
- OSA-Express3 GbE SX (short wavelength)
- OSA-Express3 1000BASE-T Ethernet
- Crypto Express3
- ISC-3 (peer mode only)

The following features may not be ordered for a z196, but if present in a z9 EC server or z10 EC server, may be carried forward when upgrading to a z196:

- FICON Express4 LX (4 km and 10 km)
- FICON Express4 SX
- OSA-Express2 LX (long wavelength)
- OSA-Express2 SX (short wavelength)
- OSA-Express2 1000BASE-T Ethernet

The following features are *not* supported on a z196:

- FICON Express2 (LX and SX)
- FICON Express (LX and SX)
- FICON (pre-FICON Express)
- OSA-Express2 10 GbE Long Reach
- OSA-Express
- ICB-2
- ICB-3
- ICB-4
- ISC-3 Links in Compatibility Mode
- Crypto Express2
- PCIXCC and PCICA
- Parallel channels (use an ESCON converter)

Table 7-1 lists the channel types described in an IOCDS that are supported with the z9 EC, z10 EC, and z196.

Table 7-1 Channels, links, and adapters with CHPID type and support

Channels	**CHPID type**	**2094 support**	**2097 support**	**2817 support**
ESCON channels: Connection Channel (ESCON architecture) Channel to Channel (connects to CNC) Converter Channel Path (for BL types) Converter Channel Path (for BY types)	CNC CTC CVC CBY	Yes Yes Yes Yes	Yes Yes Yes Yes	Up to 240 Up to 240 Up to 240 Up to 240
FICON bridge. A FICON channel that attaches to an ESCON Director Model 5.	FCV	Yes	Yes	No
FICON native channels that attach to FICON directors or directly to FICON control units: FICON Express 1 GbE SX and LX FICON Express 2 GbE SX and LX FICON Express 4 GbE SX and LX FICON Express 8 GbE SX and LX	FC FC FC FC	Yes Yes Yes No	Yes Yes Yes No	No No Carried forward Up to 288
FICON channels that attach to Fibre Channel devices, switches, directors, or Fibre-Channel-to-SCSI bridges	FCP	Yes	Yes	Yes
ISC-3 peer mode channels (connects to another CFP)	CFP	Yes	yes	Up to 48
ICB-4 peer channels (connects to another ICB-4)	CBP	Yes	Yes	No
IC peer channels (connects to another ICP)	ICP	Yes	Yes	Up to 32
PSIFB InfiniBand host channel adapters (HCA)	CIB	Yes	Yes	Up to 32
HiperSocket (IQDIO) channels	IQD	Yes	Yes	Up to 32

Channels	CHPID type	2094 support	2097 support	2817 support
OSA- Express2 GbE LX/SX	OSD and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 GbE LX/SX	OSD and OSN	No	Yes	Up to 96 ports
OSA- Express2 1000BASE-T	OSE, OSD, OSC, and OSN	Yes	Yes	Up to 48 ports carried forward
OSA-Express3 1000BASE-T	OSE, OSD, OSC, OSN, and OSM	No	OSC, OSD, OSE, and OSN: Yes OSM: No	Up to 96 ports
OSA- Express2 10 GbE LR	OSD	Yes	Yes	No

Keep the following considerations in mind when planning your configuration.

Coupling links

Only the following Coupling Facility CHPIDs are supported:

- CHPID Type=CFP: ISC-3 links in peer mode
- CHPID Type=CIB: PSIFB links connecting to an HCA2-O (Optical) card
- CHPID Type=ICP: Internal Coupling links.

Note: Coupling links can be defined as both Coupling and STP links or STP-only links.

HMC

The HMC can appear either as the current HMC does, or as a HMC that can run code to manage an Ensemble. The current HMC is used to manage, monitor, and operate one or more System z servers and their associated logical partitions. A HMC that has Ensemble code running is a HMC attached to one or more zEnterprise System(s) configured as Ensemble member(s). A particular Ensemble is managed by a pair of HMCs in primary and alternate roles.

The HMC has a global (Ensemble) management function, whereas the SE has local node management responsibility. When tasks are performed on the HMC, the commands are sent to one or more SEs, which then issue commands to their CPCs.

The z196 requires HMC Application V2.11.0 (driver level 86) or higher and only uses Ethernet for its network connection. The HMC and the Service Elements do not contain a floppy disc drive, requiring the use of a USB flash memory drive to input and back up customer configuration data.

Software support

HCD V1.12 (or HCD V1.7 and later with Preventive Service Planning (PSP) bucket for 2817DEVICE and PTFs) is required to define and support some of the new features of the z196.

Open Systems Adapter - Integrated Console Controller

As support has now been withdrawn for the 2074 console controllers, you might consider using OSA-Express2 1000BASE-T or OSA-Express3 1000BASE-T CHPIDs defined as TYPE=OSC. These OSA cards allow you to set up console function supported by a configuration file defined on the Support Element for that processor.

Fibre Channel Protocol

When using CHPIDs defined as TYPE=FCP, you may want to consider N Port ID Virtualization (NPIV).

Refer to 2.1.6, “Worldwide Port Name tool” on page 32 for more information about FCP CHPIDs and the new WWPN prediction tool to manage them.

CPC name versus Processor ID

HCD allows you to define different processors (logical) to the same CPC (physical). The Processor ID needs to be unique within the same IODF, but the CPC name does not. Therefore, the CPC name does not need to match the Processor ID. This is useful where you might have several processor/logical partition/control unit setups that share the same physical CPC within the same IODF. Furthermore, the Processor ID is what is defined for the HWNAME parameter in the LOAD member in SYS1.IPLPARM.

The CPC name is coded in HCD Option 1.3 under View Processor Definition in the CPC name field under SNA address, along with a Network name. It is the CPC name, and not the Processor ID, that appears on the HMC.

When you view the Network information for a CPC over the HMC, note that the SNA address is made up of a Network name and CPC name separated by a dot (for example, USIBMSC.SCZP301). These values are defined in the Support Element for the CPC and they need to match the values set in the IODF so that HCD Option 2.11 can find the CPC to write an IOCDS in the S/390 Microprocessor Cluster List.

Local system name

An additional system name, LSYSTEM, is used to identify the local system name of a server when defining PSIFB type=CIB coupling links.

This data field can be found when changing a CIB-capable processor under HCD Option 1.3.

The LSYSTEM field can be set or changed to any one to eight alphanumeric characters and also can begin with either an alpha or numeric character. All characters are upper case.

Here are the rules that determine whether, and where, HCD sets the LSYSTEM keyword automatically:

1. If a CIB-capable processor is defined, and the CPC name is set but the local system name is not set, HCD defaults the local system name to the CPC name.
2. If a CIB-capable processor that has not yet defined a CPC name is changed to obtain a CPC name but no local system name, HCD defaults the CPC name to the local system name.
3. If a non-CIB capable processor is changed to a support level that is CIB capable, and the processor has a CPC name set but no local system name, the local system name defaults to the CPC name.
4. If the processor definition is changed such that the local system name is explicitly removed, HCD does not do any defaulting.

5. If a processor has a local system name set (whether it has a CPC name or not), any change to the local system name has to be done explicitly. There will be no implicit name if the CPC name or the support level is changed.
6. During the Build Production IODF process, it is verified that a local system name has to be set for the processor if the processor has a CIB channel path defined. If this verification fails, an error message is given and the production IODF is not built.

We do, however, recommend that the local system name be the same as the CPC name.

Additional keywords on the ID statement in an IOCP deck include:

AID	Adapter ID.
Port	HCA port.
CPATH	Specifies the CCSID and CHPID on the connecting system.

7.1.3 The additional 2817 scenario

In this scenario, we describe the configuration steps to install a new 2817 processor into an existing hardware environment. Key considerations are as follows:

- HCD requires a new Processor ID for the 2817.
- We recommend defining a new CPC name for the 2817.
- The 2817 processor connects to new switch ports and new control unit interfaces.
- The control unit interfaces connect to the same switch ports as previously.
- The starting IODF is the current production IODF.
- The target IODF is a new 2817 work IODF.

This example shows an existing z10 EC (2097-E26) with a Processor ID of SCZP201 and four CSSs (CSS ID=0, CSS ID=1, CSS=2, and CSS ID=3). We will be adding a new z196 (2817-M32) with a Processor ID of SCZP301 and with fours CSSs (CSS ID=0, CSS ID=1, CSS ID=2, and CSS ID=3). The CPC name of SCZP301 and serial number of 0B3BD5 is used for the 2817.

The following CHPID types are defined:

- OSD and OSC
- CTC and CNC
- FC
- CFP, ICP, and CIB
- IQD

The following Hardware/CHPID types are not supported the 2817:

- PCIXCC and PCICA
- ICB-4 links
- ICB-3 links
- ICB-2 links
- ISC-3 links in compatibility mode (CHPID types CFS and CFR)
- OSA-Express Token Ring

Table 7-2 summarizes the tool requirements. The step-by-step process is documented later in this chapter.

Table 7-2 Additional 2817 I/O configuration

Additional 2817	**Additional 2817s to connect to the same switch ports and control units to which existing processors connect (additional new 2817s)**
Processor ID	Requires a new Processor ID.
CPC name	Requires a new CPC name.
Channel to switch port connections	Additional ports.
Control Unit to switch port connections	Same ports.
Starting IODF	Current active production IODF.
Target IODF	Create a new work IODF,
HCD action	Add Processor (see step 2 in 7.2, "HCD: Creating a 2817 work IODF" on page 355).
CHPID Mapping Tool (CMT) Program	Optional, but recommended.
`CFReport` file (CCN)	Required.
IOCP (import from validated work IODF)	Yes.
CHPID Mapping Tool Actions (PCHID reset)	Yes.
CHPID Mapping Tool IOCP Output	Yes.
CHPID Mapping Tool Reports	Yes, CHPID and CHPID to CU Report.

Note: As mentioned, it is possible to have a different Processor ID with a CPC name. However, if you do not need to support multiple processor images, we recommend that the Processor ID and CPC name match.

7.2 HCD: Creating a 2817 work IODF

The following steps explain how to define a new 2817 server to the existing I/O configuration using HCD:

1. Create a 2817 work IODF from a current production IODF.
2. Add the processor.
3. Change the required partition names and usage from reserved.
4. Add CHPIDs.
5. Connect FICON and ESCON CHPIDs to existing switches and available ports.
6. Create any additional control units unique to this processor and connect CHPIDs.
7. Define all required CF connections to other processors and any Internal CF connections required.
8. Create CTCs.
9. Connect to existing control units for DASD, Tape, Printer, and Communication devices directly or over switches.

10. Create an OSA configuration (OSC, OSD, OSE, OSN, OSX, and OSM).
11. Build a validated work IODF.
12. Create an IOCP statements file and transfer it to your CHPID Mapping Tool workstation. This step can also be performed with HCM.
13. Import CFReport and IOCP statements into the CMT.
14. Perform hardware resolution and PCHID/CHPID availability.
15. Create configuration reports for yourself and the IBM service representative.
16. Import IOCP statements updated with PCHIDs back into the validated work IODF.
17. Build a production IODF
18. Remote write the IOCP to an IOCDS on the processor, or if not possible, copy the IOCP statements to a USB memory flash drive.
19. Run the Stand-Alone Input/Output Configuration Program to load the IOCP statements onto the 2817 Service Element IOCDS.
20. Build Reset, Image, and Load Profiles if required.
21. Perform a power-on reset (activate) of 2817.

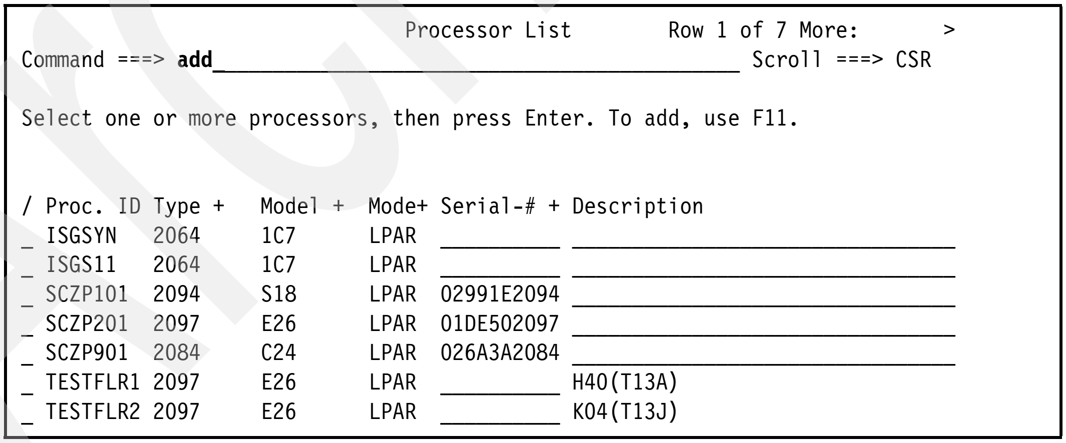
7.2.1 Creating a work IODF from the current production IODF

Select the current production IODF in HCD that contains the existing hardware environment that will be connected to the new 2817 (for example, ‘SYS6.IODF3C’).

7.2.2 Adding the new 2817 processor

To add the new 2817 processor, perform the following steps:

1. From the HCD main menu, select Option 1.3. Processor List (Figure 7-2).

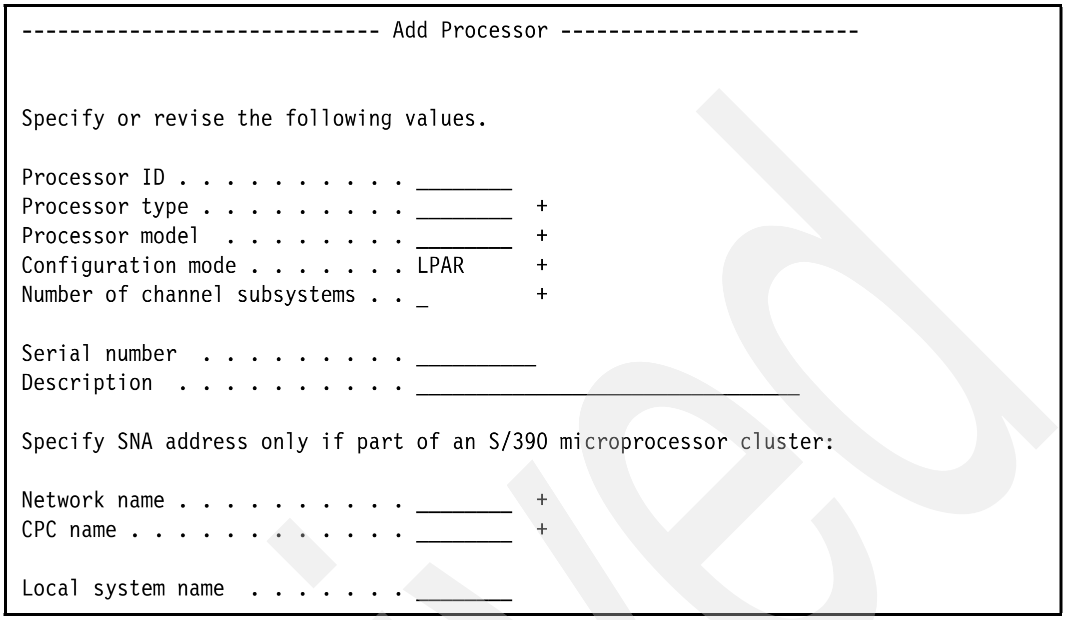


```
                                Processor List       Row 1 of 7 More:       >
Command ===> add___________________________________________ Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
```

Figure 7-2 Processor List (adding processor)

2. Enter `add` or press PF11 (add) to add a new processor and then press Enter.

   The Add Processor panel opens (Figure 7-3).



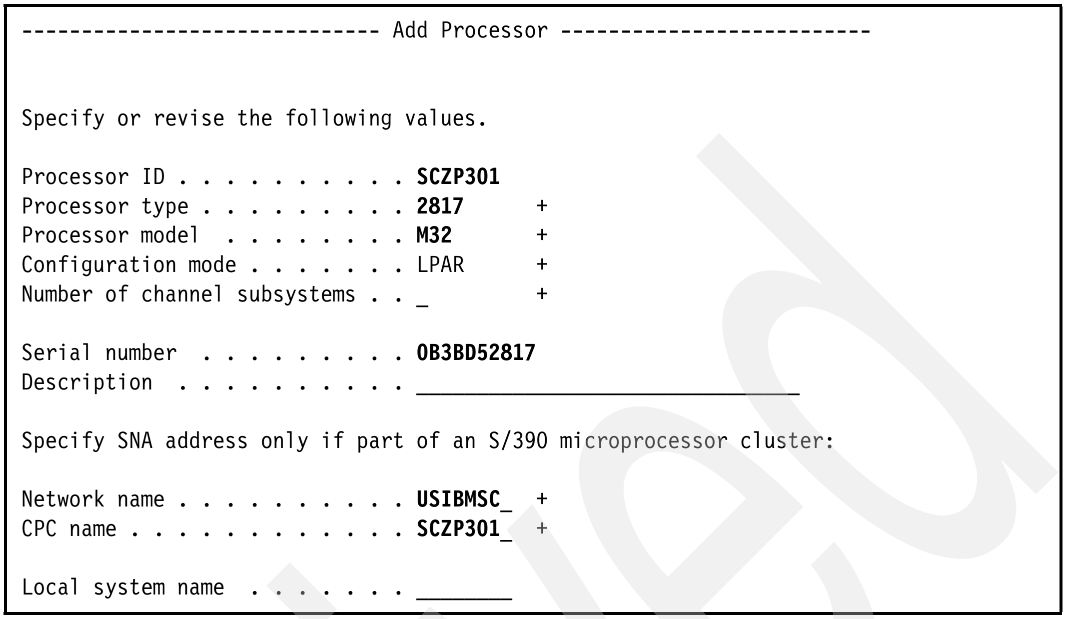
```
----------------------------- Add Processor -------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . . ________
Processor type . . . . . . . . . ________  +
Processor model  . . . . . . . . ________  +
Configuration mode . . . . . . . LPAR      +
Number of channel subsystems . . _         +

Serial number  . . . . . . . . . __________
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . ________  +
CPC name . . . . . . . . . . . . ________  +

Local system name  . . . . . . . ________
```

Figure 7-3 Add Processor (blank values)

3. Specify the appropriate values. In our example, we entered the following values:

Add Processor ID	`SCZP301`
Add Processor type	`2817`
Add Processor model	`M32`
Number of channel subsystems	Leave blank for the moment
Add Serial number	`0B3BD52817`
Add Network name	`USIBMSC`
Add CPC name	`SCZP301`
Local System Name	Leave blank for the moment

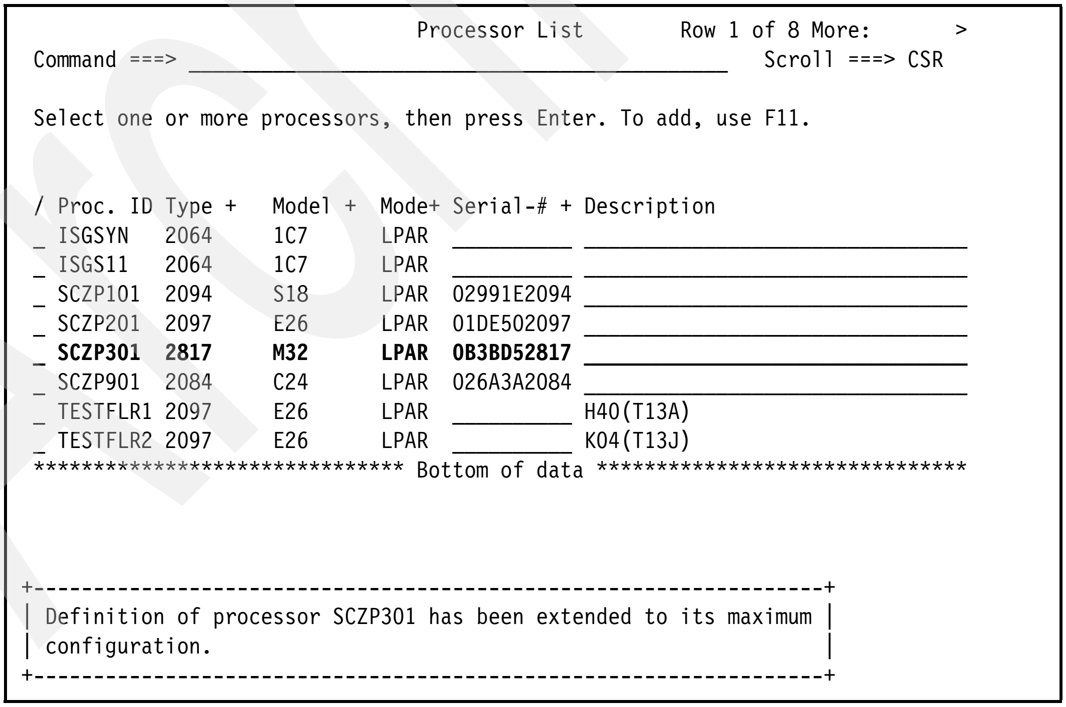
Figure 7-4 shows the values we added.



```
----------------------------- Add Processor --------------------------


Specify or revise the following values.

Processor ID . . . . . . . . . . SCZP301
Processor type . . . . . . . . . 2817       +
Processor model  . . . . . . . . M32        +
Configuration mode . . . . . . . LPAR       +
Number of channel subsystems . . _          +

Serial number  . . . . . . . . . 0B3BD52817
Description  . . . . . . . . . . ________________________________

Specify SNA address only if part of an S/390 microprocessor cluster:

Network name . . . . . . . . . . USIBMSC_  +
CPC name . . . . . . . . . . . . SCZP301_  +

Local system name  . . . . . . . ________
```

Figure 7-4 Add Processor (adding values)

4. Press Enter. The Create Work I/O Definition File panel opens and prompts you to enter the data set name of the Target IODF (for example, `SYS6.IODF3F.WORK`).
5. Press Enter. You now have an additional 2817 processor named SCZP301 (Figure 7-5).



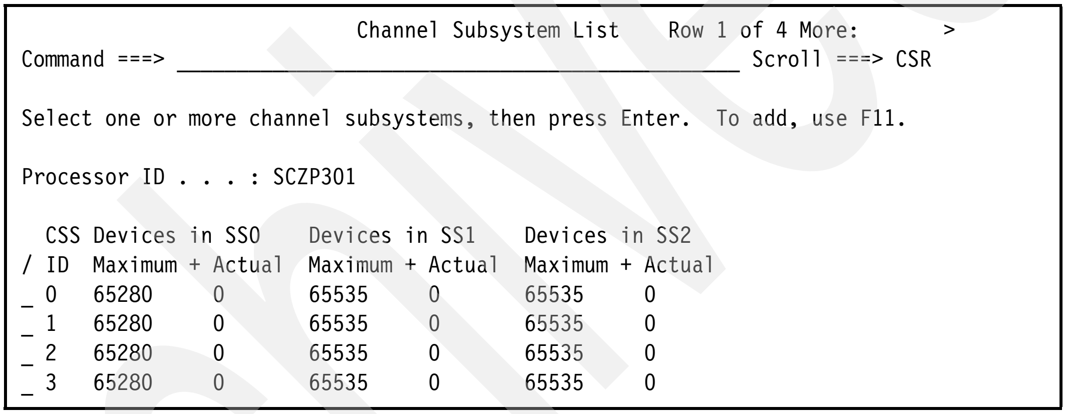
```
                             Processor List       Row 1 of 8 More:       >
Command ===> _____________________________________________    Scroll ===> CSR

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


/ Proc. ID Type +   Model +  Mode+ Serial-# + Description
_ ISGSYN   2064     1C7      LPAR  __________ ________________________________
_ ISGS11   2064     1C7      LPAR  __________ ________________________________
_ SCZP101  2094     S18      LPAR  02991E2094 ________________________________
_ SCZP201  2097     E26      LPAR  01DE502097 ________________________________
_ SCZP301  2817     M32      LPAR  0B3BD52817 ________________________________
_ SCZP901  2084     C24      LPAR  026A3A2084 ________________________________
_ TESTFLR1 2097     E26      LPAR  __________ H40(T13A)
_ TESTFLR2 2097     E26      LPAR  __________ K04(T13J)
****************************** Bottom of data *******************************



+-----------------------------------------------------------------+
| Definition of processor SCZP301 has been extended to its maximum |
| configuration.                                                  |
+-----------------------------------------------------------------+
```

Figure 7-5 Processor List (new process or added)

Note the message displayed at the bottom of the panel indicates that the processor definition has been extended to its maximum configuration. This is because part of the main storage is allocated as a fixed-sized Hardware System Area, which is not addressable by application programs. In HCD, when you define as new or redefine a processor as a 2817, HCD automatically defines the maximum configuration of four CSSs and 60 logical partitions.

6. Enter `s` next to SCZP301 and press Enter. The Channel Subsystem List is displayed. Here you can see four Channel Subsystems defined with the default MAXDEV values of 65280 set by HCD (Figure 7-6).

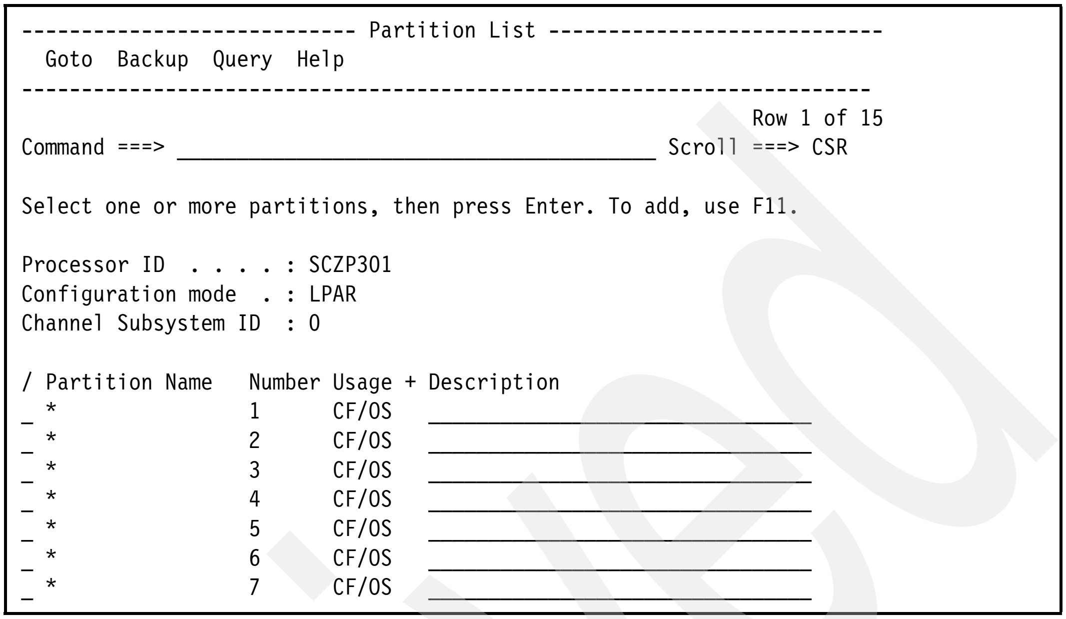
> **Note:** Starting with z196 processors (processor type 2817), users can define devices to a third subchannel set with ID 2 (SS 2). In this third subchannel set, users can configure a maximum of 64 K-1 devices. With IBM z/OS V1.12, you can define Parallel Access Volume (PAV) alias devices (device types 3380A and 3390A) of the 2105, 2107, and 1750 DASD control units, PPRC secondary devices (3390D), and DB2 data backup volumes (3390S) to SS 2.



```
                            Channel Subsystem List    Row 1 of 4 More:       >
Command ===> ________________________________________________ Scroll ===> CSR

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

Processor ID . . . : SCZP301

  CSS Devices in SS0    Devices in SS1    Devices in SS2
/ ID  Maximum + Actual  Maximum + Actual  Maximum + Actual
_ 0   65280     0       65535     0       65535     0
_ 1   65280     0       65535     0       65535     0
_ 2   65280     0       65535     0       65535     0
_ 3   65280     0       65535     0       65535     0
```

Figure 7-6 Channel Subsystem List (newly defined CSS)

7. Enter `p` next to any of the CSSs and observe that HCD also defines the maximum number of logical partitions, 15 per CSS or a total of 60, as Reserved (*) (Figure 7-7).



```
---------------------------- Partition List ----------------------------
  Goto  Backup  Query  Help
------------------------------------------------------------------------
                                                              Row 1 of 15
Command ===> ________________________________________ Scroll ===> CSR

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

Processor ID  . . . . : SCZP301
Configuration mode  . : LPAR
Channel Subsystem ID  : 0

/ Partition Name   Number Usage + Description
_ *                1      CF/OS   ________________________________
_ *                2      CF/OS   ________________________________
_ *                3      CF/OS   ________________________________
_ *                4      CF/OS   ________________________________
_ *                5      CF/OS   ________________________________
_ *                6      CF/OS   ________________________________
_ *                7      CF/OS   ________________________________
```

Figure 7-7 Partition List

If you scroll down, you see the remaining reserved logical partitions defined for this CSS.

8. Define the resources to the new 2817 processor.

> **Note:** For specific details about defining processors, partitions, switches, control units, devices, and so on, refer to *z/OS HCD Users Guide,* SC33-7988 and *IOCP Users Guide,* SB10-7037.

9. Define the resources to the new 2817 processor:
   a. Change the Reserved partitions for each desired CSS to the required partition name and usage. Not all partitions need to be changed at this point, but can be modified later by using a Dynamic IODF Activate.
   b. Add CHPIDs to each CSS with no PCHIDs assigned.
   c. Define a Partition Access list for these CHPIDs.
   d. Define a Partition Candidate list for these CHPIDs.
10. Connect FICON and ESCON CHPIDs to available ports on existing switches.
11. Connect FICON and ESCON CHPIDs directly to control units, where applicable.
12. Create any control units unique for this processor and connect CHPIDs.
13. Define all required coupling links to other processors in the hardware environment, and also any internal coupling links required.

> **Note:** We explain in more detail in 7.2.4, “Adding CHPID type=CIB channels and PSIFB links” on page 362 about how to define CIB type coupling facility links and set up a CIB coupling link between the 2097 and the new 2817.

14. Create CTCs (ESCON or FICON).

15. Define logical paths to existing control units for DASD, tape, printers, and communications controllers directly or over the FICON or ESCON switches.

16. Create OSA resources (for example, OSC, OSD, OSE, OSN, OSM, and OSX).

7.2.3 Overdefining channel paths on an XMP processor

Sometimes you may need to define a channel path that is not physically installed on the processor. This action might be useful if you are planning to add additional channel cards to the processor in the future and want to have the definitions in the IODF before the hardware is installed.

HCD allows you to overdefine CHPIDs by using an asterisk (*) for the PCHID value. An overdefined CHPID must adhere to all validation rules, but it is not taken into account by an IOCDS download. Also, it is not included in the IOCP statements, in a CONFIGxx member, or during dynamic activation.

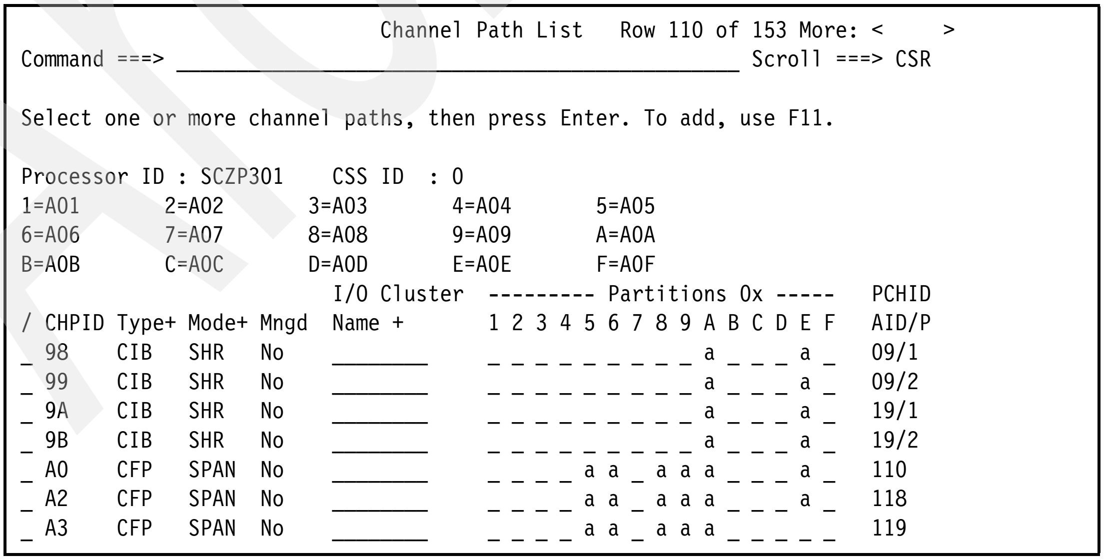
If a control unit contains only CHPIDs with a PCHID value of an asterisk (*), then the whole control unit (including any attached devices) is omitted from the configuration to be activated.

When installing the channel path later, you must edit the CHPID and replace the * with its valid PCHID.

> **Note:** This is not the case for CFP type CHPIDs, where these CHPIDs have connections to other CFP type CHPIDs. Therefore, HCD only allows you to define CFP type CHPIDs as overdefined if they are unconnected.
>
> Overdefining is now supported for CIB type CHPID definitions.

The 2817 production IODF can then be activated dynamically and the PCHID/CHPID/control unit definitions become available to the operating system.

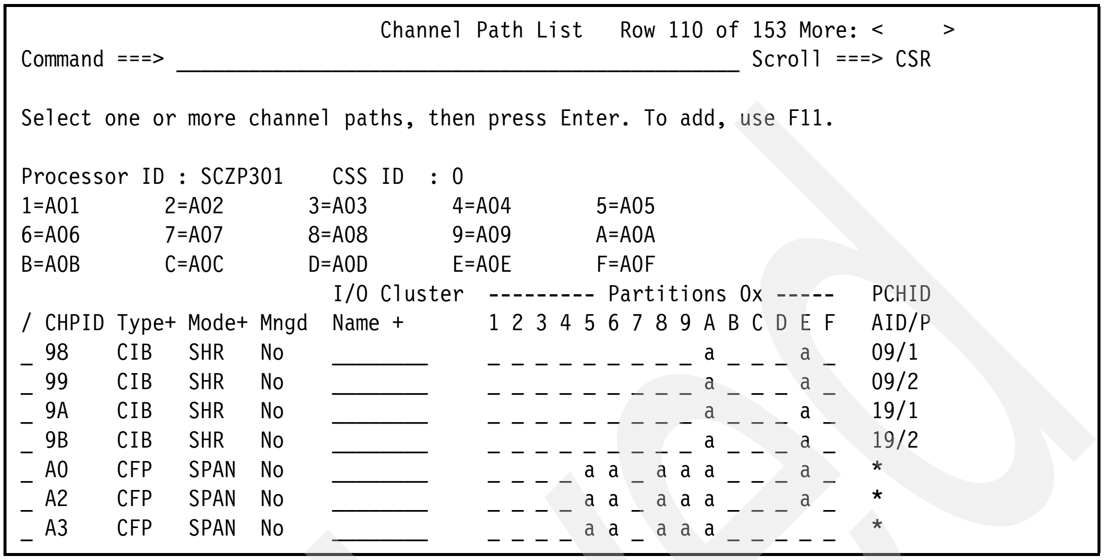
Figure 7-8 illustrates what the CHPID/PCHID definitions look like before being defined as over-defined. Press PF20 (right) in the Channel Path List.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   110
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   118
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   119
```

Figure 7-8 Channel Path List (Reserving CHPIDs)

Figure 7-9 shows what the CHPID/PCHID definitions look like after being defined as overdefined.



```
                              Channel Path List   Row 110 of 153 More: <     >
Command ===> _______________________________________________ Scroll ===> CSR

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

Processor ID : SCZP301    CSS ID  : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                          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
_ 98    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/1
_ 99    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   09/2
_ 9A    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/1
_ 9B    CIB   SHR   No    ________     _ _ _ _ _ _ _ _ _ a _ _ _ a _   19/2
_ A0    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A2    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ a _   *
_ A3    CFP   SPAN  No    ________     _ _ _ _ a a _ a a a _ _ _ _ _   *
```

Figure 7-9 Channel Path List (overdefined CHPIDs)

7.2.4 Adding CHPID type=CIB channels and PSIFB links

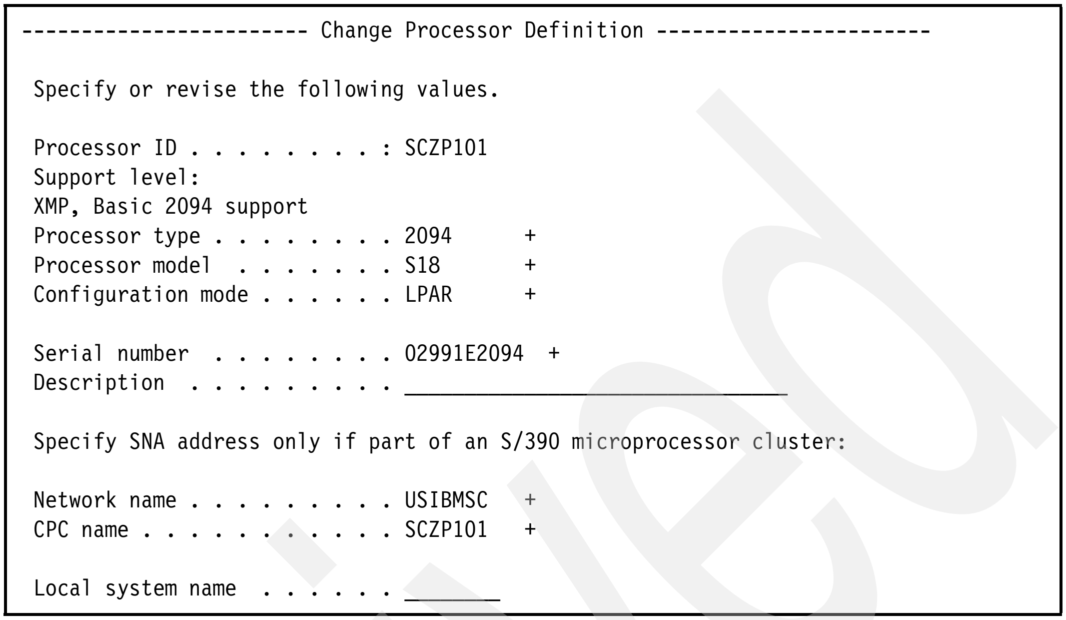
In this section, we define CIB CHPIDs to the 2094 or 2097 (running as a dedicated coupling processor) and the 2817, and define a PSIFB link between the CIB type CHPIDs.

First, we briefly go through processor Support Levels and the local system name or LSYSTEM keyword introduced for PSIFB link definitions.

> **Note:** The local system name must be defined if PSIFB links are going to be defined over CIB type CHPIDs. We recommend using the CPC name of that server.

Perform the following steps:

1. From the HCD main menu, select Option 1.3. Processor List (Figure 7-10).



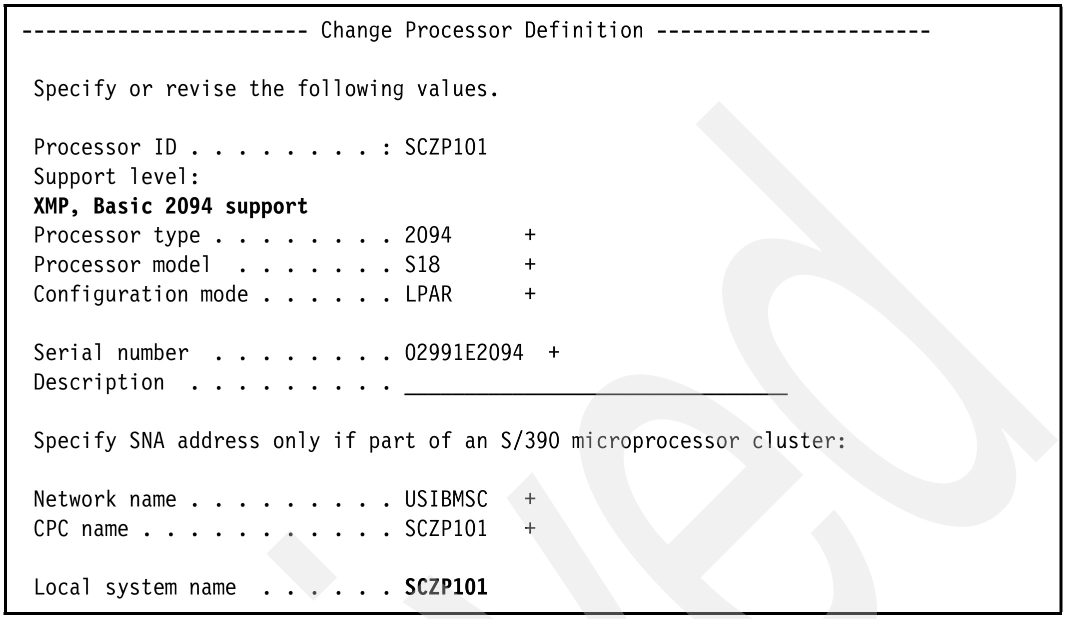
```
----------------------- Change Processor Definition -----------------------

 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP101
 Support level:
 XMP, Basic 2094 support
 Processor type . . . . . . . . 2094      +
 Processor model  . . . . . . . S18       +
 Configuration mode . . . . . . LPAR      +

 Serial number  . . . . . . . . 02991E2094  +
 Description  . . . . . . . . . ________________________________

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP101   +

 Local system name  . . . . . . ________
```

Figure 7-10 Change Processor Definition (display support level)

2. Enter `c` next to SCZP101 (the 2094) and press Enter.
3. Note that the local system name field is blank for this 2094:
   - If a 2094 (CIB-capable) processor is defined and the CPC name is set, but the local system name is not set, HCD defaults the local system name to the CPC name.
   - If a 2094 (CIB-capable) processor that has not yet defined a CPC name is changed to obtain a CPC name but no local system name, HCD defaults the CPC name to the local system name.
   - If a 2094 (non-CIB capable) processor is changed to a support level that is CIB-capable, and the processor has a CPC name set but no local system name, the local system name defaults to the CPC name.
   - If the 2094 processor definition is changed such that the local system name is explicitly removed, HCD does not do any defaulting.
   - If a 2094 processor has a local system name set (whether it has a CPC name or not), any change to the local system name has to be done explicitly. There will be no implicit name if the CPC name or the support level is changed.

   We do, however, recommend that the local system name be the same as the CPC name.

4. In our example in Figure 7-11, we add the local system name before we move on to the processor Support Levels.

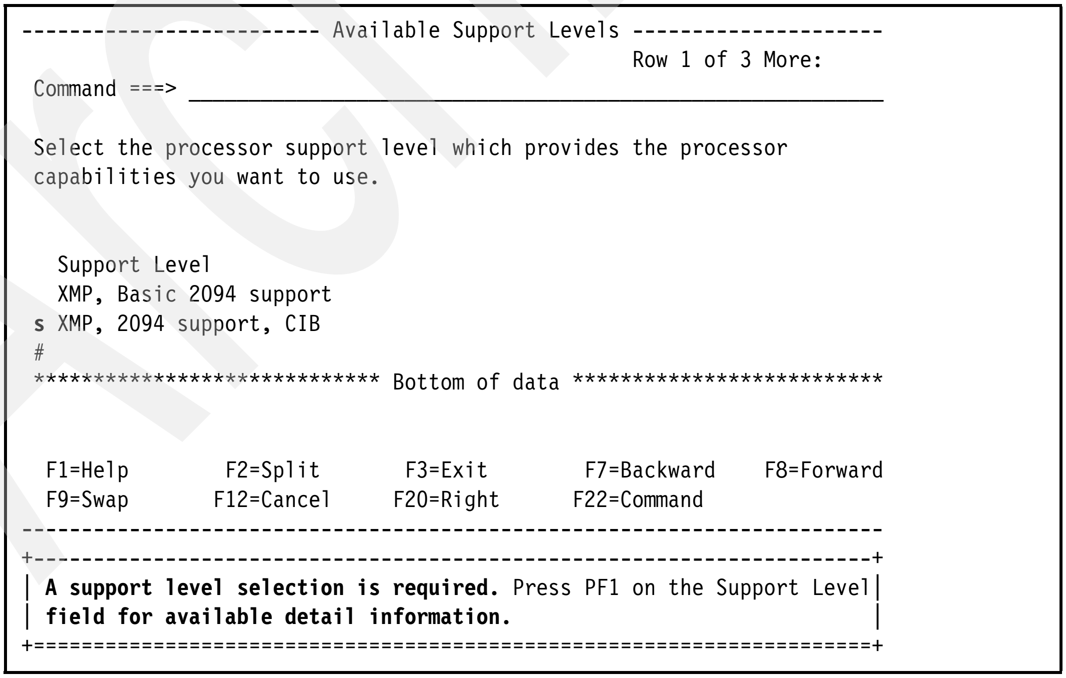


```
----------------------- Change Processor Definition -----------------------

 Specify or revise the following values.

 Processor ID . . . . . . . . : SCZP101
 Support level:
 XMP, Basic 2094 support
 Processor type . . . . . . . . 2094      +
 Processor model  . . . . . . . S18       +
 Configuration mode . . . . . . LPAR      +

 Serial number  . . . . . . . . 02991E2094  +
 Description  . . . . . . . . . ________________________________

 Specify SNA address only if part of an S/390 microprocessor cluster:

 Network name . . . . . . . . . USIBMSC   +
 CPC name . . . . . . . . . . . SCZP101   +

 Local system name  . . . . . . SCZP101
```

Figure 7-11 Change Processor Definition (display support level)

Note the Support Level in Figure 7-11 and that the 2094 is currently set to XMP, Basic 2094 support.

5. Press Enter. HCD gives you the option to change the Support Level to include CIB support (Figure 7-12).



```
------------------------ Available Support Levels ---------------------
                                                    Row 1 of 3 More:
 Command ===> __________________________________________________________

 Select the processor support level which provides the processor
 capabilities you want to use.


   Support Level
   XMP, Basic 2094 support
 s XMP, 2094 support, CIB
 #
 *************************** 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.                             |
+=====================================================================+
```

Figure 7-12 Change Processor Definition (changing support level)

6. Enter `s` next to `XMP, 2094 support, CIB` and press Enter.

Now we add some CIB type CHPIDs to the 2094 and 2817 processors and define a PSIFB link by performing the following steps:

1. Review the PCHID report that came with the 2094 and look for the AID. In our example, we use AID=0A and AID=1A (HCA1-O).
2. Review the PCHID report that came with the 2817 and do the AID. In our example, we use AID=0B and AID=1B (HCA2-O). Refer to Figure 7-13 to see the Adapter IDs for the Host Channel Adapter F/C 0163 on the 2817.

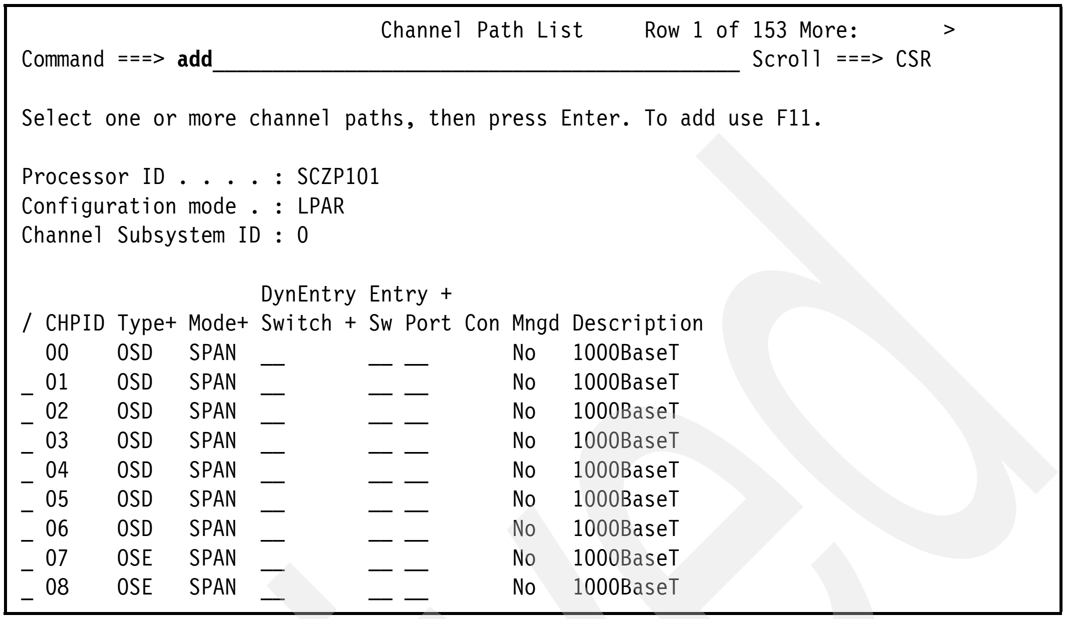
> **Note:** Once installed, Adapter IDs can also be found on the HMC/SE panels.

```
CHPIDSTART
  08348295                      PCHID REPORT                        Mar
24,2010
  Machine: 2817-M32  SN2
  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- -
  Source           Cage  Slot  F/C    PCHID/Ports or AID
Comment
  06/D5           A25B  D506  0163   AID=0A

  06/D6           A25B  D606  0163   AID=0B

  15/D5           A25B  D515  0163   AID=1A

  15/D6           A25B  D615  0163   AID=1B

  15/D7           A25B  D715  0163   AID=1C

  15/DA/J01       A01B  01    3367   100/J00J01 101/J02J03

  06/DA/J01       A01B  D102  0218   110/J00 111/J01

  06/DA/J01        A01B  D202  0218   118/J00 119/J01
```

Figure 7-13 2097 PCHID Report (showing AIDs)

3. In the processor list, enter `s` next to the 2094 and press Enter.
4. Enter `s` next to the CSS where you want to define the CIB CHPIDs and press Enter.

5. Enter `add` or press PF11 (add) to add new CHPIDs and press Enter (Figure 7-14).

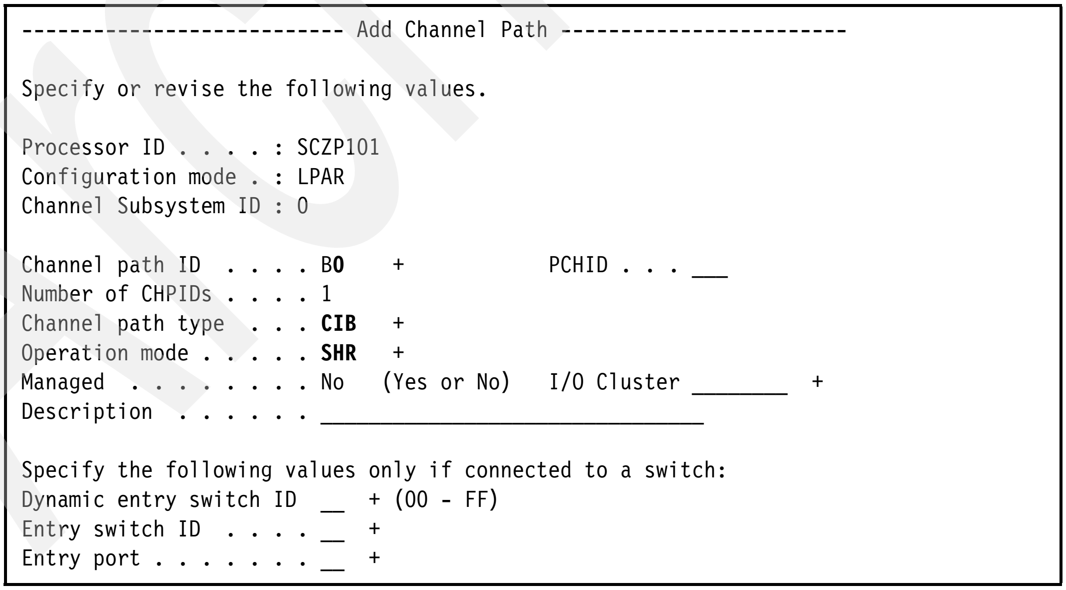


```
                              Channel Path List     Row 1 of 153 More:       >
Command ===> add____________________________________________ Scroll ===> CSR

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

Processor ID . . . . : SCZP101
Configuration mode . : LPAR
Channel Subsystem ID : 0

                    DynEntry Entry +
/ CHPID Type+ Mode+ Switch + Sw Port Con Mngd Description
  00    OSD   SPAN  __       __ __       No   1000BaseT
_ 01    OSD   SPAN  __       __ __       No   1000BaseT
_ 02    OSD   SPAN  __       __ __       No   1000BaseT
_ 03    OSD   SPAN  __       __ __       No   1000BaseT
_ 04    OSD   SPAN  __       __ __       No   1000BaseT
_ 05    OSD   SPAN  __       __ __       No   1000BaseT
_ 06    OSD   SPAN  __       __ __       No   1000BaseT
_ 07    OSE   SPAN  __       __ __       No   1000BaseT
_ 08    OSE   SPAN  __       __ __       No   1000BaseT
```

Figure 7-14 Channel Path List (adding CHPIDs)

6. Enter the appropriate values. As shown in Figure 7-15, for our example, we specify the following values:

Channel path ID	`B0`
Channel path type	`CIB`
Operational mode	`SHR`



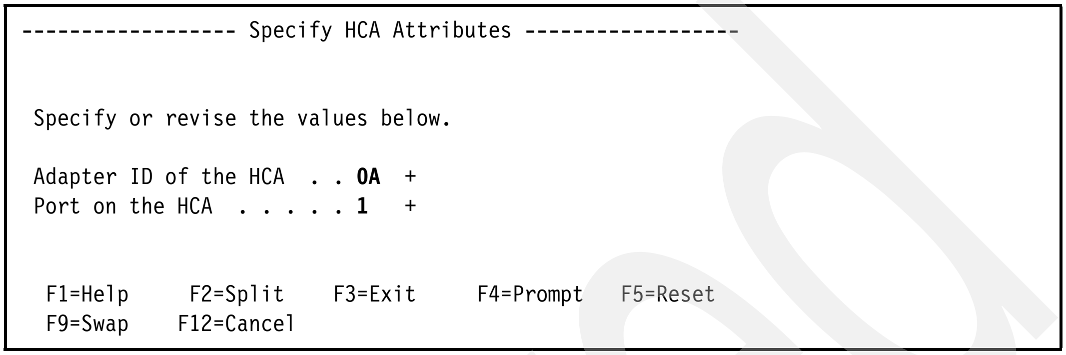
```
--------------------------- Add Channel Path ------------------------

Specify or revise the following values.

Processor ID . . . . : SCZP101
Configuration mode . : LPAR
Channel Subsystem ID : 0

Channel path ID  . . . . B0    +           PCHID . . . ___
Number of CHPIDs . . . . 1
Channel path type  . . . CIB   +
Operation mode . . . . . SHR   +
Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________   +
Description  . . . . . . ________________________________

Specify the following values only if connected to a switch:
Dynamic entry switch ID  __  + (00 - FF)
Entry switch ID  . . . . __  +
Entry port . . . . . . . __  +
```

Figure 7-15 Add Channel Path (adding CHPIDs)

7. Press Enter. HCD now displays the Specify HCA Attributes panel.

8. Enter the appropriate values. As shown in Figure 7-16, for our example, we specify the following values:

Adapter ID of the HCA	`0A`
Port on the HCA	`1`



```
------------------ Specify HCA Attributes ------------------


 Specify or revise the values below.

 Adapter ID of the HCA  . . 0A  +
 Port on the HCA  . . . . . 1   +


  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset
  F9=Swap    F12=Cancel
```

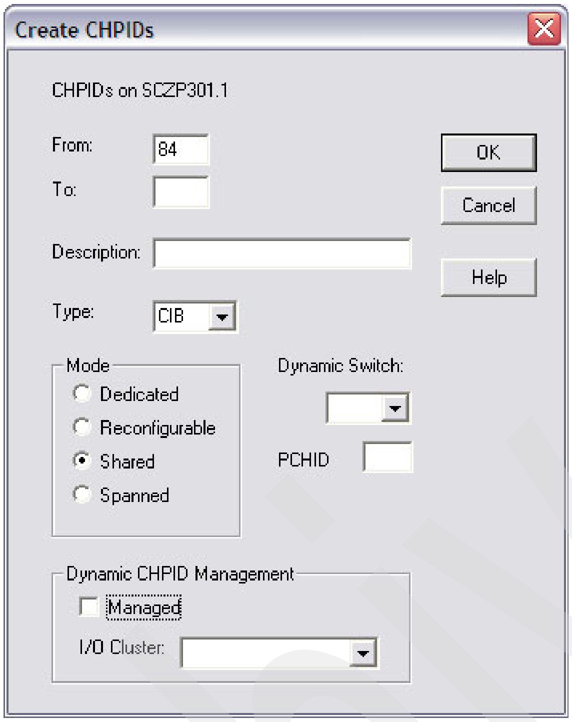
Figure 7-16 Specify HCA Attributes for 2094 (defining AID and port)

9. Press Enter. HCD processes the normal Define Access and Candidate List panels for the new CHPID.

10. Perform the same procedure to define a new CIB type CHPID to the 2817. For our example, we specify the following values:

Channel path ID	`84`
Channel path type	`CIB`
Operational mode	`SHR`

Note: Figure 7-17 on page 368 is an example of the HCM panel used to create any CHPIDs. This example shows CHPID 84, type = CIB as SHR.



Create CHPIDs

CHPIDs on SCZP301.1

From: 84

To:

Description:

Type: CIB

Mode

○ Dedicated

○ Reconfigurable

● Shared

○ Spanned

Dynamic Switch:

PCHID

Dynamic CHPID Management

☐ Managed

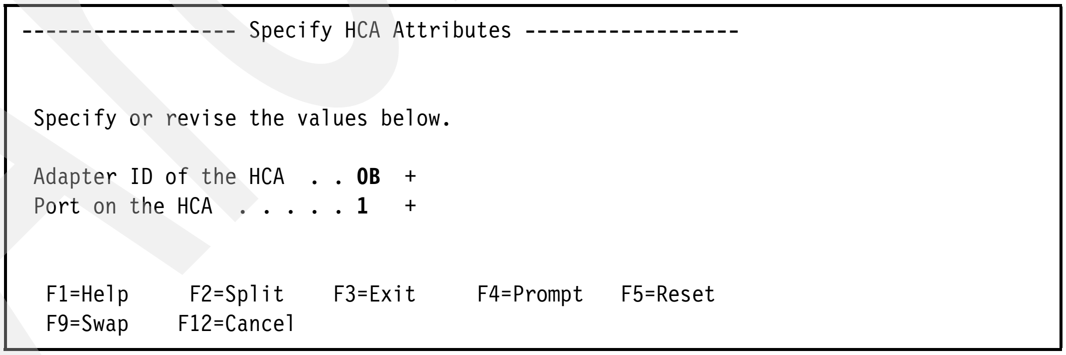
I/O Cluster:

Figure 7-17 Create CHPID (type = CIB)

Adapter ID of the HCA
0B

Port on the HCA 1

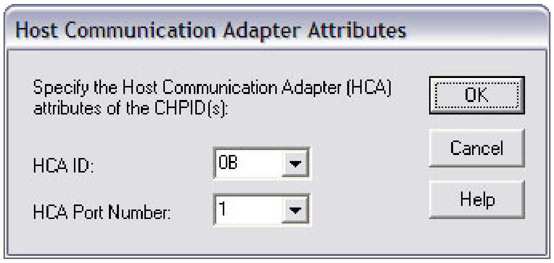
Figure 7-18 shows the HCA attributes for our example.



```
------------------ Specify HCA Attributes ------------------


 Specify or revise the values below.

 Adapter ID of the HCA  . . 0B  +
 Port on the HCA  . . . . . 1   +


  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset
  F9=Swap    F12=Cancel
```

Figure 7-18 Specify HCA Attributes for 2097 (defining AID and port)

Note: The corresponding HCM panel looks like Figure 7-19.



Specify the Host Communication Adapter (HCA) attributes of the CHPID(s):

HCA ID: 0B

HCA Port Number: 1

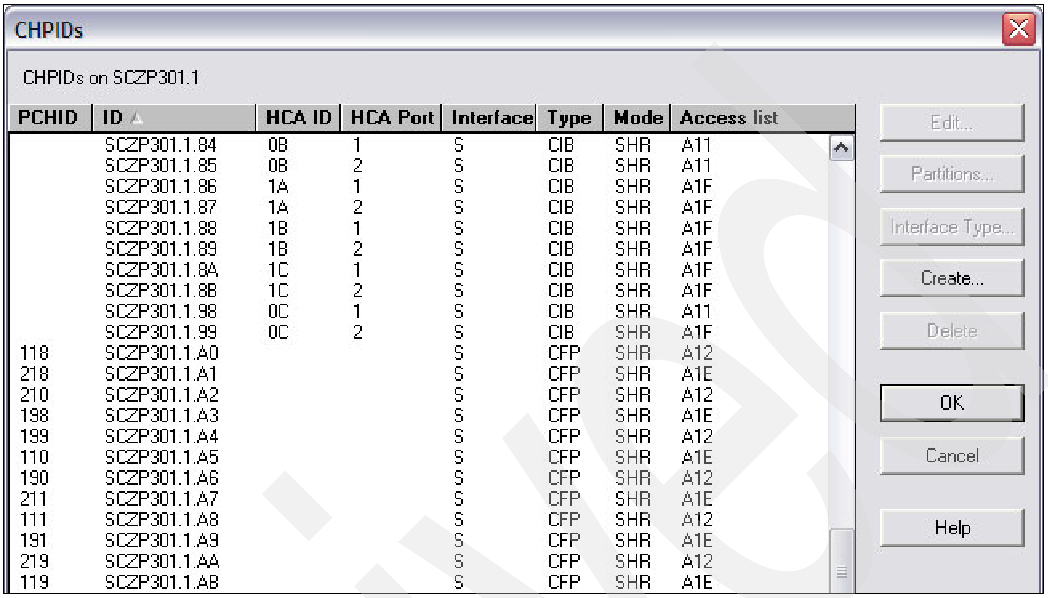
Figure 7-19 Define Host Communications Adapter parameters

11. Define the following CHPIDs and a coupling link between them:
    - 2094 CHPID B1 as type=CIB using AID/P=0A/2
    - 2817 CHPID 90 as type=CIB using AID/P=0B/2
12. In HCD, open the Channel Path List for the 2817 and press PF20. Notice how HCD shows a CIB CHPID in the AID/P column as opposed to a PCHID (Figure 7-20).

```
                              Channel Path List   Row 100 of 143 More: <     >
Command ===> ______________________________________________ Scroll ===> CSR

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

Channel Subsystem ID : 0
1=A01       2=A02       3=A03       4=A04       5=A05
6=A06       7=A07       8=A08       9=A09       A=A0A
B=A0B       C=A0C       D=A0D       E=A0E       F=A0F
                              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
_ 79    FCP   SPAN  No    ________     a a a a a a a a a a a a _ _ _   1F3
_ 7A    FCP   SPAN  No    ________     a a a a a a a a a a a a _ _ _   553
_ 7B    FCP   SPAN  No    ________     a a a a a a a a a a a a _ _ _   1D3
_ 84    CIB   SHR   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _   0B/1
_ 85    CIB   SHR   No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ _ _   0B/2
_ A0    CFP   SPAN  No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ a _   110
_ A1    CFP   SPAN  No    ________     _ a _ _ _ _ _ _ _ _ _ _ a _ _   111
_ A2    CFP   SPAN  No    ________     a _ _ _ _ _ _ _ _ _ _ _ _ a _   118
_ A3    CFP   SPAN  No    ________     _ a _ _ _ _ _ _ _ _ _ _ a _ _   119
```

Figure 7-20 Channel Path List (displaying AID/P)

Note: Figure 7-21 shows how HCM represents CIB CHPIDs with the HCA ID and HCA Port.



PCHID	ID	HCA ID	HCA Port	Interface	Type	Mode	Access list
	SCZP301.1.84	0B	1	S	CIB	SHR	A11
	SCZP301.1.85	0B	2	S	CIB	SHR	A11
	SCZP301.1.86	1A	1	S	CIB	SHR	A1F
	SCZP301.1.87	1A	2	S	CIB	SHR	A1F
	SCZP301.1.88	1B	1	S	CIB	SHR	A1F
	SCZP301.1.89	1B	2	S	CIB	SHR	A1F
	SCZP301.1.8A	1C	1	S	CIB	SHR	A1F
	SCZP301.1.8B	1C	2	S	CIB	SHR	A1F
	SCZP301.1.98	0C	1	S	CIB	SHR	A11
	SCZP301.1.99	0C	2	S	CIB	SHR	A1F
118	SCZP301.1.A0			S	CFP	SHR	A12
218	SCZP301.1.A1			S	CFP	SHR	A1E
210	SCZP301.1.A2			S	CFP	SHR	A12
198	SCZP301.1.A3			S	CFP	SHR	A1E
199	SCZP301.1.A4			S	CFP	SHR	A12
110	SCZP301.1.A5			S	CFP	SHR	A1E
190	SCZP301.1.A6			S	CFP	SHR	A12
211	SCZP301.1.A7			S	CFP	SHR	A1E
111	SCZP301.1.A8			S	CFP	SHR	A12
191	SCZP301.1.A9			S	CFP	SHR	A1E
219	SCZP301.1.AA			S	CFP	SHR	A12
119	SCZP301.1.AB			S	CFP	SHR	A1E

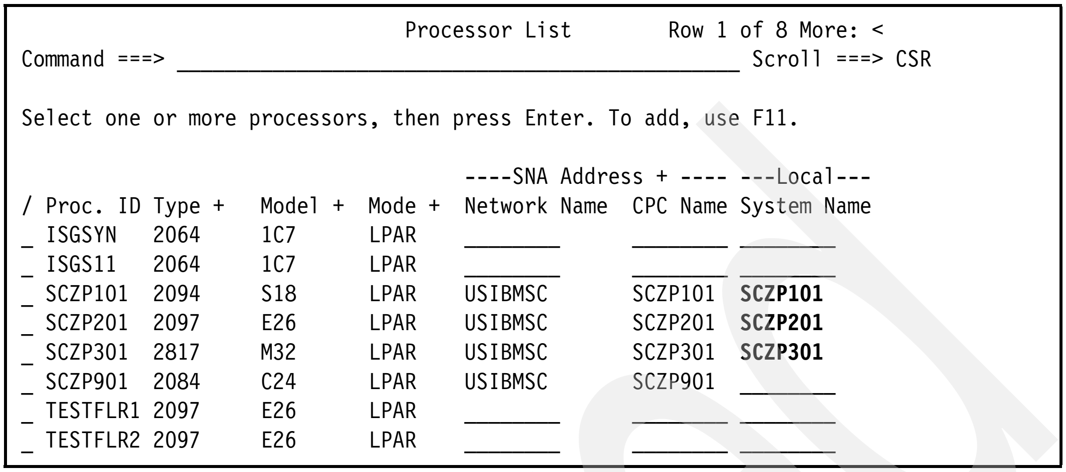
Figure 7-21 CHPID summary showing CIB CHPIDs

13. That concludes the CIB CHPID definitions. Define a coupling link between these two sets of CIB CHPIDs as you would with a CFP type CHPID. Figure 7-22 shows the end result.

```
-------------------- View CF Control Units and Devices -----

 Peer CF side 1:
 Processor ID . . . . . . . : SCZP101
 Channel subsystem ID . . . : 0
 Channel path ID  . . . . . : B0
 Channel path type  . . . . : CIB
 Control unit number  . . . :
 Device number  . . . . . . :
 Number of devices  . . . . :

 Peer CF side 2:
 Processor ID . . . . . . . : SCZP301
 Channel subsystem ID . . . : 0
 Channel path ID  . . . . . : 84
 Channel path type  . . . . : CIB
 Control unit number  . . . : FFDC
 Device number  . . . . . . : FD86
 Number of devices  . . . . : 7

 ENTER to continue.
  F1=Help      F2=Split     F3=Exit      F9=Swap     F12=Cancel
```

Figure 7-22 View CF Control Units and Devices

14. From the HCD main menu, select Option 1.3. Processor List and press PF20 to display the SNA Address and Local Name (Figure 7-23).



```
                                Processor List       Row 1 of 8 More: <
Command ===> _______________________________________________ Scroll ===> CSR

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

                                   ----SNA Address + ---- ---Local---
/ Proc. ID Type +   Model +  Mode + Network Name  CPC Name System Name
_ ISGSYN   2064     1C7      LPAR   ________      ________ ________
_ ISGS11   2064     1C7      LPAR   ________      ________ ________
_ SCZP101  2094     S18      LPAR   USIBMSC       SCZP101  SCZP101
_ SCZP201  2097     E26      LPAR   USIBMSC       SCZP201  SCZP201
_ SCZP301  2817     M32      LPAR   USIBMSC       SCZP301  SCZP301
_ SCZP901  2084     C24      LPAR   USIBMSC       SCZP901  ________
_ TESTFLR1 2097     E26      LPAR   ________      ________ ________
_ TESTFLR2 2097     E26      LPAR   ________      ________ ________
```

Figure 7-23 Processor List (displaying local system name)

> **Note:** As described previously, in most cases the local system name value defaults to the recommended value of the CPC name, unless, during the addition of the new processor, the CPC name was not specified. In this case, HCD also leaves the local system name undefined.
>
> System A (SCZP101) is known to itself as the LSYSTEM or local system, and it sees System B (SCZP201) as the CSYSTEM or connecting system.
>
> System B (SCZP201) is known to itself as the LSYSTEM or local system, and it sees System A (SCZP101) as the CSYSTEM or connecting system.
>
> CSYSTEM, along with the other keywords associated with CIB type coupling links, can be seen in the IOCP deck. Refer to Figure 7-28 on page 375.

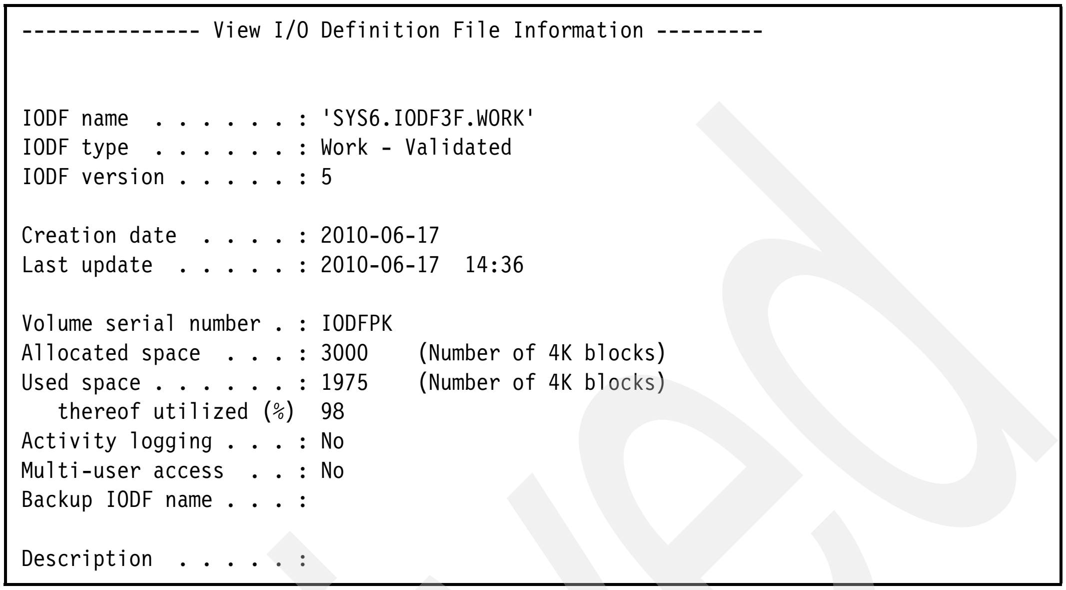
7.3 HCD: Validating the 2817 work IODF

To validate the 2817 work IODF, perform the following steps:

1. Select HCD Option 2.12. Build validated work I/O definition file.
2. Review the Message List.
3. Press PF3 to continue. You should receive the following message:

```
Requested action successfully processed
```

4. Select HCD Option 6.4. View I/O Definition File Information (Figure 7-24). Note that the IODF type is now `Work - Validated`.



```
--------------- View I/O Definition File Information ---------


IODF name  . . . . . . : 'SYS6.IODF3F.WORK'
IODF type  . . . . . . : Work - Validated
IODF version . . . . . : 5

Creation date  . . . . : 2010-06-17
Last update  . . . . . : 2010-06-17  14:36

Volume serial number . : IODFPK
Allocated space  . . . : 3000    (Number of 4K blocks)
Used space . . . . . . : 1975    (Number of 4K blocks)
   thereof utilized (%)  98
Activity logging . . . : No
Multi-user access  . . : No
Backup IODF name . . . :

Description  . . . . . :
```

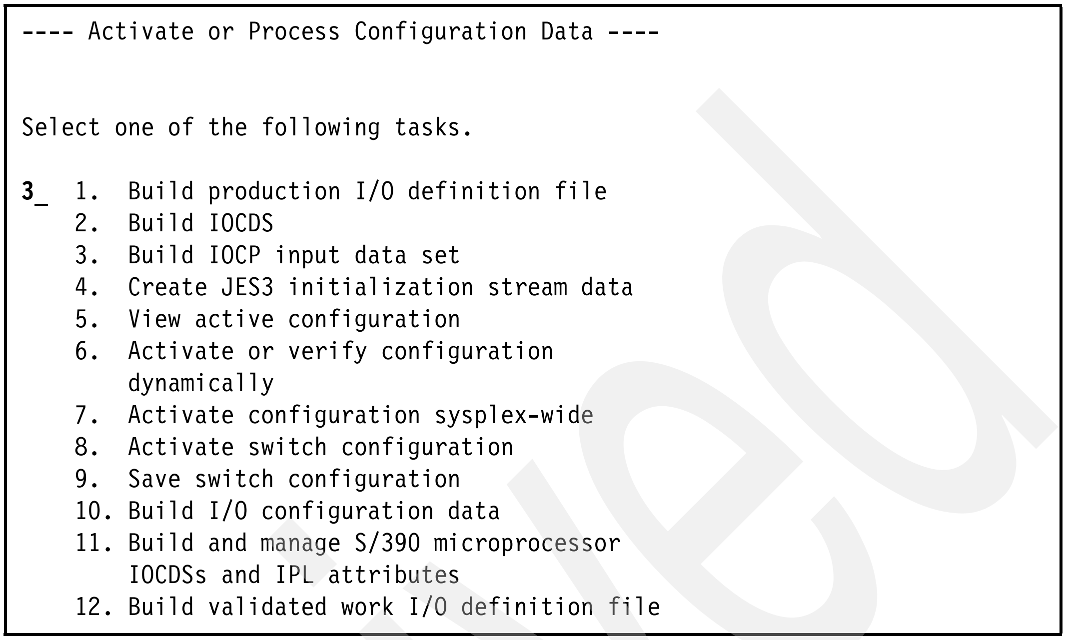
Figure 7-24 View I/O Definition File Information (validated work IODF)

7.3.1 Creating the IOCP statements for the CHPID Mapping Tool

Note: You might prefer to use HCM to create the IOCP statements file and transfer the file to your workstation. You can then launch the CHPID Mapping Tool, create an updated IOCP statements file, and transfer the file back to the host.

To create the IOCP statements for the CHPID Mapping Tool, perform the following steps:

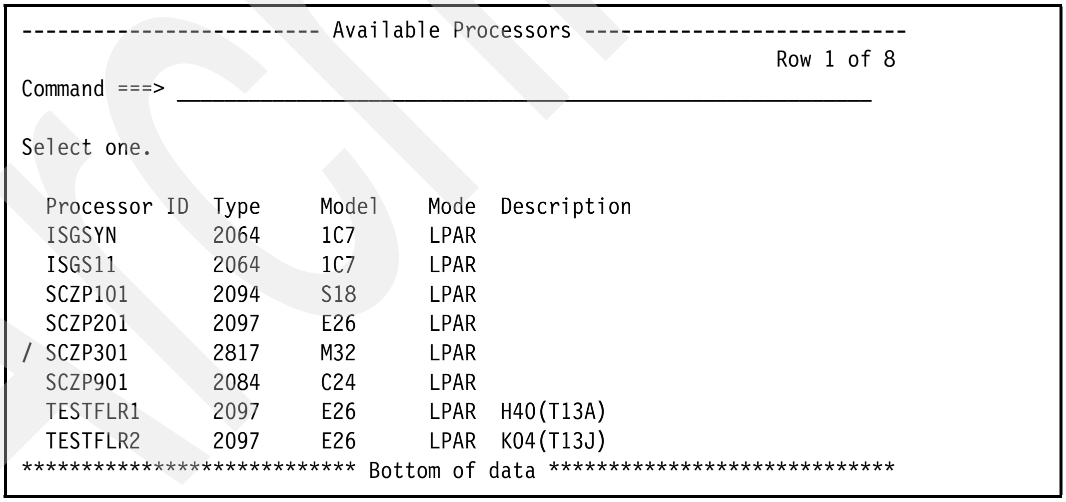
1. Select HCD Option 2.3. Build IOCP input data set and press Enter (Figure 7-25).



```
---- Activate or Process Configuration Data ----


Select one of the following tasks.

3_  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

Figure 7-25 Activate or Process Configuration Data (Build IOCP for SCZP201)

2. HCD displays the list of available processors to chose from (Figure 7-26). Select the SCZP301 processor by using a forward slash mark (/) and then press Enter.



```
------------------------- Available Processors ---------------------------
                                                                 Row 1 of 8
Command ===> ___________________________________________________________

Select one.

  Processor ID  Type     Model    Mode  Description
  ISGSYN        2064     1C7      LPAR
  ISGS11        2064     1C7      LPAR
  SCZP101       2094     S18      LPAR
  SCZP201       2097     E26      LPAR
/ SCZP301       2817     M32      LPAR
  SCZP901       2084     C24      LPAR
  TESTFLR1      2097     E26      LPAR  H40(T13A)
  TESTFLR2      2097     E26      LPAR  K04(T13J)
**************************** Bottom of data *****************************
```

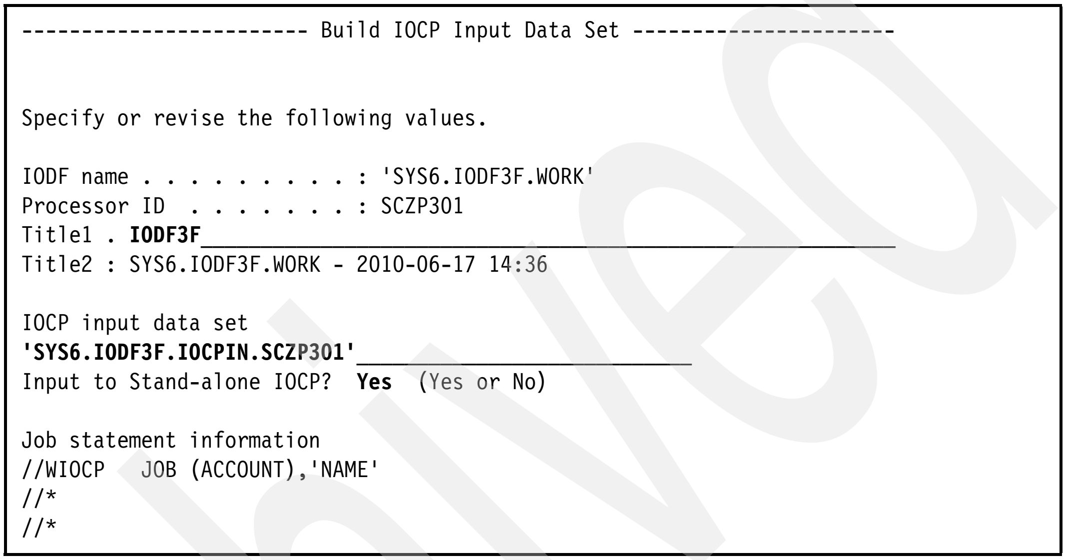
Figure 7-26 Available Processors (select processor for IOCP file)

3. HCD displays a panel on which you enter information regarding the IOCP input data set to be created (Figure 7-27).

   Complete the following fields:

   - `Title1`.
   - `IOCP input data set`.
   - Enter `Yes` in the `Input to Stand-alone IOCP?` field.
   - The `Job statement information` for the installation.

4. Press Enter. HCD submits a batch job to create the data set.



```
------------------------ Build IOCP Input Data Set -----------------------


Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF3F.WORK'
Processor ID  . . . . . . . : SCZP301
Title1 . IODF3F___________________________________________________________
Title2 : SYS6.IODF3F.WORK - 2010-06-17 14:36

IOCP input data set
'SYS6.IODF3F.IOCPIN.SCZP301'____________________________
Input to Stand-alone IOCP?  Yes  (Yes or No)

Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
```

Figure 7-27 Build IOCP Input Data Set

5. Verify in TSO that the data set just created exists and that it contains IOCP statements. This data set is used as input into the CHPID Mapping Tool (Figure 7-28). Also shown here is the LSYSTEM keyword and the CHPID statement showing the CPATH and CSYSTEM keywords.

```
ID    MSG1='IODF3F',                                          *
      MSG2='SYS6.IODF3F.WORK - 2010-06-17 14:36',              *
      SYSTEM=(2817,1),LSYSTEM=SCZP301,                        *
      TOK=('SCZP301',008000013BD52817143640010110168F00000000,*
      00000000,'10-06-17','14:36:40','........','........')
RESOURCE PARTITION=((CSS(0),(A0A,A),(A0B,B),(A0C,C),(A0D,D),(A*
      0E,E),(A0F,F),(A01,1),(A02,2),(A03,3),(A04,4),(A05,5),(A*
      06,6),(A07,7),(A08,8),(A09,9)),(CSS(1),(A1E,E),(A1F,F),(*
      A11,1),(A12,2),(*,3),(*,4),(*,5),(*,6),(*,7),(*,8),(*,9)*
      ,(*,A),(*,B),(*,C),(*,D)),(CSS(2),(A21,1),(*,2),(*,3),(**
      ,4),(*,5),(*,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D*
      ),(*,E),(*,F)),(CSS(3),(A31,1),(*,2),(*,3),(*,4),(*,5),(*
      *,6),(*,7),(*,8),(*,9),(*,A),(*,B),(*,C),(*,D),(*,E),(*,*
      F)))
CHPID PATH=(CSS(0,1,2,3),00),SHARED,                           *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),PCHID=5A0,TYPE=OSD
CHPID PATH=(CSS(0,1,2,3),01),SHARED,                           *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),PCHID=5B0,TYPE=OSC
.................................................................
CHPID PATH=(CSS(0),84),SHARED,PARTITION=((A01),(=)),          *
      CPATH=(CSS(0),B0),CSYSTEM=SCZP101,AID=0B,PORT=1,TYPE=CIB
.................................................................
CNTLUNIT CUNUMBR=FFDC,PATH=((CSS(0),84)),UNIT=CFP
IODEVICE ADDRESS=(FD86,007),CUNUMBR=(FFDC),UNIT=CFP
```

Figure 7-28 IOCP input data set contents (truncated)

Note that part of the TOK statement has been blanked out with dots (Example 7-1).

Example 7-1 IOCP file (TOK statement)

```
TOK=('SCZP301',008000013BD52817143640010110168F00000000,*
00000000,'10-06-17','14:36:40','........','........')
```

This is a safeguard to ensure that this IOCP file cannot be written to a processor and used for a power-on reset because this IOCP file was created from a validated work IODF and not a production IODF, which is something that can be done only for processors that contain PCHID definitions.

> **Important:** When an IOCP statement file is exported from a Validated Work IODF using HCD, it must be imported *back* to HCD for the process to be valid. The IOCP file cannot be used directly by the IOCP program.

6. Download this file from z/OS to your workstation. Use a workstation file transfer facility such as the one in IBM Personal Communications Workstation Program, or any equivalent 3270 emulation program. Be sure to use TEXT as the transfer type. In this example, we call this file `SCZP301in.iocp`.

7.4 CMT: Assigning PCHIDs to CHPIDs

In this section, we take the output from the previous set of HCD steps (IOCP) (see 7.3.1, “Creating the IOCP statements for the CHPID Mapping Tool” on page 372), as well as the output from the 2817 order process (CFReport). We then use the CHPID Mapping Tool to assign PCHIDs to CHPIDs in the configuration.

Download and install the CHPID Mapping Tool (CMT). Refer to 2.1.5, “CHPID Mapping Tool” on page 28 for information about obtaining and installing the CMT. If you already have the CHPID Mapping Tool installed, verify that you have the latest updates installed.

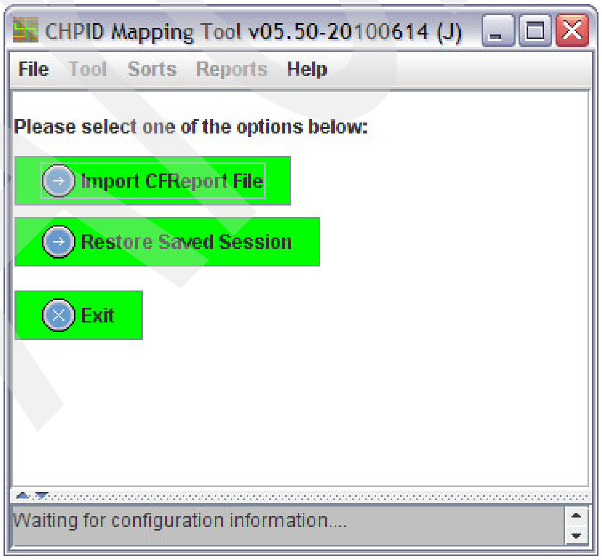
Using the CHPID Mapping Tool, perform the following steps:

1. Import the IOCP statements file and the new 2817 `CFReport` file into the CHPID Mapping Tool. Importing the IOCP statements can be performed with HCM.
2. Resolve CHPIDs without associated hardware.
3. Resolve hardware resolution.
4. Set CU Priority for single-path control units and other control units that would override the CHPID Mapping Tool default priorities.
5. Run the CHPID Mapping Tool availability function.
6. Create the CHPID Mapping Tool CHPID reports.
7. Create an updated IOCP statements file and transfer it back to the host. This step can be performed with HCM.

7.4.1 Importing the CFReport order file into the CHPID Mapping Tool

To importing the `CFReport` order file into the CHPID Mapping Tool, perform the following steps:

1. Start the CHPID Mapping Tool on your workstation.
2. Import the `CFReport` order file into the CHPID Mapping Tool by selecting **File** → **Import CFReport Order file** (Figure 7-29).

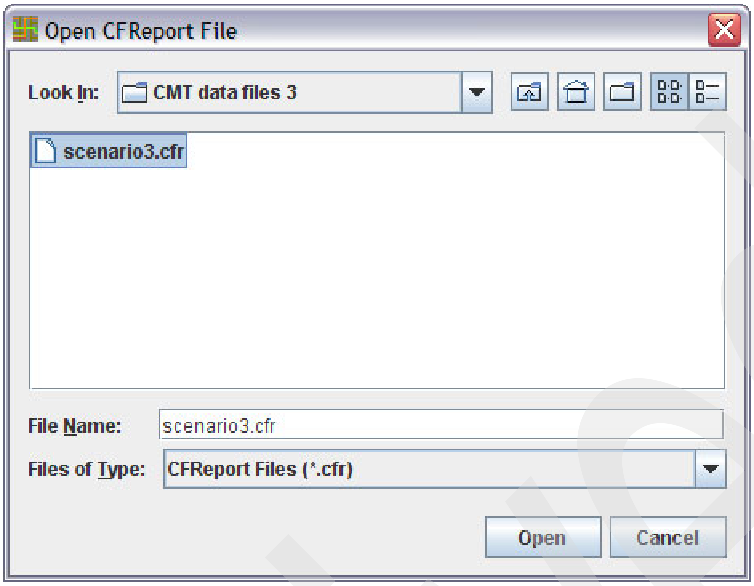


Please select one of the options below:

Waiting for configuration information....

Figure 7-29 Import CFReport Order file

3. Select the `CFReport` file on your workstation to import it into the CHPID Mapping Tool and click **Open** (Figure 7-30).



Open CFReport File

Look In: CMT data files 3

scenario3.cfr

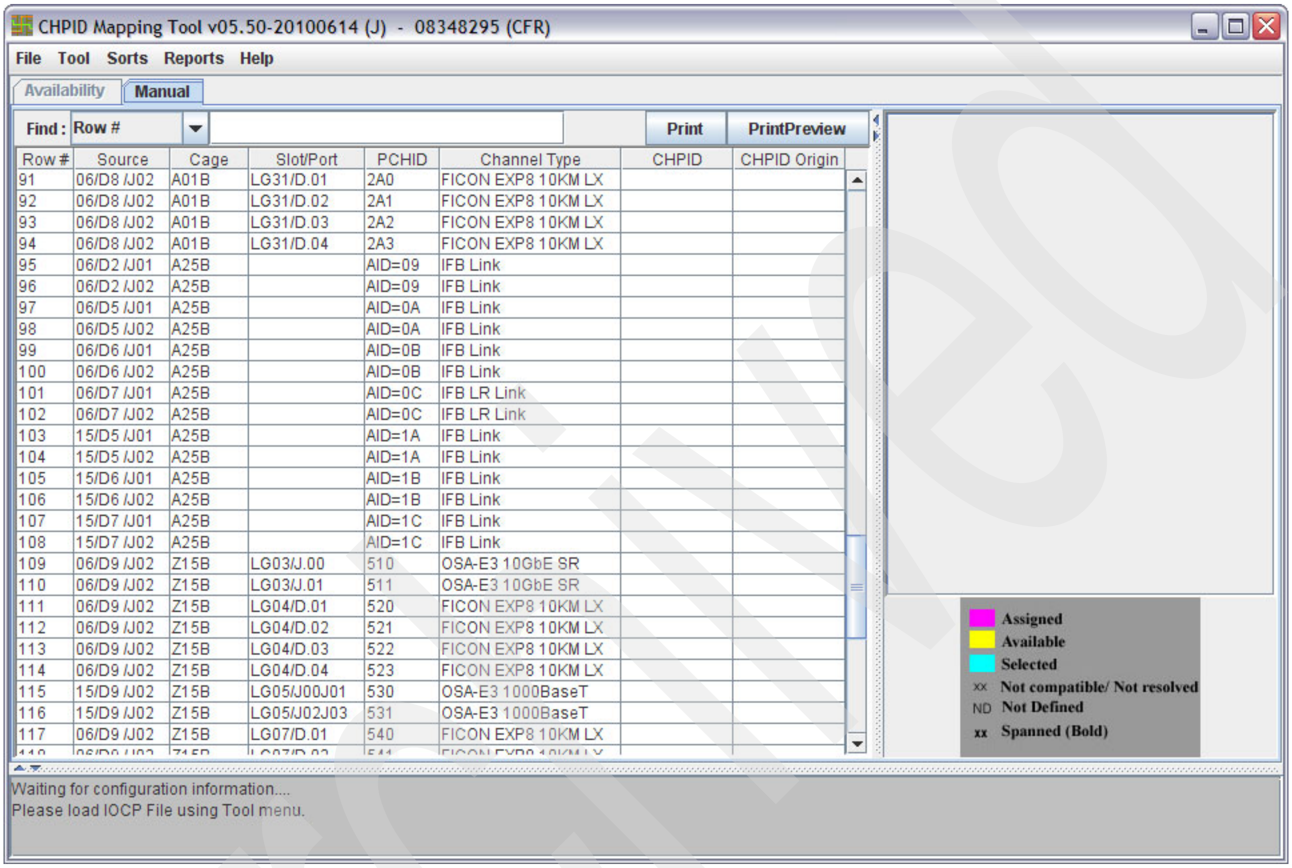
File Name: scenario3.cfr

Files of Type: CFReport Files (*.cfr)

Figure 7-30 Open CFReport Order file

The CHPID Mapping Tool displays the information from the CFReport on the left side of the window (Figure 7-31).

Note: This window also shows the Adapter IDs for the four HCAs that have been ordered for this processor.



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
91	06/D8 /J02	A01B	LG31/D.01	2A0	FICON EXP8 10KM LX		
92	06/D8 /J02	A01B	LG31/D.02	2A1	FICON EXP8 10KM LX		
93	06/D8 /J02	A01B	LG31/D.03	2A2	FICON EXP8 10KM LX		
94	06/D8 /J02	A01B	LG31/D.04	2A3	FICON EXP8 10KM LX		
95	06/D2 /J01	A25B		AID=09	IFB Link		
96	06/D2 /J02	A25B		AID=09	IFB Link		
97	06/D5 /J01	A25B		AID=0A	IFB Link		
98	06/D5 /J02	A25B		AID=0A	IFB Link		
99	06/D6 /J01	A25B		AID=0B	IFB Link		
100	06/D6 /J02	A25B		AID=0B	IFB Link		
101	06/D7 /J01	A25B		AID=0C	IFB LR Link		
102	06/D7 /J02	A25B		AID=0C	IFB LR Link		
103	15/D5 /J01	A25B		AID=1A	IFB Link		
104	15/D5 /J02	A25B		AID=1A	IFB Link		
105	15/D6 /J01	A25B		AID=1B	IFB Link		
106	15/D6 /J02	A25B		AID=1B	IFB Link		
107	15/D7 /J01	A25B		AID=1C	IFB Link		
108	15/D7 /J02	A25B		AID=1C	IFB Link		
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR		
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR		
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX		
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX		
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX		
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX		
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT		
116	15/D9 /J02	Z15B	LG05/J02J03	531	OSA-E3 1000BaseT		
117	06/D9 /J02	Z15B	LG07/D.01	540	FICON EXP8 10KM LX		

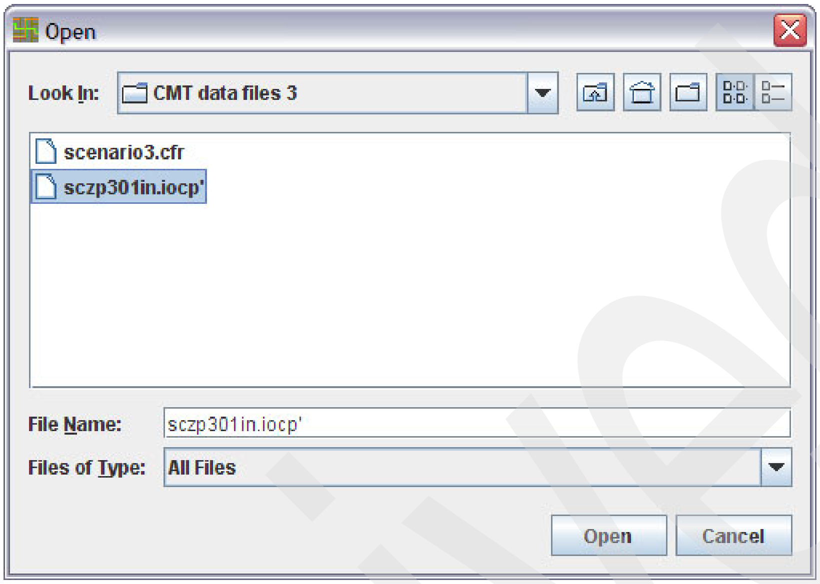
Waiting for configuration information....
Please load IOCP File using Tool menu.

Figure 7-31 Importing the CFReport Order file

7.4.2 Importing the IOCP file into the CHPID Mapping Tool

To import IOCP file into the CHPID Mapping Tool, perform the following steps:

1. Import the IOCP file by selecting **Tool** → **Import IOCP File** (Figure 7-32).



File Name: sczp301in.iocp'

Files of Type: All Files

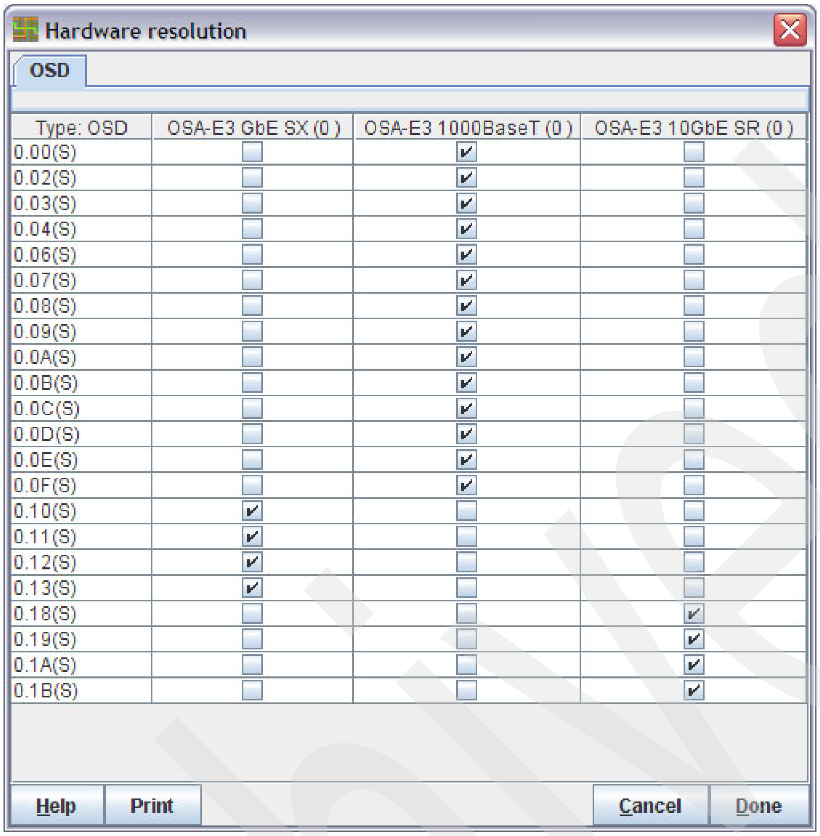
Figure 7-32 Import the IOCP files

2. Select the IOCP file on your workstation to import into the CHPID Mapping Tool and click **Open**.

7.4.3 Hardware resolution

The CHPID Mapping Tool may prompt you to resolve issues that may arise from importing the IOCP file. In our example, the CHPID Mapping Tool wanted clarification on the TYPE=OSD channels.

In each case, we must check off for what each of the channels is used (Figure 7-33).



Type: OSD	OSA-E3 GbE SX (0)	OSA-E3 1000BaseT (0)	OSA-E3 10GbE SR (0)
0.00(S)	☐	☑	☐
0.02(S)	☐	☑	☐
0.03(S)	☐	☑	☐
0.04(S)	☐	☑	☐
0.06(S)	☐	☑	☐
0.07(S)	☐	☑	☐
0.08(S)	☐	☑	☐
0.09(S)	☐	☑	☐
0.0A(S)	☐	☑	☐
0.0B(S)	☐	☑	☐
0.0C(S)	☐	☑	☐
0.0D(S)	☐	☑	☐
0.0E(S)	☐	☑	☐
0.0F(S)	☐	☑	☐
0.10(S)	☑	☐	☐
0.11(S)	☑	☐	☐
0.12(S)	☑	☐	☐
0.13(S)	☑	☐	☐
0.18(S)	☐	☐	☑
0.19(S)	☐	☐	☑
0.1A(S)	☐	☐	☑
0.1B(S)	☐	☐	☑

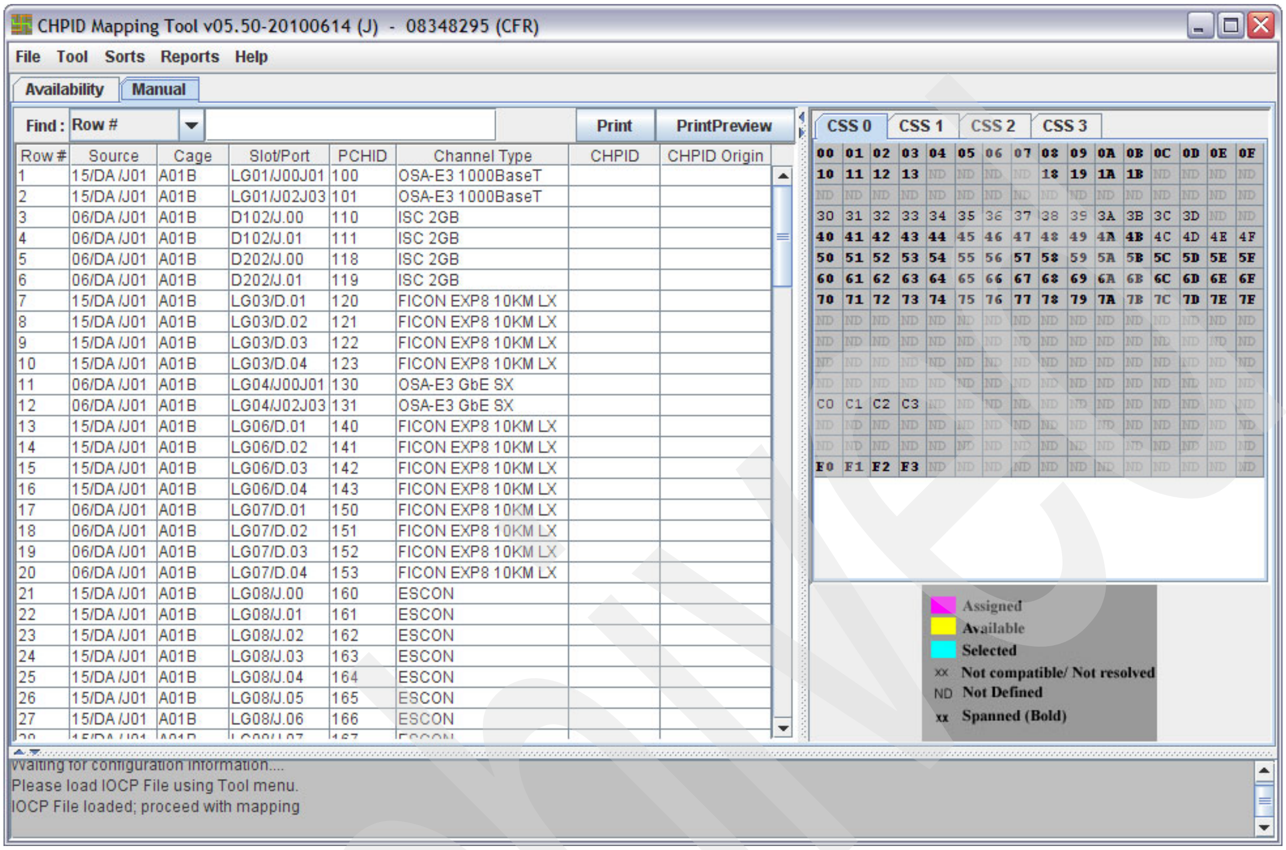
Figure 7-33 Hardware resolution after IOCP import

Select one tab at a time. In one of our examples, the CHPID Mapping Tool needs to know which channel type the OSD CHPID definitions use between the OSA-Express3 GbE, OSA-Express3 100BaseT, and OSA-Express3 10 GbE. Select the desired box and move to the next tab until all CHPID definitions have hardware selected.

The CHPID Mapping Tool displays all of the information that it currently knows.

Click **Done** when all the selections have been made.

The CHPID Mapping Tool displays all of the currently known information. Note that the CHPID column and the CHPID Origin column are completed after the CHPID Mapping Tool assigns the CHPIDs to PCHIDs (Figure 7-34).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT		
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT		
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB		
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB		
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB		
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB		
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX		
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX		
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX		
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX		
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX		
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX		
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX		
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX		
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX		
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX		
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX		
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX		
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX		
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX		
21	15/DA /J01	A01B	LG08/J.00	160	ESCON		
22	15/DA /J01	A01B	LG08/J.01	161	ESCON		
23	15/DA /J01	A01B	LG08/J.02	162	ESCON		
24	15/DA /J01	A01B	LG08/J.03	163	ESCON		
25	15/DA /J01	A01B	LG08/J.04	164	ESCON		
26	15/DA /J01	A01B	LG08/J.05	165	ESCON		
27	15/DA /J01	A01B	LG08/J.06	166	ESCON		

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

🟪 Assigned
🟨 Available
🟦 Selected
xx Not compatible/ Not resolved
ND Not Defined
xx Spanned (Bold)

Waiting for configuration information....
Please load IOCP File using Tool menu.
IOCP File loaded; proceed with mapping

Figure 7-34 CMT: Manual tab

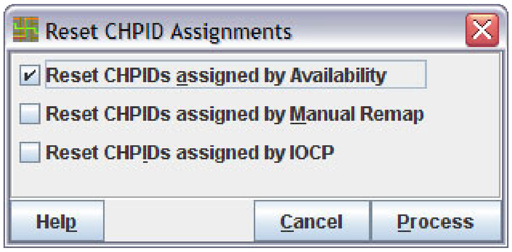
7.4.4 Setting the Control Unit priority manually

To set the Control Unit priority manually, perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click the **Process** CU Priority and a window opens. The Reset CHPID Assignment window allows you to change the CHPID values:
   - Reset CHPIDs assigned by Availability.
   - Reset CHPIDs assigned by Manual Remap.
   - Reset CHPIDs assigned by IOCP.

   In our example, we select **Reset CHPIDs assigned by Availability** because no PCHIDs were defined in the manual window.

3. Click **Process** (Figure 7-35).



Reset CHPID Assignments

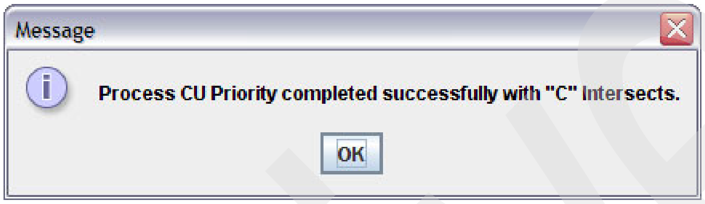
☑ Reset CHPIDs assigned by Availability

☐ Reset CHPIDs assigned by Manual Remap

☐ Reset CHPIDs assigned by IOCP

Figure 7-35 Reset CHPID Assignments by Availability

4. After the CHPID Mapping Tool has assigned the CHPIDs, a message indicating the results of the process is displayed (Figure 7-36).



Message

Process CU Priority completed successfully with "C" intersects.

Figure 7-36 Process CU Priority completion message

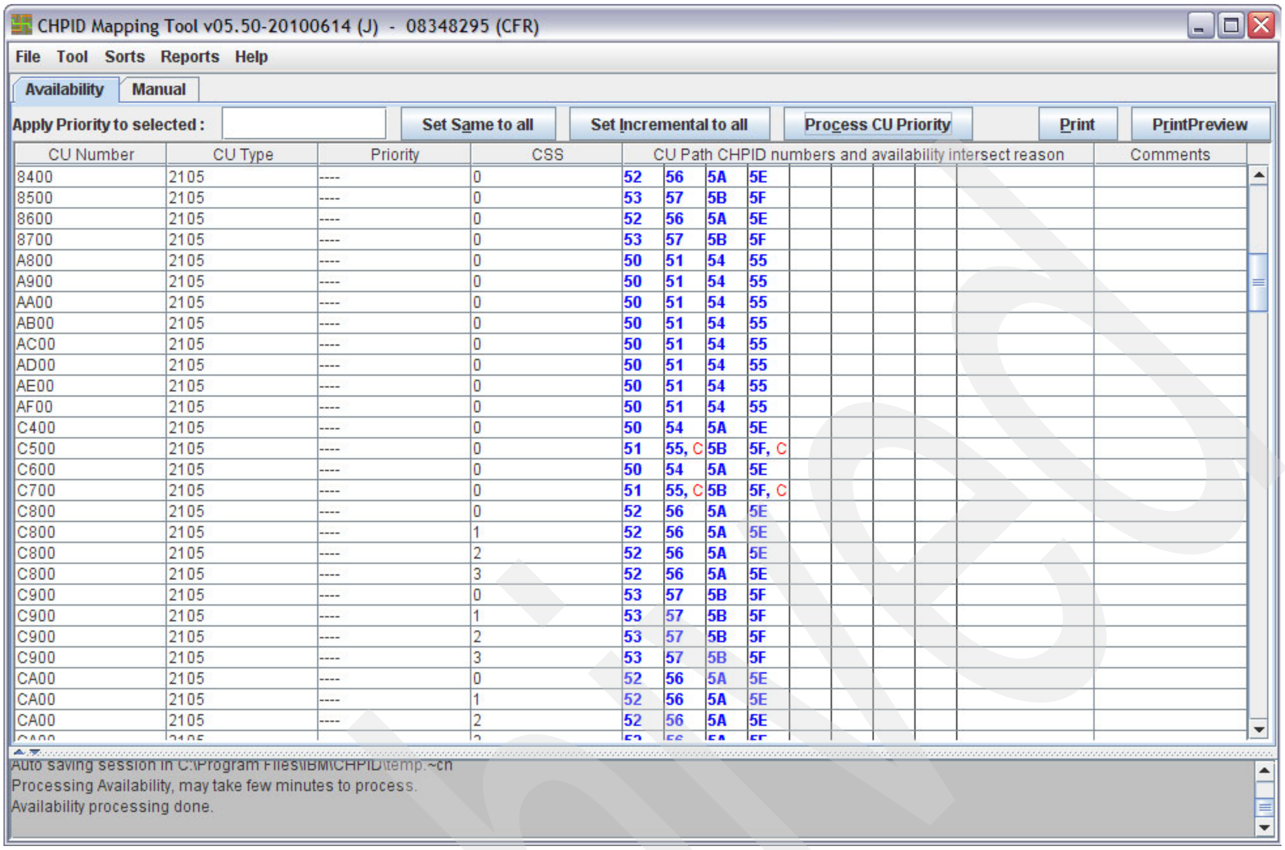
Our example returned C type intersects

The following list defines the possible intersects:

C	Two or more assigned channels use the same channel card.
S	Greater than half the assigned channels use the same STI.
M	All assigned channels are supported by the same MBA group.
B	More than half the assigned channels are supported by the same book.
D	Assigned channels are on the same daughter card.

> **Note:** Intersect messages inform you of a potential availability problem detected by the CMT, but do not necessarily indicate an error. It is *your* responsibility to evaluate whether the condition should be corrected or not.

5. Click **OK**. Figure 7-37 shows the C intersects under the Availability tab.

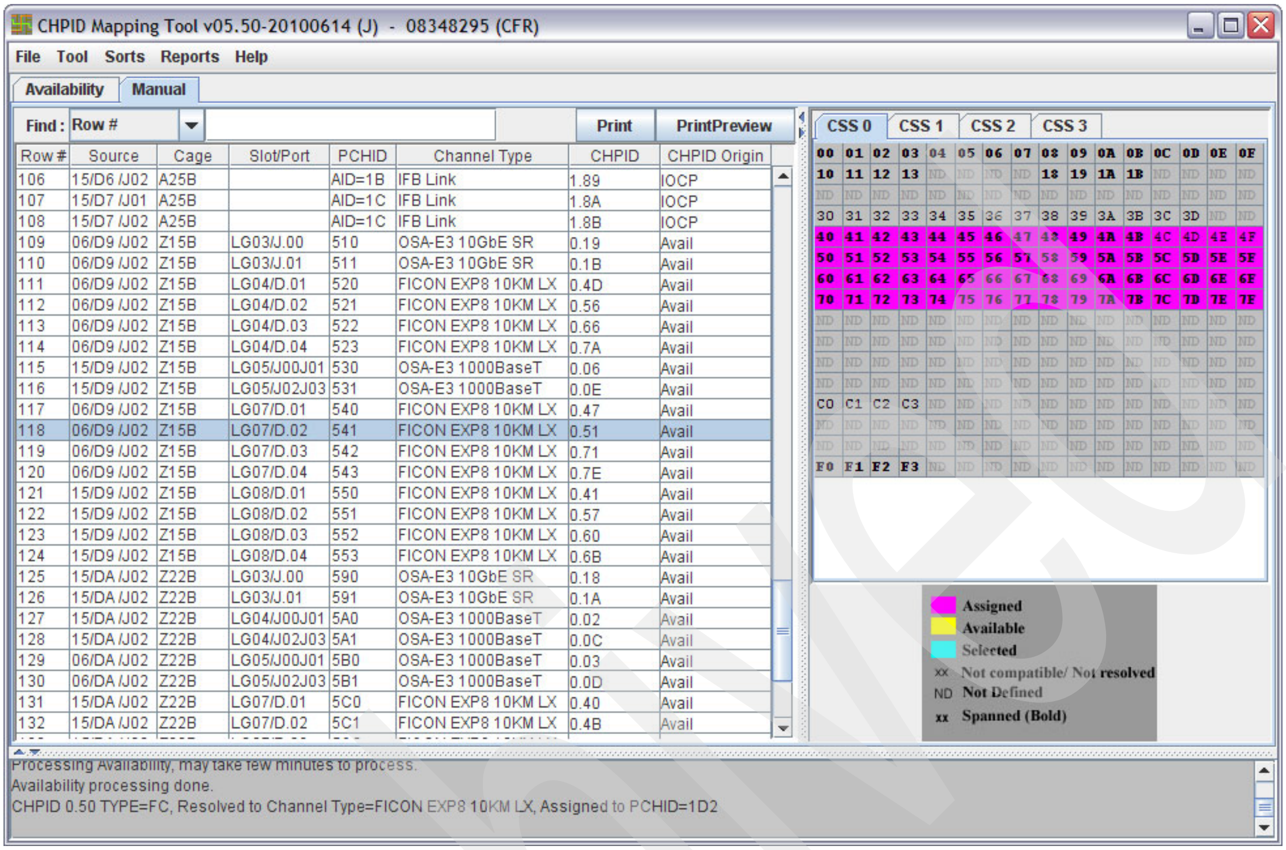


CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason				Comments
8400	2105	----	0	52	56	5A	5E	
8500	2105	----	0	53	57	5B	5F	
8600	2105	----	0	52	56	5A	5E	
8700	2105	----	0	53	57	5B	5F	
A800	2105	----	0	50	51	54	55	
A900	2105	----	0	50	51	54	55	
AA00	2105	----	0	50	51	54	55	
AB00	2105	----	0	50	51	54	55	
AC00	2105	----	0	50	51	54	55	
AD00	2105	----	0	50	51	54	55	
AE00	2105	----	0	50	51	54	55	
AF00	2105	----	0	50	51	54	55	
C400	2105	----	0	50	54	5A	5E	
C500	2105	----	0	51	55, C	5B	5F, C	
C600	2105	----	0	50	54	5A	5E	
C700	2105	----	0	51	55, C	5B	5F, C	
C800	2105	----	0	52	56	5A	5E	
C800	2105	----	1	52	56	5A	5E	
C800	2105	----	2	52	56	5A	5E	
C800	2105	----	3	52	56	5A	5E	
C900	2105	----	0	53	57	5B	5F	
C900	2105	----	1	53	57	5B	5F	
C900	2105	----	2	53	57	5B	5F	
C900	2105	----	3	53	57	5B	5F	
CA00	2105	----	0	52	56	5A	5E	
CA00	2105	----	1	52	56	5A	5E	
CA00	2105	----	2	52	56	5A	5E	

```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~cn
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 7-37 C type intersects under the Availability tab

6. Click the **Manual** tab and notice the C intersects (Figure 7-38).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
106	15/D6 /J02	A25B		AID=1B	IFB Link	1.89	IOCP
107	15/D7 /J01	A25B		AID=1C	IFB Link	1.8A	IOCP
108	15/D7 /J02	A25B		AID=1C	IFB Link	1.8B	IOCP
109	06/D9 /J02	Z15B	LG03/J.00	510	OSA-E3 10GbE SR	0.19	Avail
110	06/D9 /J02	Z15B	LG03/J.01	511	OSA-E3 10GbE SR	0.1B	Avail
111	06/D9 /J02	Z15B	LG04/D.01	520	FICON EXP8 10KM LX	0.4D	Avail
112	06/D9 /J02	Z15B	LG04/D.02	521	FICON EXP8 10KM LX	0.56	Avail
113	06/D9 /J02	Z15B	LG04/D.03	522	FICON EXP8 10KM LX	0.66	Avail
114	06/D9 /J02	Z15B	LG04/D.04	523	FICON EXP8 10KM LX	0.7A	Avail
115	15/D9 /J02	Z15B	LG05/J00J01	530	OSA-E3 1000BaseT	0.06	Avail
116	15/D9 /J02	Z15B	LG05/J02J03	531	OSA-E3 1000BaseT	0.0E	Avail
117	06/D9 /J02	Z15B	LG07/D.01	540	FICON EXP8 10KM LX	0.47	Avail
118	06/D9 /J02	Z15B	LG07/D.02	541	FICON EXP8 10KM LX	0.51	Avail
119	06/D9 /J02	Z15B	LG07/D.03	542	FICON EXP8 10KM LX	0.71	Avail
120	06/D9 /J02	Z15B	LG07/D.04	543	FICON EXP8 10KM LX	0.7E	Avail
121	15/D9 /J02	Z15B	LG08/D.01	550	FICON EXP8 10KM LX	0.41	Avail
122	15/D9 /J02	Z15B	LG08/D.02	551	FICON EXP8 10KM LX	0.57	Avail
123	15/D9 /J02	Z15B	LG08/D.03	552	FICON EXP8 10KM LX	0.60	Avail
124	15/D9 /J02	Z15B	LG08/D.04	553	FICON EXP8 10KM LX	0.6B	Avail
125	15/DA /J02	Z22B	LG03/J.00	590	OSA-E3 10GbE SR	0.18	Avail
126	15/DA /J02	Z22B	LG03/J.01	591	OSA-E3 10GbE SR	0.1A	Avail
127	15/DA /J02	Z22B	LG04/J00J01	5A0	OSA-E3 1000BaseT	0.02	Avail
128	15/DA /J02	Z22B	LG04/J02J03	5A1	OSA-E3 1000BaseT	0.0C	Avail
129	06/DA /J02	Z22B	LG05/J00J01	5B0	OSA-E3 1000BaseT	0.03	Avail
130	06/DA /J02	Z22B	LG05/J02J03	5B1	OSA-E3 1000BaseT	0.0D	Avail
131	15/DA /J02	Z22B	LG07/D.01	5C0	FICON EXP8 10KM LX	0.40	Avail
132	15/DA /J02	Z22B	LG07/D.02	5C1	FICON EXP8 10KM LX	0.4B	Avail

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

```
Processing Availability, may take few minutes to process.
Availability processing done.
CHPID 0.50 TYPE=FC, Resolved to Channel Type=FICON EXP8 10KM LX, Assigned to PCHID=1D2
```

Figure 7-38 C type intersects under the Manual tab

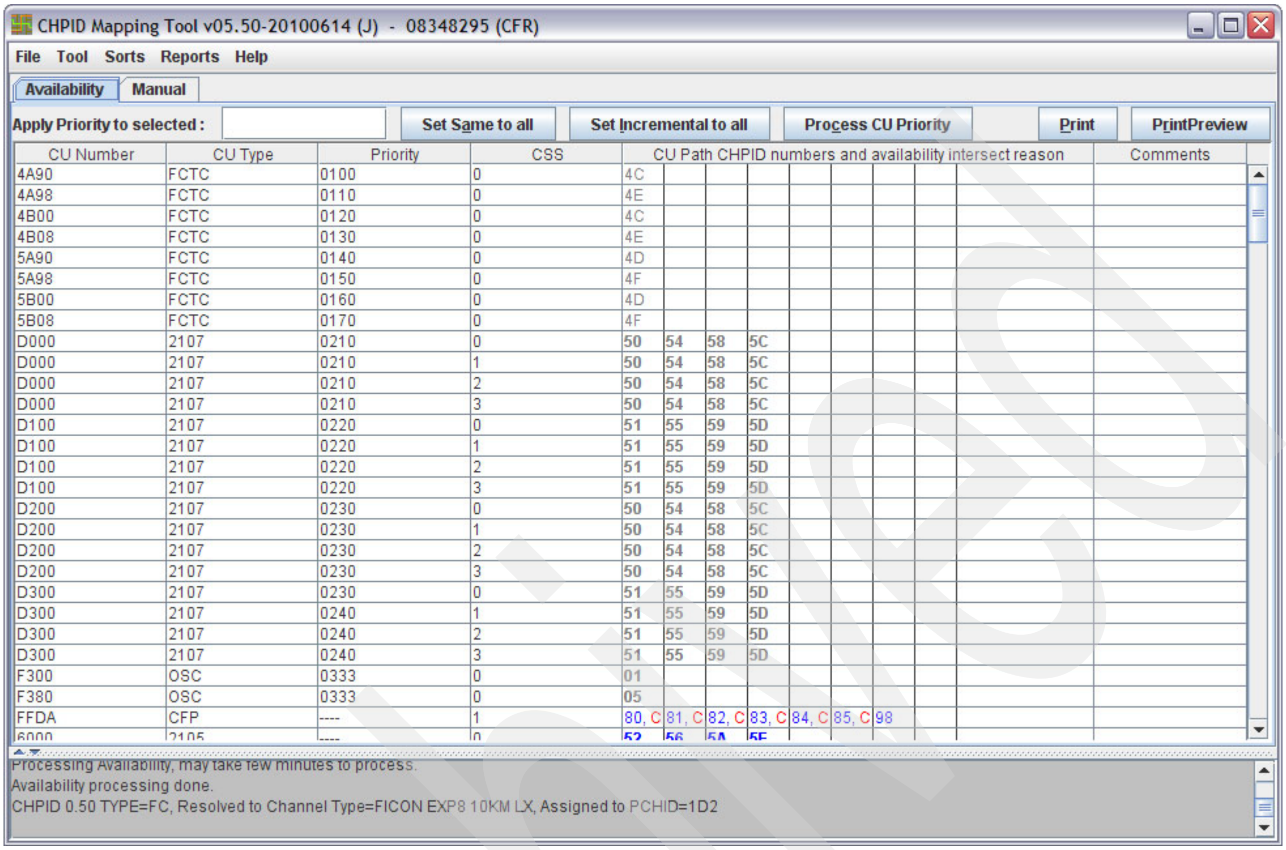
The CHPID Mapping Tool can only identify these intersects. Go back to the HCD and redefine the PSIFB connections over different HCAs, run another validation and import the IOCP statements into CMT, and run the Process CU function again.

You can now display the results of the channel mapping. You can also sort the report in different ways. For example, to see how the CHPID Mapping Tool ranked the control units, select **Sorts** → **By CU Priority**.

Our example does not contain any control units set with CU Priority, but we do need to check and set values for items such as OSA-ICC CHPIDs and CTC CHPIDs to ensure that the CHPID Mapping Tool allocates these CHPIDs with high PCHID availability.

Go through the listing and search through the CU Number column for any control units for which you want to set a priority.

In our example, we set the OSC type CU Numbers F300 and F380 to priority 333 plus a few FCTCs and a 2107 CU (Figure 7-39).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason									Comments
4A90	FCTC	0100	0	4C									
4A98	FCTC	0110	0	4E									
4B00	FCTC	0120	0	4C									
4B08	FCTC	0130	0	4E									
5A90	FCTC	0140	0	4D									
5A98	FCTC	0150	0	4F									
5B00	FCTC	0160	0	4D									
5B08	FCTC	0170	0	4F									
D000	2107	0210	0	50	54	58	5C						
D000	2107	0210	1	50	54	58	5C						
D000	2107	0210	2	50	54	58	5C						
D000	2107	0210	3	50	54	58	5C						
D100	2107	0220	0	51	55	59	5D						
D100	2107	0220	1	51	55	59	5D						
D100	2107	0220	2	51	55	59	5D						
D100	2107	0220	3	51	55	59	5D						
D200	2107	0230	0	50	54	58	5C						
D200	2107	0230	1	50	54	58	5C						
D200	2107	0230	2	50	54	58	5C						
D200	2107	0230	3	50	54	58	5C						
D300	2107	0230	0	51	55	59	5D						
D300	2107	0240	1	51	55	59	5D						
D300	2107	0240	2	51	55	59	5D						
D300	2107	0240	3	51	55	59	5D						
F300	OSC	0333	0	01									
F380	OSC	0333	0	05									
FFDA	CFP	----	1	80, C	81, C	82, C	83, C	84, C	85, C	98			
6000	2105	----	0	52	56	5A	5E						

```
Processing Availability, may take few minutes to process.
Availability processing done.
CHPID 0.50 TYPE=FC, Resolved to Channel Type=FICON EXP8 10KM LX, Assigned to PCHID=1D2
```

Figure 7-39 CMT: Set CU Priority

If there are coupling links used by a CF image, you should group these links.

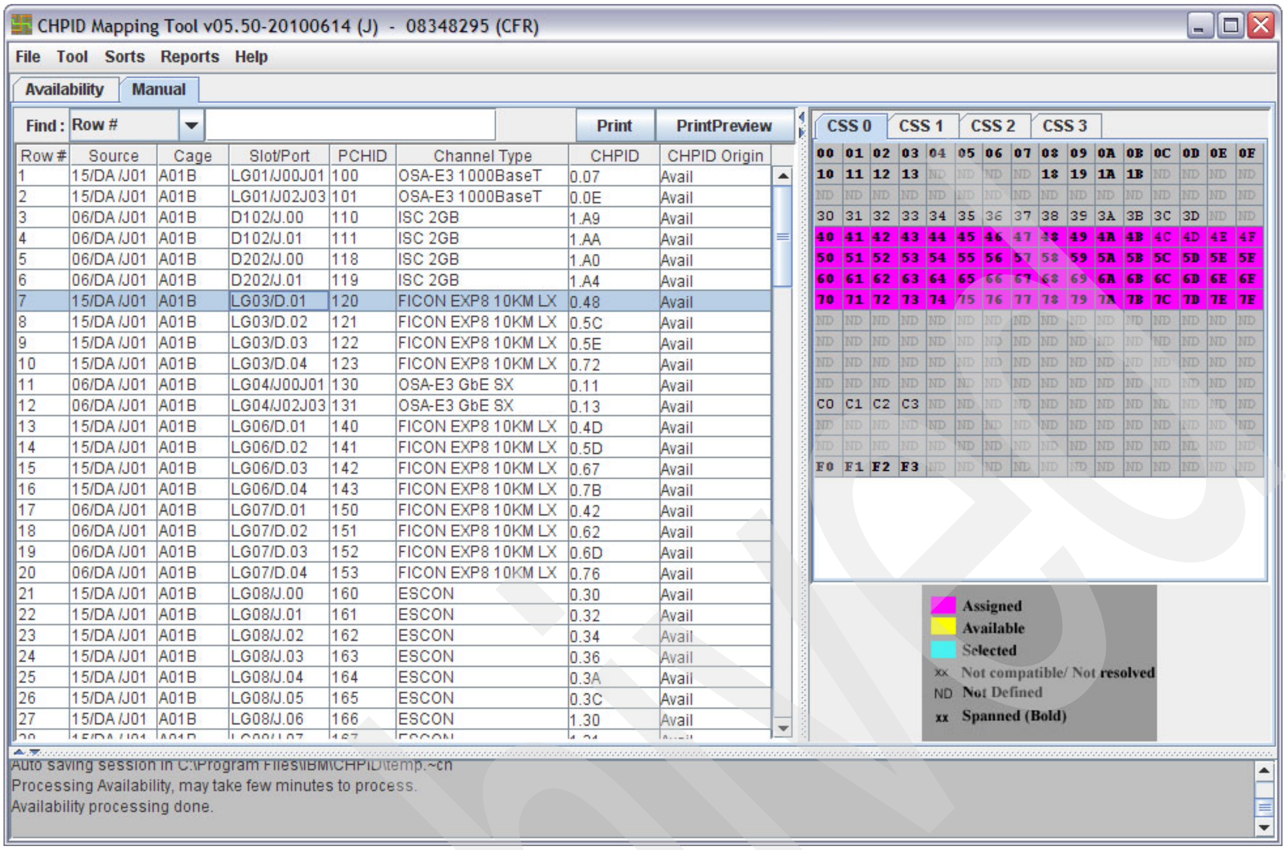
Each set of CHPIDs going to a different CPC should be grouped with a common priority. For example, suppose the CF image has four links (CHPIDs 40, 41, 42, and 43) and that 40 and 41 go to one CPC, and 42 and 43 go to a different CPC. In this case, you should give CHPIDs 40 and 41 one priority and CHPIDs 42 and 43 a different priority. The concept is the same regardless of the number of connecting CPCs or the number of links to each CPC.

To group CHPIDs by a common priority, perform the following steps:

1. Under the File menu, click the **Availability** tab.
2. Click **Process CU Priority**. The Reset CHPID Assignment window opens and allows you to change the CHPID values:
   - Reset CHPIDs assigned by Availability.
   - Reset CHPIDs assigned by Manual Remap.
   - Reset CHPIDs assigned by IOCP.

   In our example, we select **Reset CHPIDs assigned by Availability**.
3. Click **Process**.
4. Select **Sorts** → **By CU Priority** and note that the OSC type control units with priority of 333 have been sorted to the top of the list.

5. Click the **Manual** tab to view the results of mapping the CHPIDs (Figure 7-40).



Row #	Source	Cage	Slot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1	15/DA /J01	A01B	LG01/J00J01	100	OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.42	Avail
18	06/DA /J01	A01B	LG07/D.02	151	FICON EXP8 10KM LX	0.62	Avail
19	06/DA /J01	A01B	LG07/D.03	152	FICON EXP8 10KM LX	0.6D	Avail
20	06/DA /J01	A01B	LG07/D.04	153	FICON EXP8 10KM LX	0.76	Avail
21	15/DA /J01	A01B	LG08/J.00	160	ESCON	0.30	Avail
22	15/DA /J01	A01B	LG08/J.01	161	ESCON	0.32	Avail
23	15/DA /J01	A01B	LG08/J.02	162	ESCON	0.34	Avail
24	15/DA /J01	A01B	LG08/J.03	163	ESCON	0.36	Avail
25	15/DA /J01	A01B	LG08/J.04	164	ESCON	0.3A	Avail
26	15/DA /J01	A01B	LG08/J.05	165	ESCON	0.3C	Avail
27	15/DA /J01	A01B	LG08/J.06	166	ESCON	1.30	Avail

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	ND	ND	ND	ND	18	19	1A	1B	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	ND	ND
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C0	C1	C2	C3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
F0	F1	F2	F3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

🟪	Assigned
🟨	Available
🟦	Selected
xx	Not compatible/ Not resolved
ND	Not Defined
xx	Spanned (Bold)

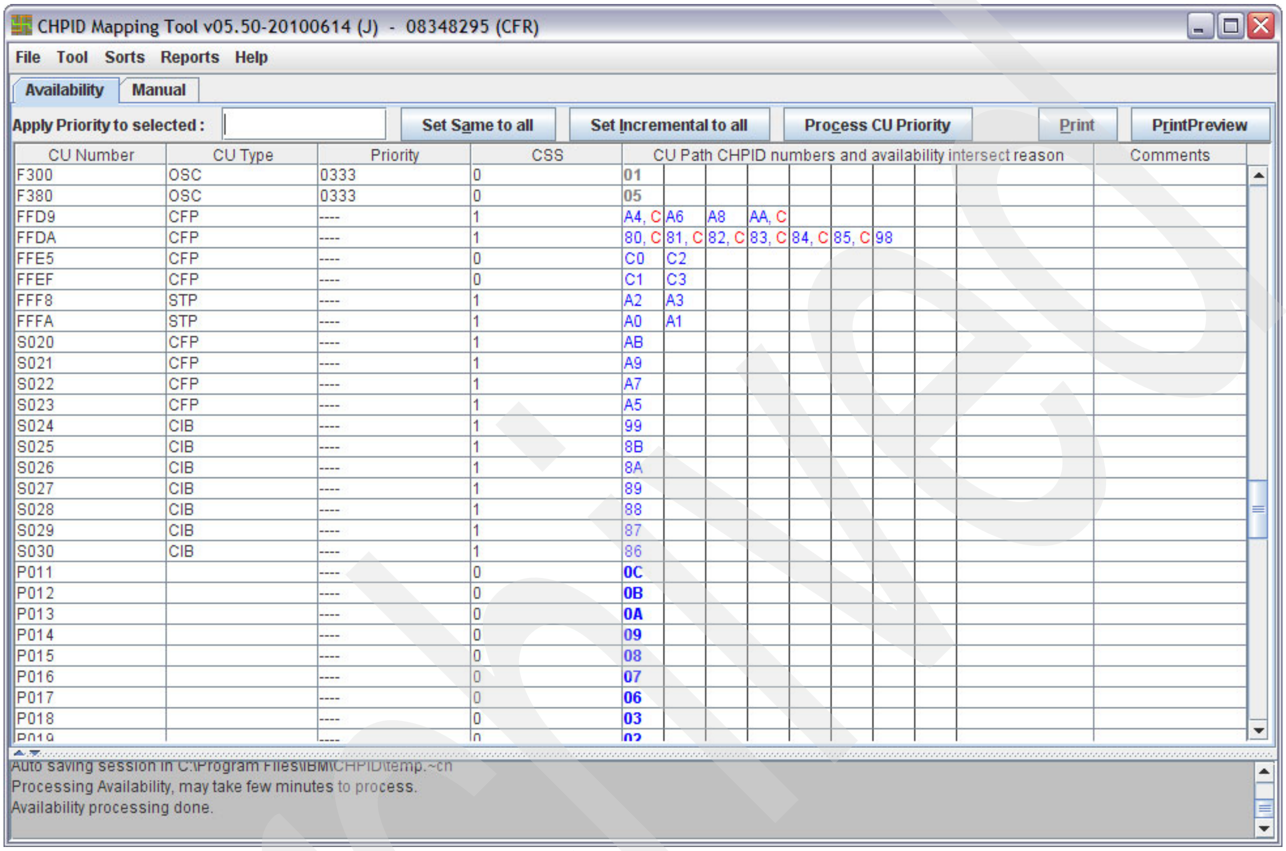
```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~ch
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 7-40 Manual (CHPIDs assigned)

Note that the CHPID column and the CHPID Origin column are no longer blank. The CHPID Mapping Tool has assigned CHPIDs to PCHIDs, and placed the Avail value in the CHPID Origin column, indicating that the CHPID values were assigned based on availability.

7.4.5 CHPIDs not connected to Control Units

Under the Availability tab, select **Sorts** → **By Control Unit**. The CHPID Mapping Tool displays at the end of the list all CHPIDs defined in the IOCP input that are not connected to control units. All coupling CHPIDs in this list are preceded with an “S” in the CU Number column. All non-coupling CHPIDs are preceded with a “P” (see Figure 7-41).



CU Number	CU Type	Priority	CSS	CU Path CHPID numbers and availability intersect reason							Comments
F300	OSC	0333	0	01							
F380	OSC	0333	0	05							
FFD9	CFP	----	1	A4, C	A6	A8	AA, C				
FFDA	CFP	----	1	80, C	81, C	82, C	83, C	84, C	85, C	98	
FFE5	CFP	----	0	C0	C2						
FFEF	CFP	----	0	C1	C3						
FFF8	STP	----	1	A2	A3						
FFFA	STP	----	1	A0	A1						
S020	CFP	----	1	AB							
S021	CFP	----	1	A9							
S022	CFP	----	1	A7							
S023	CFP	----	1	A5							
S024	CIB	----	1	99							
S025	CIB	----	1	8B							
S026	CIB	----	1	8A							
S027	CIB	----	1	89							
S028	CIB	----	1	88							
S029	CIB	----	1	87							
S030	CIB	----	1	86							
P011		----	0	0C							
P012		----	0	0B							
P013		----	0	0A							
P014		----	0	09							
P015		----	0	08							
P016		----	0	07							
P017		----	0	06							
P018		----	0	03							
P019		----	0	02							

```
Auto saving session in C:\Program Files\IBM\CHPID\temp.~cn
Processing Availability, may take few minutes to process.
Availability processing done.
```

Figure 7-41 Sort by Control Unit

You should review the list because:

- You might have forgotten to add a CHPID to a control unit and may need to update the IOCP source before continuing with the CHPID Mapping Tool.
- The unconnected CHPIDs may be extra channels you are ordering in anticipation of new control units.
- The unconnected CHPIDs may be coupling links that are being used in coupling facility (CF) images (these do not require control units).

If there are extra CHPIDs for anticipated new control units, you may want to group these CHPIDs with a common priority. This action allows the availability mapping function to pick PCHIDs that can afford your new control unit’s availability.

7.4.6 Creating reports for the hardware team

The CHPID Mapping Tool has built-in reports, which are available from the Reports drop-down menu. You can also print the information in the Availability tab or the Manual tab by clicking the **Print** button. When in the Availability tab, you can also enter information into the Comments column that might be useful at a later date.

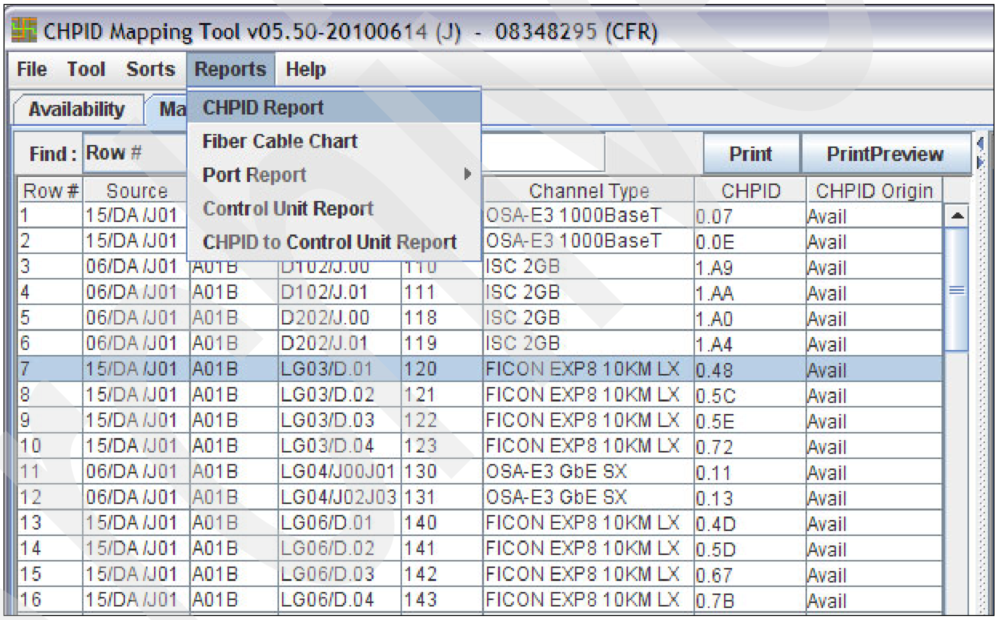
For simplicity, we only describe how to print three reports in this example (the CHPID Report, the Port Report, Sorted by Location, and the CHPID to Control Unit Report). However, all built-in reports are printed in the same way, as explained here.

The person who installs the I/O cables during system installation needs one of these reports. The Port Report, Sorted by Location is recommended. The installer can use this report to label the cables. The labels must include the PCHID or cage/slot/port information before system delivery.

CHPID Report

To create the CHPID Report, perform the following steps:

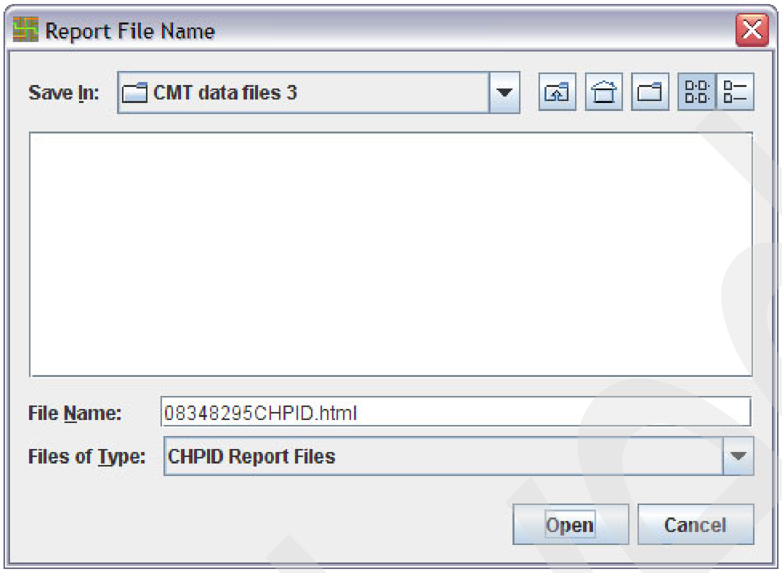
1. Select **Reports** → **CHPID Report** (Figure 7-42).



Row #	Source				Channel Type	CHPID	CHPID Origin
1	15/DA /J01				OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01				OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail

Figure 7-42 Select CHPID Report

2. Enter the report's File name, or accept the name that the CHPID Mapping Tool provides and click **Save** (Figure 7-43).



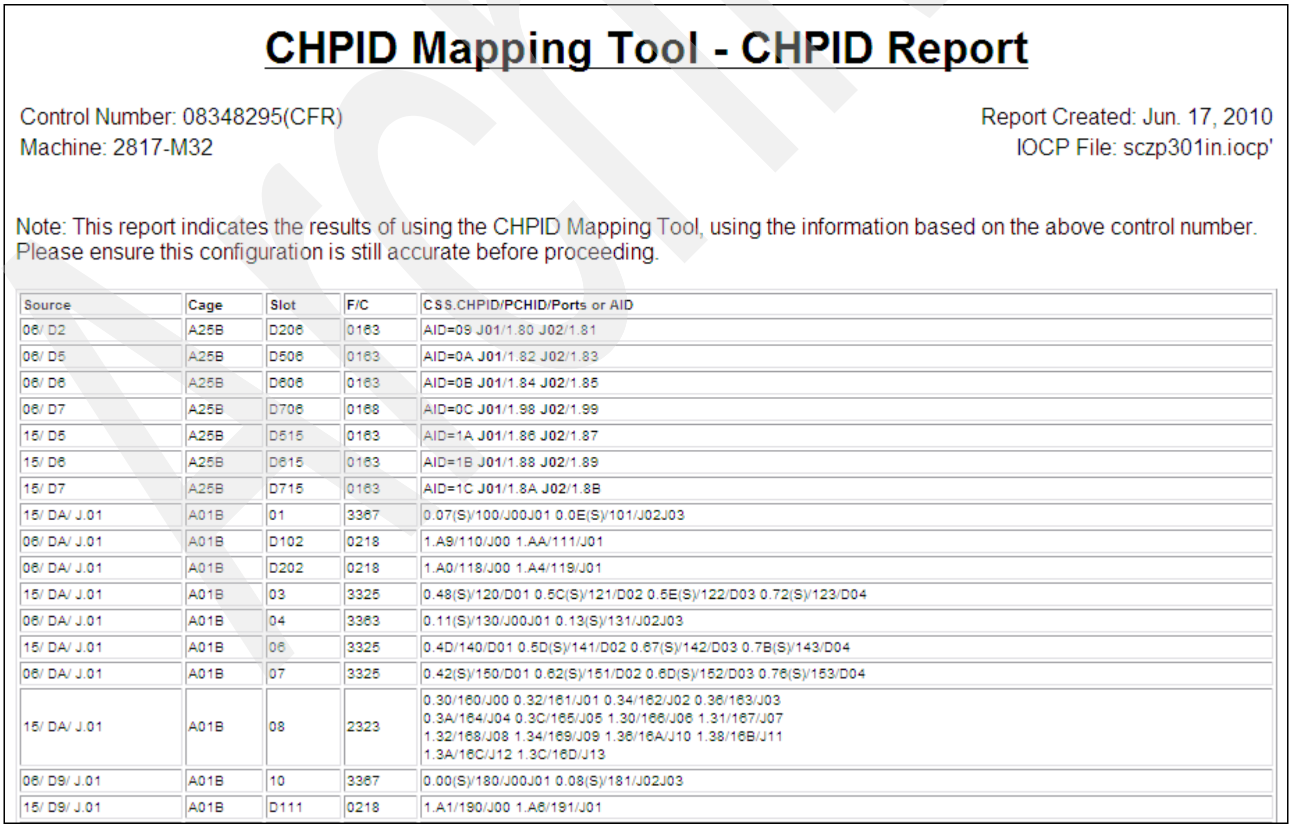
Save In: CMT data files 3

File Name: 08348295CHPID.html

Files of Type: CHPID Report Files

Figure 7-43 Report File Name

3. The CHPID Mapping Tool opens a browser window with the CHPID report (Figure 7-44). You may be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 17, 2010
IOCP File: sczp301in.iocp'

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

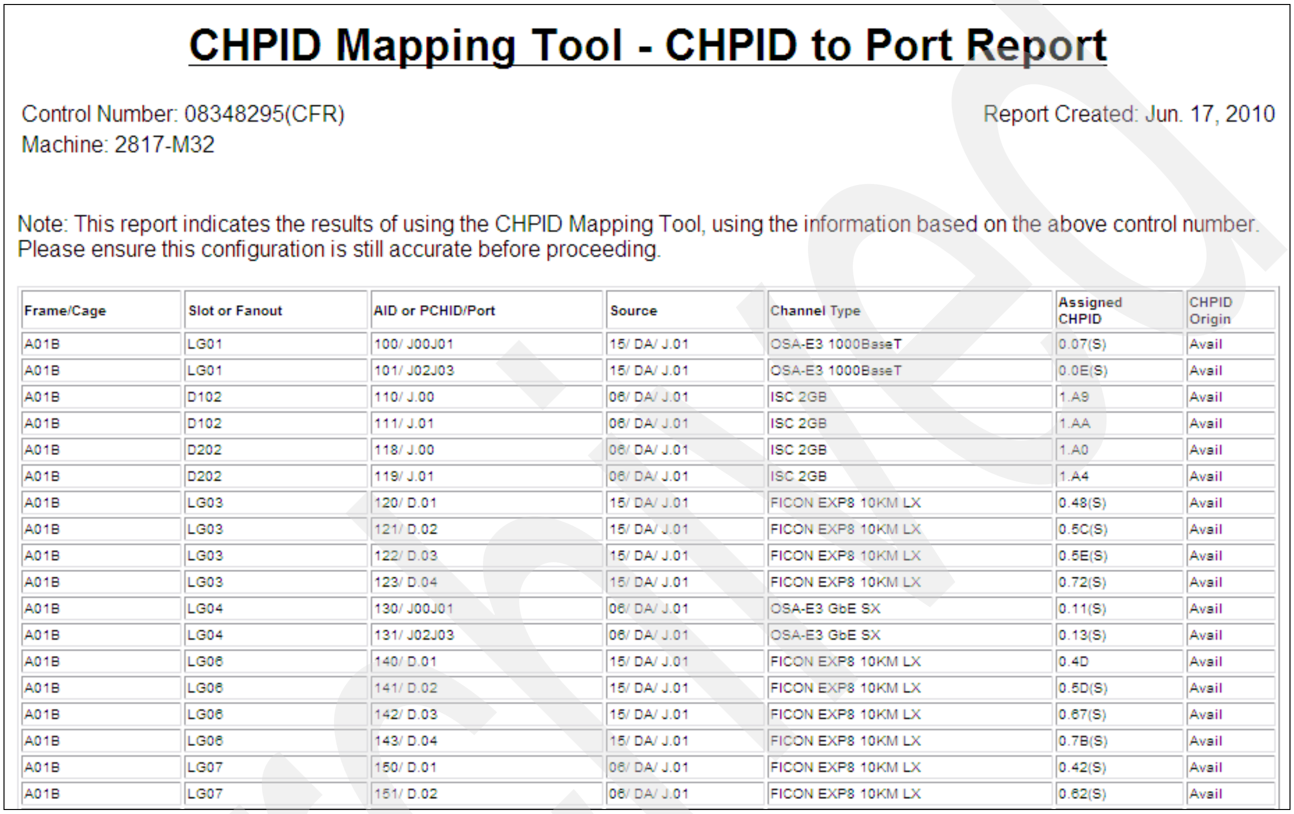
Source	Cage	Slot	F/C	CSS.CHPID/PCHID/Ports or AID
06/ D2	A25B	D206	0163	AID=09 J01/1.80 J02/1.81
06/ D5	A25B	D506	0163	AID=0A **J01**/1.82 **J02**/1.83
06/ D6	A25B	D606	0163	AID=0B **J01**/1.84 **J02**/1.85
06/ D7	A25B	D706	0168	AID=0C **J01**/1.98 **J02**/1.99
15/ D5	A25B	D515	0163	AID=1A **J01**/1.86 **J02**/1.87
15/ D6	A25B	D615	0163	AID=1B **J01**/1.88 **J02**/1.89
15/ D7	A25B	D715	0163	AID=1C **J01**/1.8A **J02**/1.8B
15/ DA/ J.01	A01B	01	3367	0.07(S)/100/J00J01 0.0E(S)/101/J02J03
06/ DA/ J.01	A01B	D102	0218	1.A9/110/J00 1.AA/111/J01
06/ DA/ J.01	A01B	D202	0218	1.A0/118/J00 1.A4/119/J01
15/ DA/ J.01	A01B	03	3325	0.48(S)/120/D01 0.5C(S)/121/D02 0.5E(S)/122/D03 0.72(S)/123/D04
06/ DA/ J.01	A01B	04	3363	0.11(S)/130/J00J01 0.13(S)/131/J02J03
15/ DA/ J.01	A01B	06	3325	0.4D/140/D01 0.5D(S)/141/D02 0.67(S)/142/D03 0.7B(S)/143/D04
06/ DA/ J.01	A01B	07	3325	0.42(S)/150/D01 0.62(S)/151/D02 0.6D(S)/152/D03 0.76(S)/153/D04
15/ DA/ J.01	A01B	08	2323	0.30/160/J00 0.32/161/J01 0.34/162/J02 0.36/163/J03 0.3A/164/J04 0.3C/165/J05 1.30/166/J06 1.31/167/J07 1.32/168/J08 1.34/169/J09 1.36/16A/J10 1.38/16B/J11 1.3A/16C/J12 1.3C/16D/J13
06/ D9/ J.01	A01B	10	3367	0.00(S)/180/J00J01 0.08(S)/181/J02J03
15/ D9/ J.01	A01B	D111	0218	1.A1/190/J00 1.A6/191/J01

Figure 7-44 CHPID Report

Port Report, Sorted by Location

To create the Port Report, Sorted by Location, perform the following steps:

1. Select **Reports** → **Port Report** → **Sorted by Location**. Click **Save** (assuming that you accept the CHPID Mapping Tool report name).
2. The CHPID Mapping Tool opens a browser window with the CHPID to Port Report (Figure 7-45). You may be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to Port Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 17, 2010

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number. Please ensure this configuration is still accurate before proceeding.

Frame/Cage	Slot or Fanout	AID or PCHID/Port	Source	Channel Type	Assigned CHPID	CHPID Origin
A01B	LG01	100/ J00J01	15/ DA/ J.01	OSA-E3 1000BaseT	0.07(S)	Avail
A01B	LG01	101/ J02J03	15/ DA/ J.01	OSA-E3 1000BaseT	0.0E(S)	Avail
A01B	D102	110/ J.00	06/ DA/ J.01	ISC 2GB	1.A9	Avail
A01B	D102	111/ J.01	06/ DA/ J.01	ISC 2GB	1.AA	Avail
A01B	D202	118/ J.00	06/ DA/ J.01	ISC 2GB	1.A0	Avail
A01B	D202	119/ J.01	06/ DA/ J.01	ISC 2GB	1.A4	Avail
A01B	LG03	120/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.48(S)	Avail
A01B	LG03	121/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	0.5C(S)	Avail
A01B	LG03	122/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	0.5E(S)	Avail
A01B	LG03	123/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX	0.72(S)	Avail
A01B	LG04	130/ J00J01	06/ DA/ J.01	OSA-E3 GbE SX	0.11(S)	Avail
A01B	LG04	131/ J02J03	06/ DA/ J.01	OSA-E3 GbE SX	0.13(S)	Avail
A01B	LG06	140/ D.01	15/ DA/ J.01	FICON EXP8 10KM LX	0.4D	Avail
A01B	LG06	141/ D.02	15/ DA/ J.01	FICON EXP8 10KM LX	0.5D(S)	Avail
A01B	LG06	142/ D.03	15/ DA/ J.01	FICON EXP8 10KM LX	0.67(S)	Avail
A01B	LG06	143/ D.04	15/ DA/ J.01	FICON EXP8 10KM LX	0.7B(S)	Avail
A01B	LG07	150/ D.01	06/ DA/ J.01	FICON EXP8 10KM LX	0.42(S)	Avail
A01B	LG07	151/ D.02	06/ DA/ J.01	FICON EXP8 10KM LX	0.62(S)	Avail

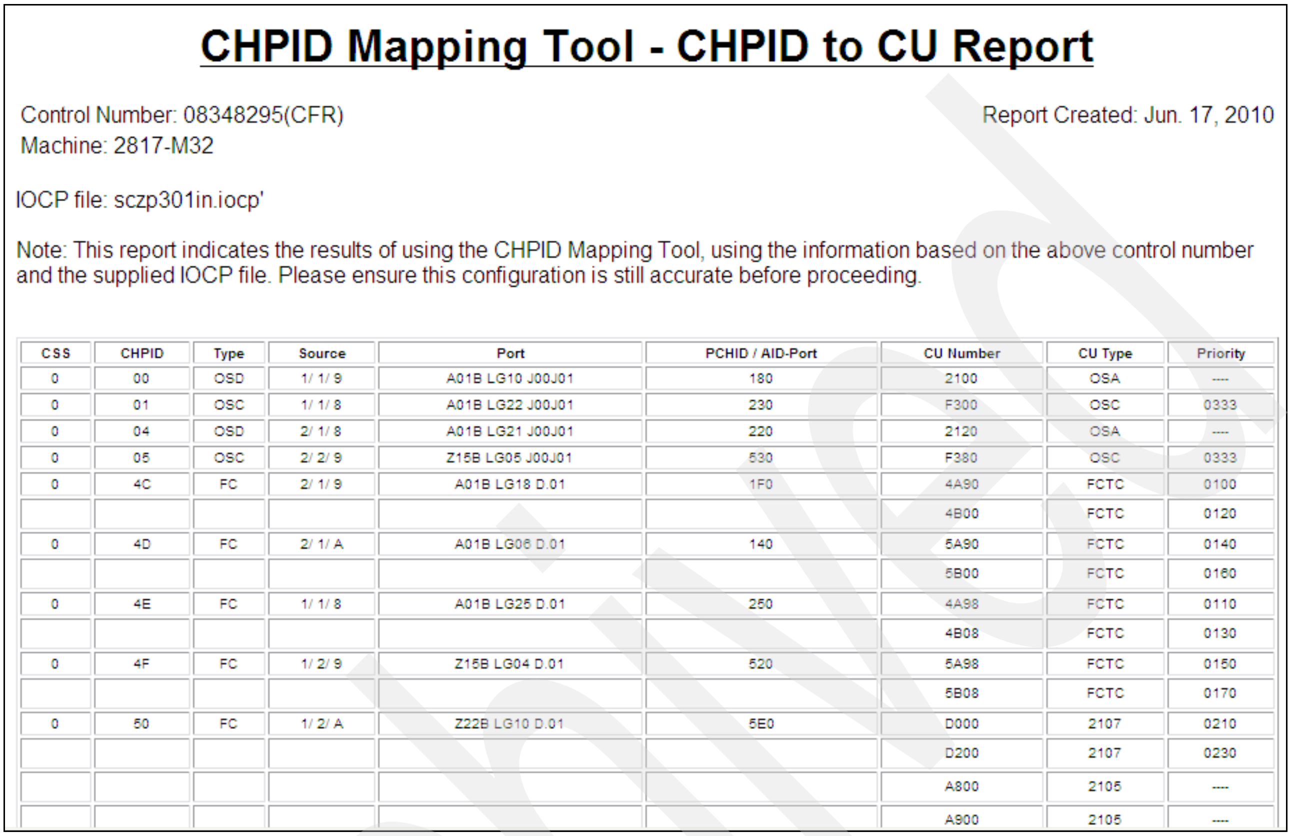
Figure 7-45 CHPID to Port Report

CHPID to Control Unit Report

To created the CHPID to Control Unit Report, perform the following steps:

1. Select **Reports** → **CHPID to Control Unit Report**. Click **Save** (assuming that you accept the CHPID Mapping Tool report name).

2. The CHPID Mapping Tool opens a browser window with the CHPID to Control Unit Report (Figure 7-46). You may be prompted to accept active content. Accept the active content to display the report in your browser.



CHPID Mapping Tool - CHPID to CU Report

Control Number: 08348295(CFR)
Machine: 2817-M32

Report Created: Jun. 17, 2010

IOCP file: sczp301in.iocp'

Note: This report indicates the results of using the CHPID Mapping Tool, using the information based on the above control number and the supplied IOCP file. Please ensure this configuration is still accurate before proceeding.

CSS	CHPID	Type	Source	Port	PCHID / AID-Port	CU Number	CU Type	Priority
0	00	OSD	1/ 1/ 9	A01B LG10 J00J01	180	2100	OSA	----
0	01	OSC	1/ 1/ 8	A01B LG22 J00J01	230	F300	OSC	0333
0	04	OSD	2/ 1/ 8	A01B LG21 J00J01	220	2120	OSA	----
0	05	OSC	2/ 2/ 9	Z15B LG05 J00J01	530	F380	OSC	0333
0	4C	FC	2/ 1/ 9	A01B LG18 D.01	1F0	4A90	FCTC	0100
						4B00	FCTC	0120
0	4D	FC	2/ 1/ A	A01B LG06 D.01	140	5A90	FCTC	0140
						5B00	FCTC	0160
0	4E	FC	1/ 1/ 8	A01B LG25 D.01	250	4A98	FCTC	0110
						4B08	FCTC	0130
0	4F	FC	1/ 2/ 9	Z15B LG04 D.01	520	5A98	FCTC	0150
						5B08	FCTC	0170
0	50	FC	1/ 2/ A	Z22B LG10 D.01	5E0	D000	2107	0210
						D200	2107	0230
						A800	2105	----
						A900	2105	----

Figure 7-46 CHPID to CU Report

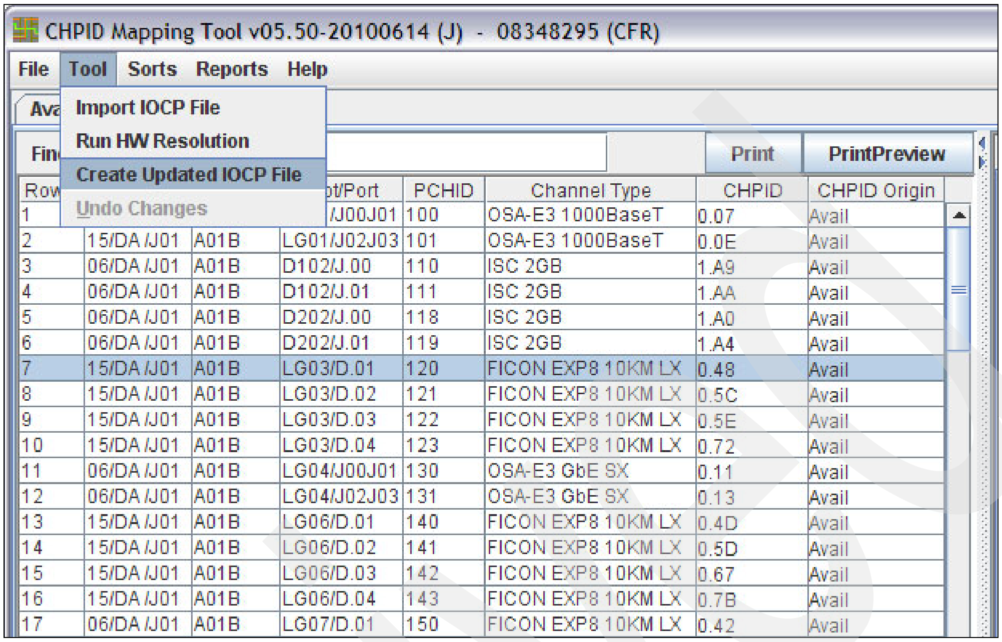
7.4.7 Creating the updated IOCP file

> **Note:** You might prefer to use HCM to transfer the updated IOCP statements file back to the host. Before doing so, however, first perform the following procedure in the CHPID Mapping Tool to create the updated IOCP file.

Create an IOCP statements file for input back into the IODF by HCD. This IOCP statements file now has the CHPIDs assigned to PCHIDs.

Perform the following steps:

1. Select **Tool** → **Create Updated IOCP File** (Figure 7-47).

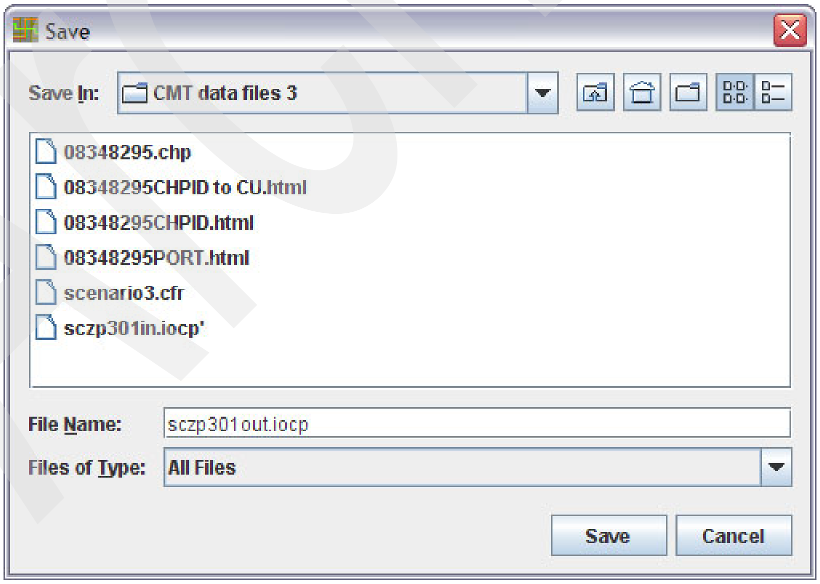


Row			ot/Port	PCHID	Channel Type	CHPID	CHPID Origin
1			/J00J01	100	OSA-E3 1000BaseT	0.07	Avail
2	15/DA /J01	A01B	LG01/J02J03	101	OSA-E3 1000BaseT	0.0E	Avail
3	06/DA /J01	A01B	D102/J.00	110	ISC 2GB	1.A9	Avail
4	06/DA /J01	A01B	D102/J.01	111	ISC 2GB	1.AA	Avail
5	06/DA /J01	A01B	D202/J.00	118	ISC 2GB	1.A0	Avail
6	06/DA /J01	A01B	D202/J.01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail
17	06/DA /J01	A01B	LG07/D.01	150	FICON EXP8 10KM LX	0.42	Avail

Figure 7-47 Create Updated IOCP File

2. Enter the file name and location for the IOCP output file and click **Save** (Figure 7-48).

> **Note:** The file must be uploaded to the z/OS image on which you have the work IODF used previously to create the IOCP input data set.



Save In: CMT data files 3

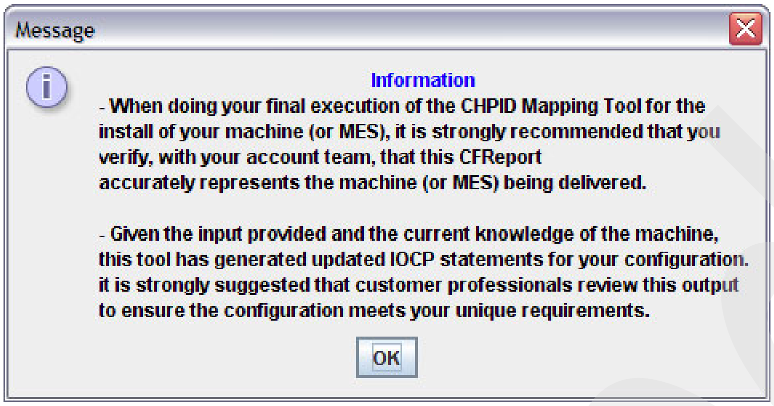
08348295.chp
08348295CHPID to CU.html
08348295CHPID.html
08348295PORT.html
scenario3.cfr
sczp301in.iocp'

File Name: sczp301out.iocp

Files of Type: All Files

Figure 7-48 Save IOCP output file

The CHPID Mapping Tool displays an informational message, shown in Figure 7-49, regarding what to do for the final execution of the tool.

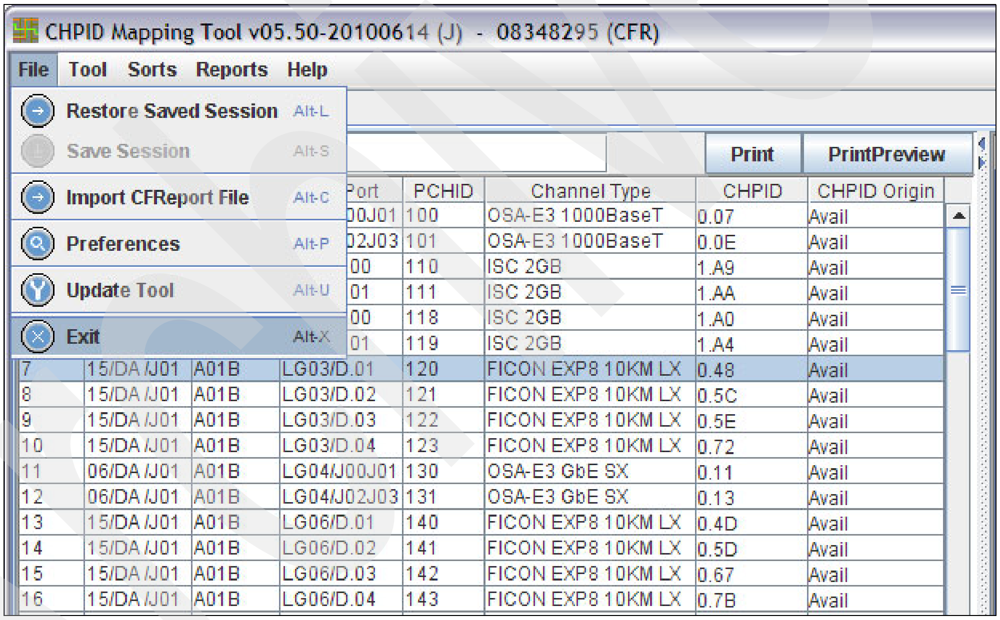


- When doing your final execution of the CHPID Mapping Tool for the install of your machine (or MES), it is strongly recommended that you verify, with your account team, that this CFReport accurately represents the machine (or MES) being delivered.

- Given the input provided and the current knowledge of the machine, this tool has generated updated IOCP statements for your configuration. it is strongly suggested that customer professionals review this output to ensure the configuration meets your unique requirements.

Figure 7-49 Informational message

3. The CHPID Mapping Tool program can be shut down now. Select **File** → **Exit** (Figure 7-50).



			Port	PCHID	Channel Type	CHPID	CHPID Origin
			00J01	100	OSA-E3 1000BaseT	0.07	Avail
			02J03	101	OSA-E3 1000BaseT	0.0E	Avail
			00	110	ISC 2GB	1.A9	Avail
			01	111	ISC 2GB	1.AA	Avail
			00	118	ISC 2GB	1.A0	Avail
			01	119	ISC 2GB	1.A4	Avail
7	15/DA /J01	A01B	LG03/D.01	120	FICON EXP8 10KM LX	0.48	Avail
8	15/DA /J01	A01B	LG03/D.02	121	FICON EXP8 10KM LX	0.5C	Avail
9	15/DA /J01	A01B	LG03/D.03	122	FICON EXP8 10KM LX	0.5E	Avail
10	15/DA /J01	A01B	LG03/D.04	123	FICON EXP8 10KM LX	0.72	Avail
11	06/DA /J01	A01B	LG04/J00J01	130	OSA-E3 GbE SX	0.11	Avail
12	06/DA /J01	A01B	LG04/J02J03	131	OSA-E3 GbE SX	0.13	Avail
13	15/DA /J01	A01B	LG06/D.01	140	FICON EXP8 10KM LX	0.4D	Avail
14	15/DA /J01	A01B	LG06/D.02	141	FICON EXP8 10KM LX	0.5D	Avail
15	15/DA /J01	A01B	LG06/D.03	142	FICON EXP8 10KM LX	0.67	Avail
16	15/DA /J01	A01B	LG06/D.04	143	FICON EXP8 10KM LX	0.7B	Avail

Figure 7-50 Exit program

7.5 HCD: Updating the 2817 work IODF with PCHIDs

After mapping the PCHIDs to CHPIDs using the CHPID Mapping Tool, the information needs to be transferred back in HCD by performing the following steps:

1. Upload the IOCP file created by the CMT (`sczp301out.iocp`, in our example) to the z/OS image. Use a file transfer facility such as the one in IBM Personal Communications or an equivalent FTP program. Be sure to use TEXT as the transfer type.

   Looking at the updated IOCP statements file, you notice that the CMT has left a reference to the CCN. Also note the CU Priority values added for the OSC control units.

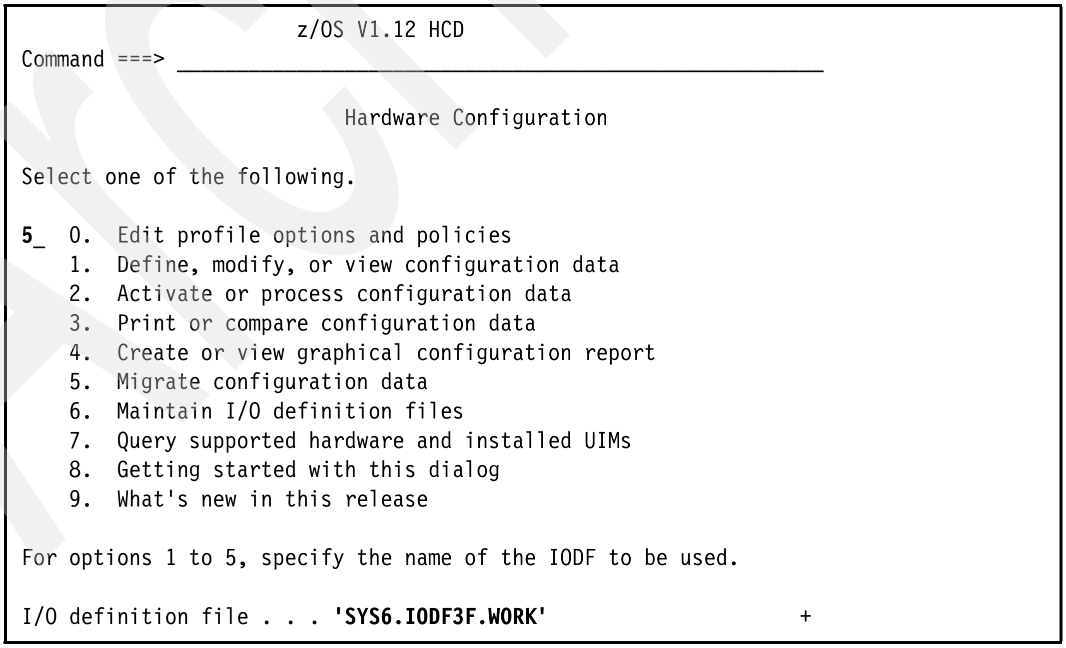
Note: Control unit priorities are stored in the IOCP output file created by the CHPID Mapping Tool that is migrated back into HCD. HCD maintains these priorities and outputs them when creating another IOCP deck. They are in the form of commented lines at the end of the IOCP deck (Example 7-2).

Example 7-2 Updated IOCP statements file (with CMT statements)

```
IODEVICE ADDRESS=(FF74,007),CUNUMBR=(FFEF),UNIT=CFP
        CNTLUNIT CUNUMBR=FFF8,PATH=((CSS(1),A2,A3)),UNIT=STP
        CNTLUNIT CUNUMBR=FFFA,PATH=((CSS(1),A0,A1)),UNIT=STP
*CMT* VERSION=000
*CMT* CCN=08348295(CFR)
*CMT* 4A90.0=0100,4A98.0=0110,4B00.0=0120,4B08.0=0130,5A90.0=0140
*CMT* 5A98.0=0150,5B00.0=0160,5B08.0=0170,D000.0=0210,D000.1=0210
*CMT* D000.2=0210,D000.3=0210,D100.0=0220,D100.1=0220,D100.2=0220
*CMT* D100.3=0220,D200.0=0230,D200.1=0230,D200.2=0230,D200.3=0230
*CMT* D300.0=0230,D300.1=0240,D300.2=0240,D300.3=0240,F300.0=0333
*CMT* F380.0=0333
****************************** Bottom of Data ***********************
```

Important: The CMT comments contained in the IOCP output file should not be edited manually. If priorities need to be changed, it should always be done by using the CHPID Mapping Tool.

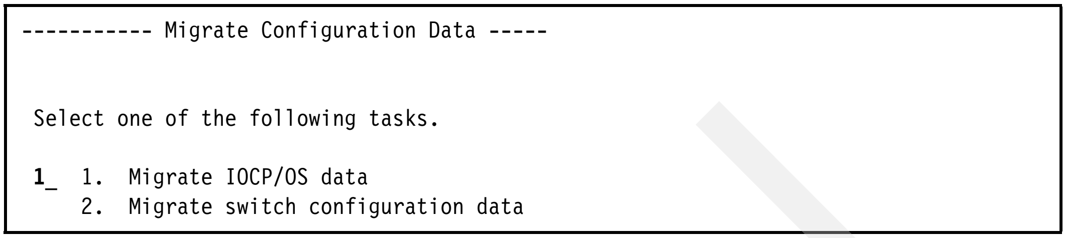
2. On the HCD main menu, enter the work IODF name used to create the IOCP input data set for the CHPID Mapping Tool on the HCD main menu (Figure 7-51). Select Option 5. Migrate configuration data.



```
                       z/OS V1.12 HCD
Command ===> _______________________________________________

                           Hardware Configuration

Select one of the following.

5_  0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3F.WORK'                 +
```

Figure 7-51 Main menu: Select Migrate configuration data

3. The Migrate Configuration Data panel opens (Figure 7-52). Select Option 1. Migrate IOCP/OS data and press Enter.



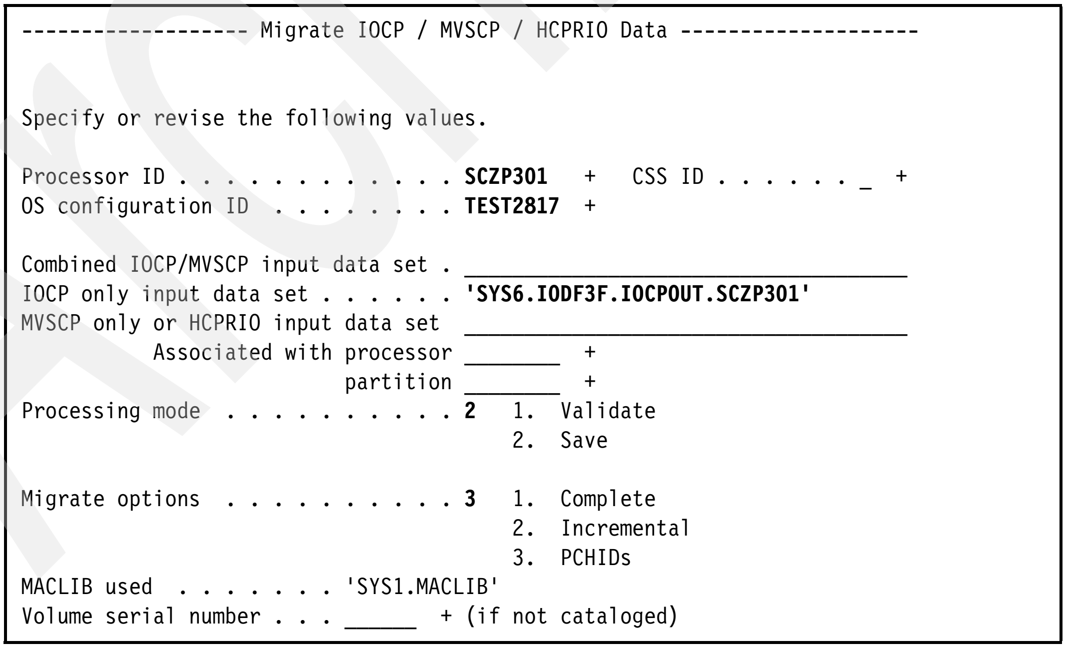
```
----------- Migrate Configuration Data -----


 Select one of the following tasks.

 1_  1.  Migrate IOCP/OS data
     2.  Migrate switch configuration data
```

Figure 7-52 Migrate Configuration Data

4. HCD displays the Migrate IOCP Data panel (Figure 7-53). Complete the following fields:

Processor ID	Use the same ID used to create the IOCP input deck.
OS configuration ID	This configuration is the OS configuration associated with the processor.
IOCP only input data set	This data set is the data set name specified when the `iocpout.txt` file was uploaded to z/OS (see 7.5, "HCD: Updating the 2817 work IODF with PCHIDs" on page 393).
Processing mode	Use Option 2 to save the results of the migration. (Prior to using Option 2, however, try to migrate using Option 1 to validate the operation.)
Migrate options	Use Option 3 for PCHIDS. Only the PCHIDs are migrated into the work IODF.

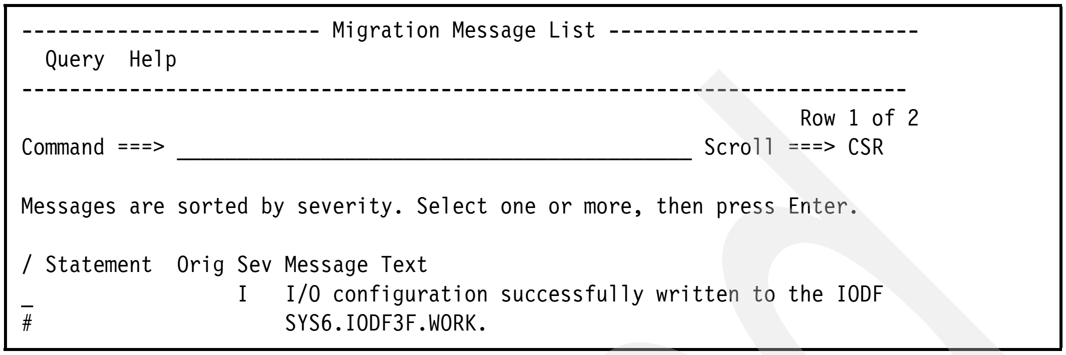
Press Enter.



```
------------------- Migrate IOCP / MVSCP / HCPRIO Data --------------------



Specify or revise the following values.

Processor ID . . . . . . . . . . . . SCZP301   +   CSS ID . . . . . . _  +
OS configuration ID  . . . . . . . . TEST2817  +

Combined IOCP/MVSCP input data set . _____________________________________
IOCP only input data set . . . . . . 'SYS6.IODF3F.IOCPOUT.SCZP301'
MVSCP only or HCPRIO input data set  _____________________________________
           Associated with processor ________  +
                           partition ________  +
Processing mode  . . . . . . . . . . 2   1.  Validate
                                         2.  Save

Migrate options  . . . . . . . . . . 3   1.  Complete
                                         2.  Incremental
                                         3.  PCHIDs
MACLIB used  . . . . . . . 'SYS1.MACLIB'
Volume serial number . . . ______  + (if not cataloged)
```

Figure 7-53 Migrate IOCP / MVSCP / HCPRIO Data

5. HCD displays any errors or warning messages as a result of the migration action. In our example, we did not receive any messages other than the one indicating that the migration was successful (Figure 7-54).



```
------------------------- Migration Message List --------------------------
  Query  Help
---------------------------------------------------------------------------
                                                                  Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Statement  Orig Sev Message Text
_                 I   I/O configuration successfully written to the IODF
#                     SYS6.IODF3F.WORK.
```

Figure 7-54 Migration Message List

This is the message that you should receive. At this point, the work IODF contains both the CHPID definitions and the mapping to PCHIDs that was done using the CHPID Mapping Tool.

6. Press PF3. You should receive the following message:

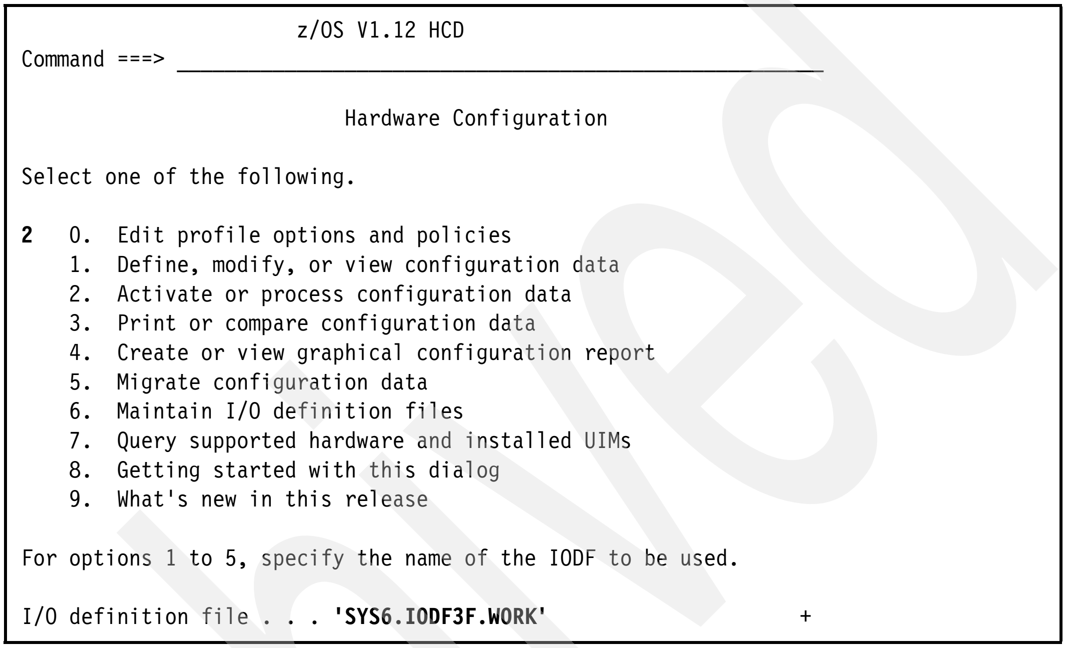
   `IOCP/Operating system deck migration processing complete, return code = 0`

7. Press PF3 again.

7.6 HCD: Building the 2817 production IODF

To make use of the definitions that were updated in HCD, a production IODF needs to be created from the work IODF. Perform the following steps:

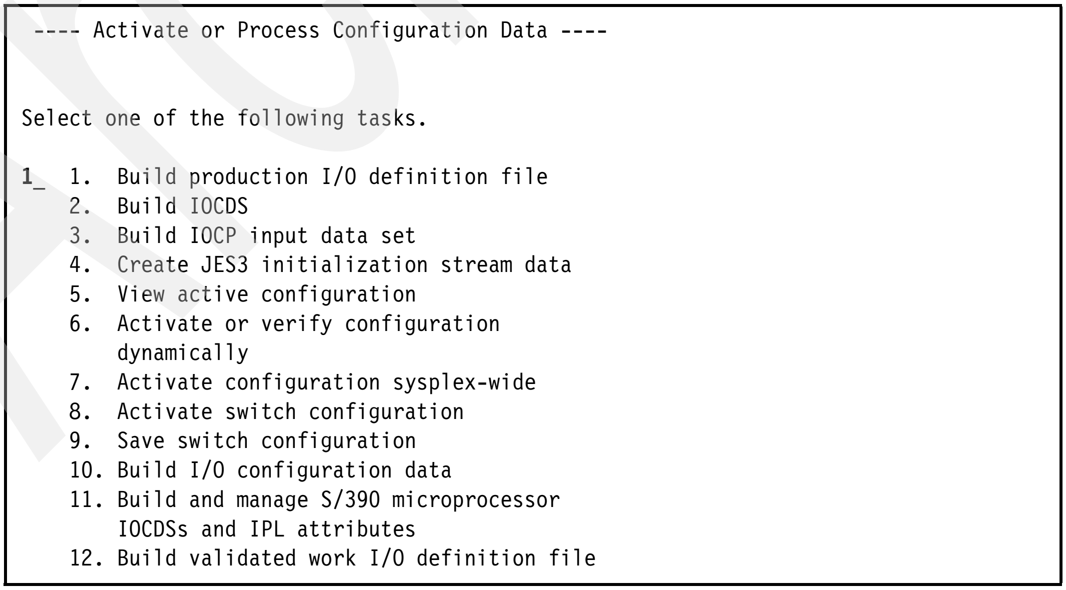
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 7-55).



```
                       z/OS V1.12 HCD
Command ===> ______________________________________________________

                            Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3F.WORK'                 +
```

Figure 7-55 Main menu: Select Activate or process configuration data

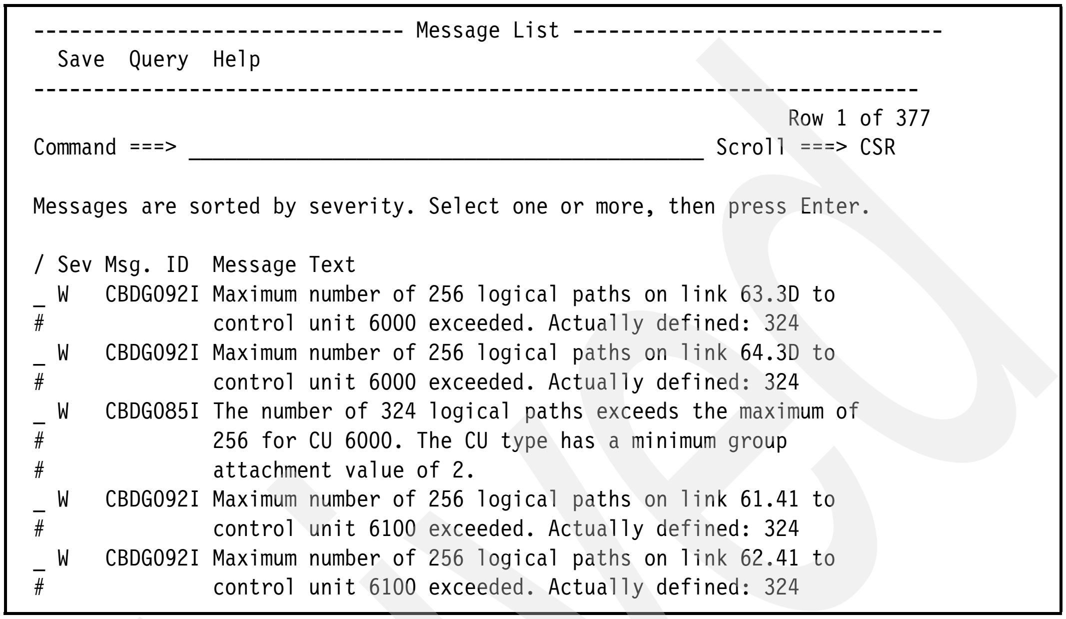
2. The Activate or Process Configuration Data panel opens (Figure 7-56). Select Option 1. Build production I/O definition file and press Enter.



```
 ---- Activate or Process Configuration Data ----


Select one of the following tasks.

1_  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

Figure 7-56 Activate or Process Configuration Data: Select Build production IODF

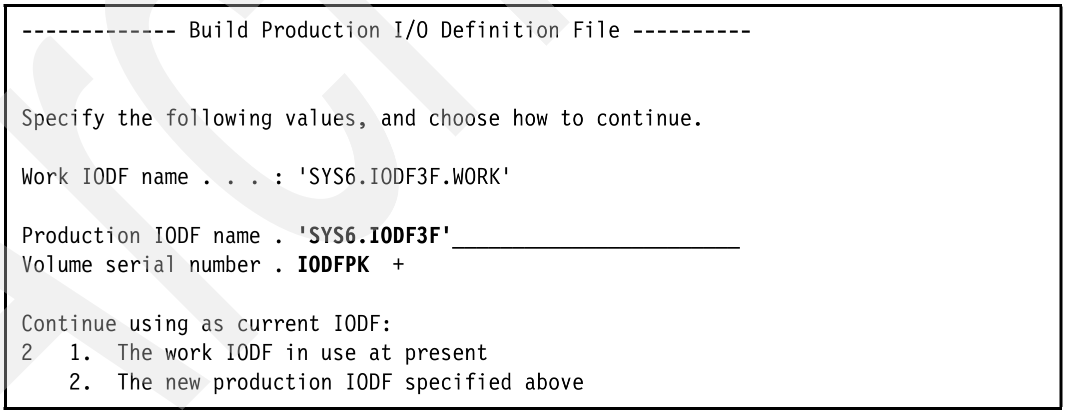
3. The Message List panel opens (Figure 7-57). Verify that you have only Severity W warning messages and that they are normal for the configuration. Correct any messages that should not occur and try to build the production IODF again. Continue this process until you have no messages that indicate problems.



```
------------------------------ Message List ------------------------------
  Save  Query  Help
--------------------------------------------------------------------------
                                                        Row 1 of 377
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ W   CBDG092I Maximum number of 256 logical paths on link 63.3D to
#              control unit 6000 exceeded. Actually defined: 324
_ W   CBDG092I Maximum number of 256 logical paths on link 64.3D to
#              control unit 6000 exceeded. Actually defined: 324
_ W   CBDG085I The number of 324 logical paths exceeds the maximum of
#              256 for CU 6000. The CU type has a minimum group
#              attachment value of 2.
_ W   CBDG092I Maximum number of 256 logical paths on link 61.41 to
#              control unit 6100 exceeded. Actually defined: 324
_ W   CBDG092I Maximum number of 256 logical paths on link 62.41 to
#              control unit 6100 exceeded. Actually defined: 324
```

Figure 7-57 Message List (building Production IODF)

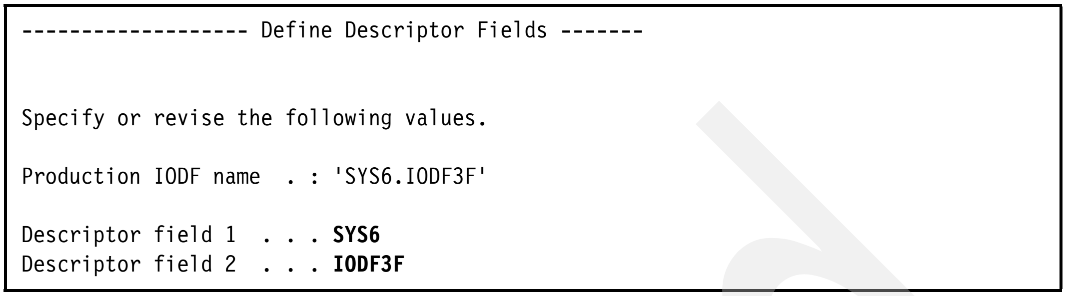
4. Press PF3 to continue.
5. The Build Production I/O Definition File panel opens (Figure 7-58). Complete the Production IODF name and Volume serial number fields and then press Enter.



```
------------- Build Production I/O Definition File ----------


Specify the following values, and choose how to continue.

Work IODF name . . . : 'SYS6.IODF3F.WORK'

Production IODF name . 'SYS6.IODF3F'________________________
Volume serial number . IODFPK  +

Continue using as current IODF:
2   1.  The work IODF in use at present
    2.  The new production IODF specified above
```

Figure 7-58 Build Production I/O Definition File

6. The Define Descriptor Fields panel opens (Figure 7-59). Press Enter to accept the descriptor fields selected by HCD, or enter different values and then press Enter.



```
------------------ Define Descriptor Fields -------


Specify or revise the following values.

Production IODF name  . : 'SYS6.IODF3F'

Descriptor field 1  . . . SYS6
Descriptor field 2  . . . IODF3F
```

Figure 7-59 Define Descriptor Fields

7. HCD displays the following message, indicating that the production IODF was successfully created:

   `Production IODF SYS6.IODF3F created.`

7.7 HCD/HMC: Loading the 2817 processor IOCDS

At this point, there is a production IODF called SYS6.IODF3F. Now the IOCDS component of the IODF needs to be updated on the new CPC that is being installed (for example, SCZP301) and activated (POR) using this IOCDS. The final step would be to power-on reset the processor using this IOCDS.

Describing how to power-on reset the new hardware is beyond the scope of this book.

There are two possible ways to load the IOCP Statements onto the 2817 Service Element IOCDS

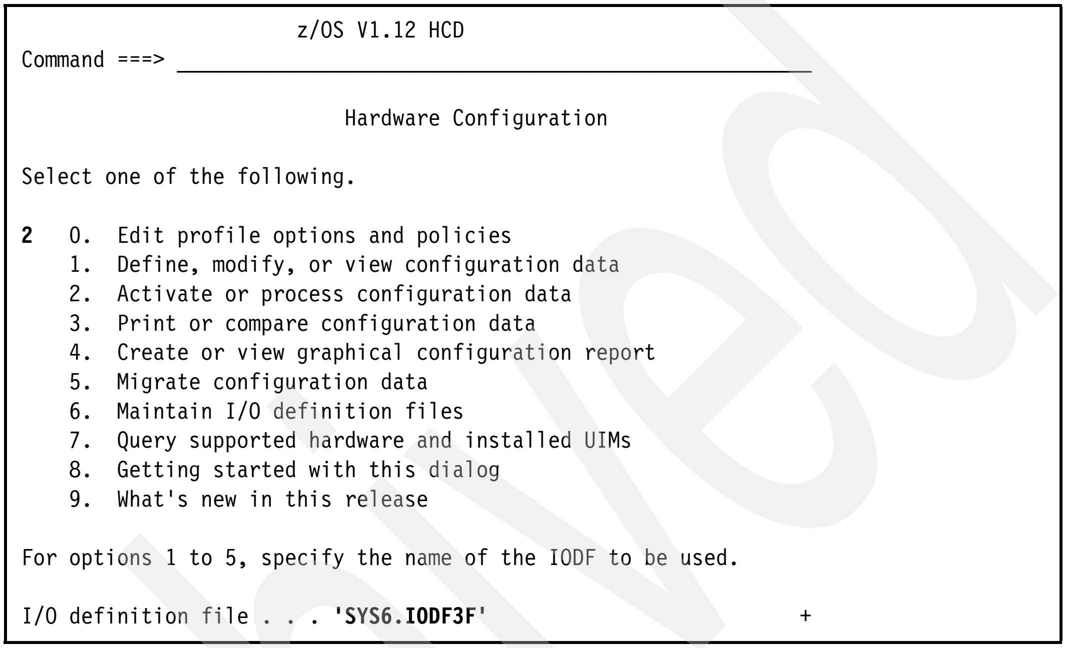
- HCD, using Option 2.11
- HMC, using the Stand-Alone Input/Output Configuration Program

While both are valid methods to write the new configuration to the IOCDS, we recommend using HCD Option 2.11. However, your new 2817 processor and Service Element might not be connected to the system where the configuration was generated or to any system where HCD is running. In that case, you need to use the Stand-Alone IOCP process.

7.7.1 Updating the IOCDS using HCD Option 2.11

To update the IOCDS using HCD Option 2.11, perform the following steps:

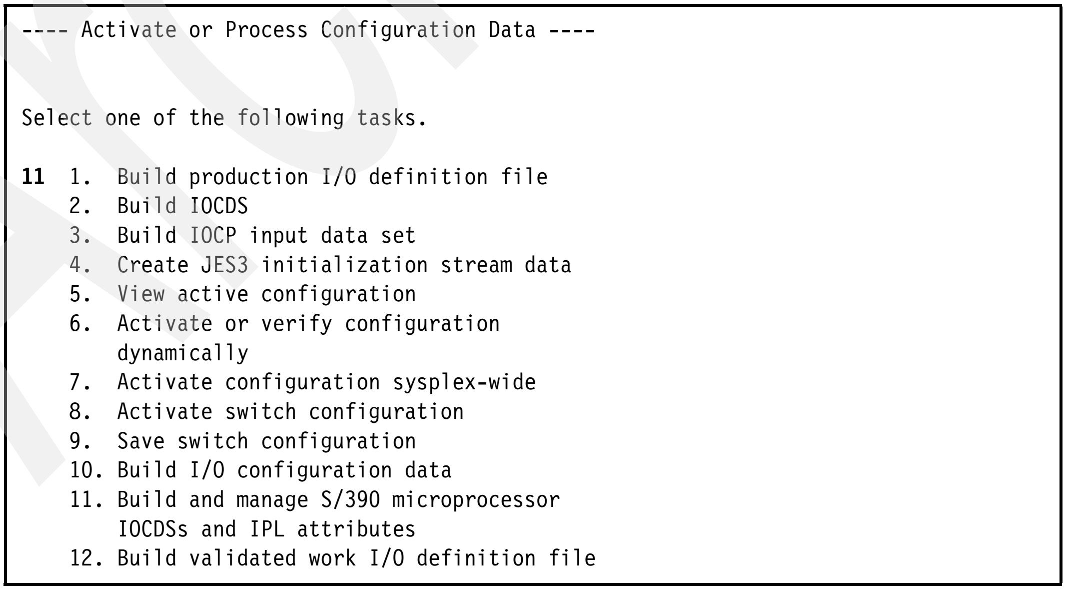
1. From the HCD main menu, select Option 2. Activate or process configuration data (Figure 7-60). Ensure that the IODF is the production one created in 7.6, “HCD: Building the 2817 production IODF” on page 397. Press Enter.



```
                       z/OS V1.12 HCD
Command ===> _____________________________________________________

                            Hardware Configuration

Select one of the following.

2   0.  Edit profile options and policies
    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 . . . 'SYS6.IODF3F'                         +
```

Figure 7-60 Main menu: Select Activate or Process Configuration Data

2. The Activate or Process Configuration Data panel opens (Figure 7-61). Select Option 11. Build and manage S/390 microprocessor IOCDSs and IPL attributes.



```
---- Activate or Process Configuration Data ----


Select one of the following tasks.

11  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 data
    11. Build and manage S/390 microprocessor
        IOCDSs and IPL attributes
    12. Build validated work I/O definition file
```

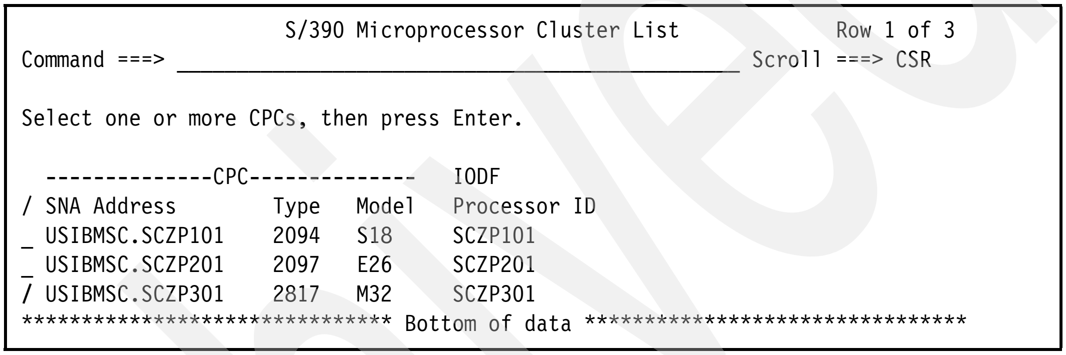
Figure 7-61 Activate or Process Configuration Data: Select Build IOCDSs

Note: In this example, we assume that we have connectivity to the new 2817 over the HMC LAN to create an IOCDS from which we power-on reset.

If the new 2817 is not accessible from the HMC LAN, you need to copy the IOCP statements onto a USB flash memory drive and import them into the 2817 HMC to run a Stand-Alone IOCP. Creating a file on a USB flash memory drive can be done by using the same process that is used to create an IOCP input file for the CHPID Mapping Tool.

Tip: The Support Element can now read an IOCP file that has been written to a USB flash memory drive.

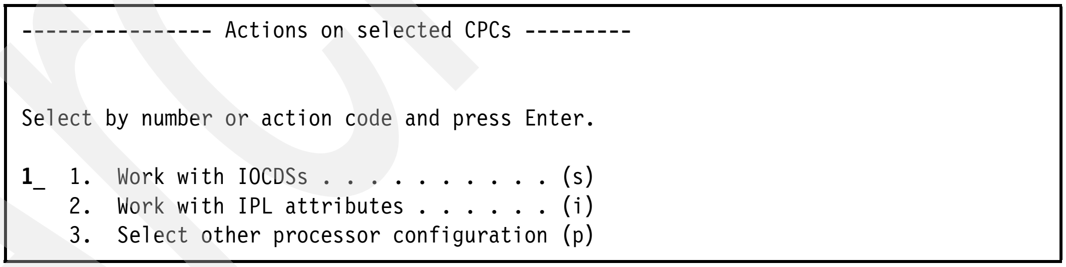
3. The S/390 Microprocessor Cluster List panel opens (Figure 7-62). Use a forward slash (/) to select the new 2817 from the list to update one of its IOCDSs. Press Enter.



```
                      S/390 Microprocessor Cluster List             Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
_ USIBMSC.SCZP201    2097   E26     SCZP201
/ USIBMSC.SCZP301    2817   M32     SCZP301
******************************* Bottom of data ********************************
```

Figure 7-62 S/390 Microprocessor Cluster List

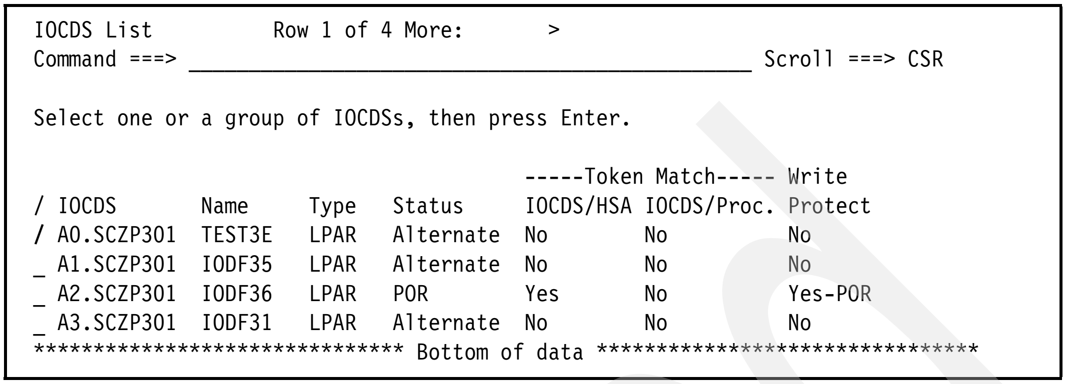
4. The Actions on selected CPCs panel opens (Figure 7-63). Select Option 1. Work with IOCDSs and press Enter.



```
---------------- Actions on selected CPCs ---------


Select by number or action code and press Enter.

1_  1.  Work with IOCDSs . . . . . . . . . . (s)
    2.  Work with IPL attributes . . . . . . (i)
    3.  Select other processor configuration (p)
```

Figure 7-63 Actions on selected CPCs: Work with IOCDSs

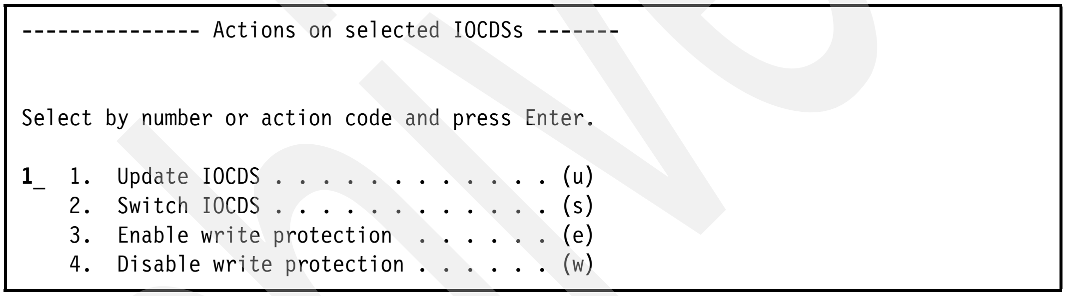
5. The IOCDS List panel opens (Figure 7-64). Select the IOCDS that you want to update for the 2817 installation using the forward slash (/) and then press Enter.



```
IOCDS List          Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                        -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
/ A0.SCZP301  TEST3E   LPAR   Alternate  No        No          No
_ A1.SCZP301  IODF35   LPAR   Alternate  No        No          No
_ A2.SCZP301  IODF36   LPAR   POR        Yes       No          Yes-POR
_ A3.SCZP301  IODF31   LPAR   Alternate  No        No          No
******************************* Bottom of data ********************************
```

Figure 7-64 IOCDS List

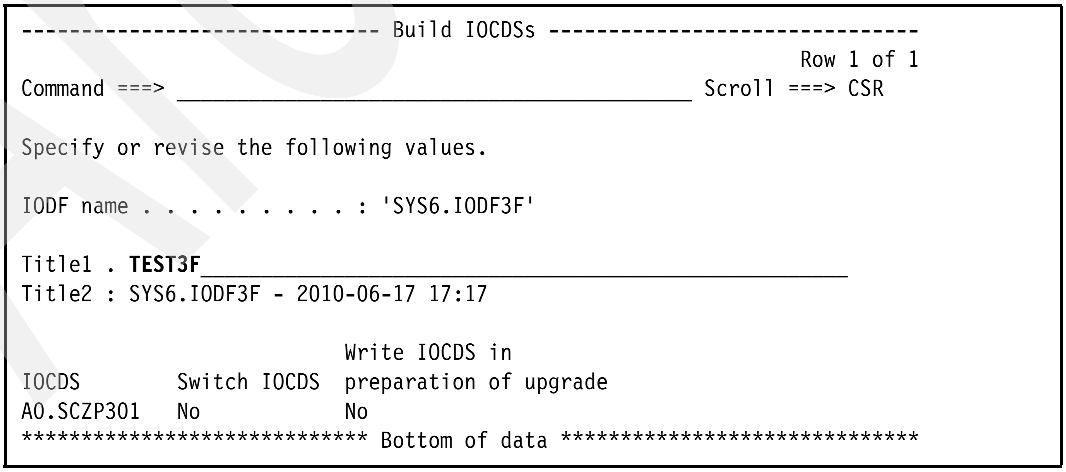
6. The Actions on selected IOCDSs panel opens (Figure 7-65). Select Option 1. Update IOCDS and press Enter.



```
--------------- Actions on selected IOCDSs -------


Select by number or action code and press Enter.

1_  1.  Update IOCDS . . . . . . . . . . . . (u)
    2.  Switch IOCDS . . . . . . . . . . . . (s)
    3.  Enable write protection  . . . . . . (e)
    4.  Disable write protection . . . . . . (w)
```

Figure 7-65 Actions on selected IOCDSs

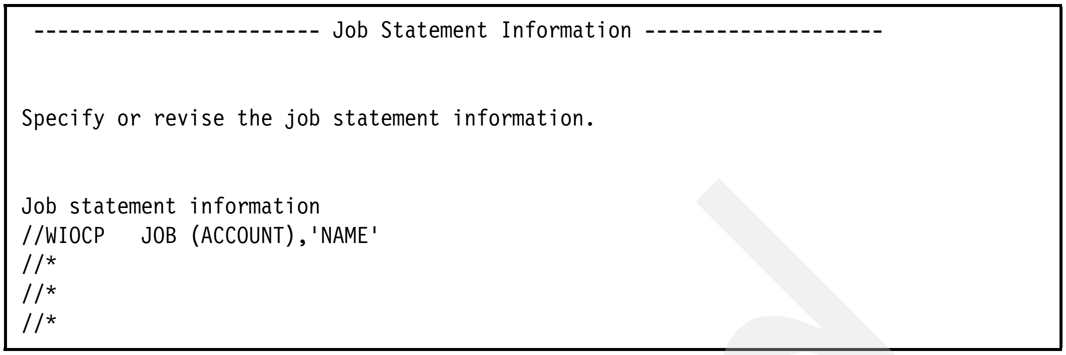
7. The Build IOCDSs panel opens (Figure 7-66). Verify that all the information is correct. Complete the `Title1` field and press Enter.



```
------------------------------ Build IOCDSs -------------------------------
                                                                 Row 1 of 1
Command ===> ___________________________________________ Scroll ===> CSR

Specify or revise the following values.

IODF name . . . . . . . . . : 'SYS6.IODF3F'

Title1 . TEST3F______________________________________________________
Title2 : SYS6.IODF3F - 2010-06-17 17:17

                           Write IOCDS in
IOCDS        Switch IOCDS  preparation of upgrade
A0.SCZP301   No            No
***************************** Bottom of data ******************************
```

Figure 7-66 Build IOCDSs

8. The Job Statement Information panel opens (Figure 7-67). Complete the job statements as required by the installation and press Enter. HCD submits the job to update the IOCDS.



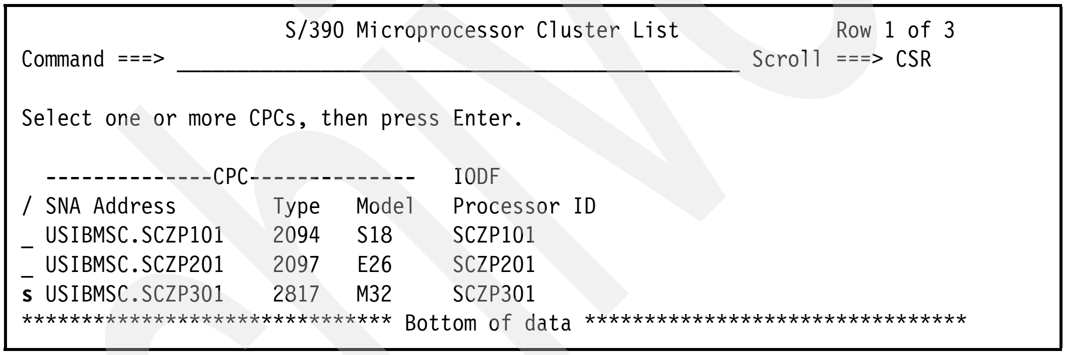
```
 ----------------------- Job Statement Information --------------------


Specify or revise the job statement information.



Job statement information
//WIOCP   JOB (ACCOUNT),'NAME'
//*
//*
//*
```

Figure 7-67   Job Statement Information

9. Verify the job output to ensure that the IOCDS was written without error and to the correct IOCDS. You should receive a message like the following:

   `ICP057I IOCP JOB WIOCDS SUCCESSFUL. LEVEL A0 IOCDS REPLACED.`

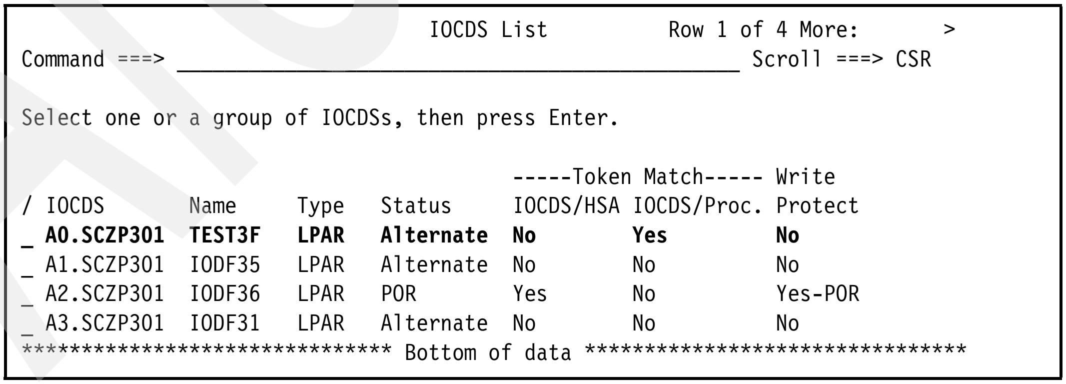
10. Now if you return to HCD Option 2.11 and view the IOCDS, note that the SNA Address is at `USIBMSC.SCZP301` (Figure 7-68).



```
                      S/390 Microprocessor Cluster List            Row 1 of 3
Command ===> _______________________________________________ Scroll ===> CSR

Select one or more CPCs, then press Enter.

  --------------CPC--------------   IODF
/ SNA Address        Type   Model   Processor ID
_ USIBMSC.SCZP101    2094   S18     SCZP101
_ USIBMSC.SCZP201    2097   E26     SCZP201
s USIBMSC.SCZP301    2817   M32     SCZP301
****************************** Bottom of data *******************************
```

Figure 7-68   IOCDS with replacement IODF

11. Figure 7-69 shows the Alternate status.



```
                                  IOCDS List         Row 1 of 4 More:       >
Command ===> _______________________________________________ Scroll ===> CSR

Select one or a group of IOCDSs, then press Enter.

                                        -----Token Match----- Write
/ IOCDS       Name     Type   Status     IOCDS/HSA IOCDS/Proc. Protect
_ A0.SCZP301  TEST3F   LPAR   Alternate  No        Yes         No
_ A1.SCZP301  IODF35   LPAR   Alternate  No        No          No
_ A2.SCZP301  IODF36   LPAR   POR        Yes       No          Yes-POR
_ A3.SCZP301  IODF31   LPAR   Alternate  No        No          No
****************************** Bottom of data *******************************
```

Figure 7-69   IOCDS showing Alternate Status

7.7.2 Updating the IOCDS using the Stand-Alone Input/Output Config Program

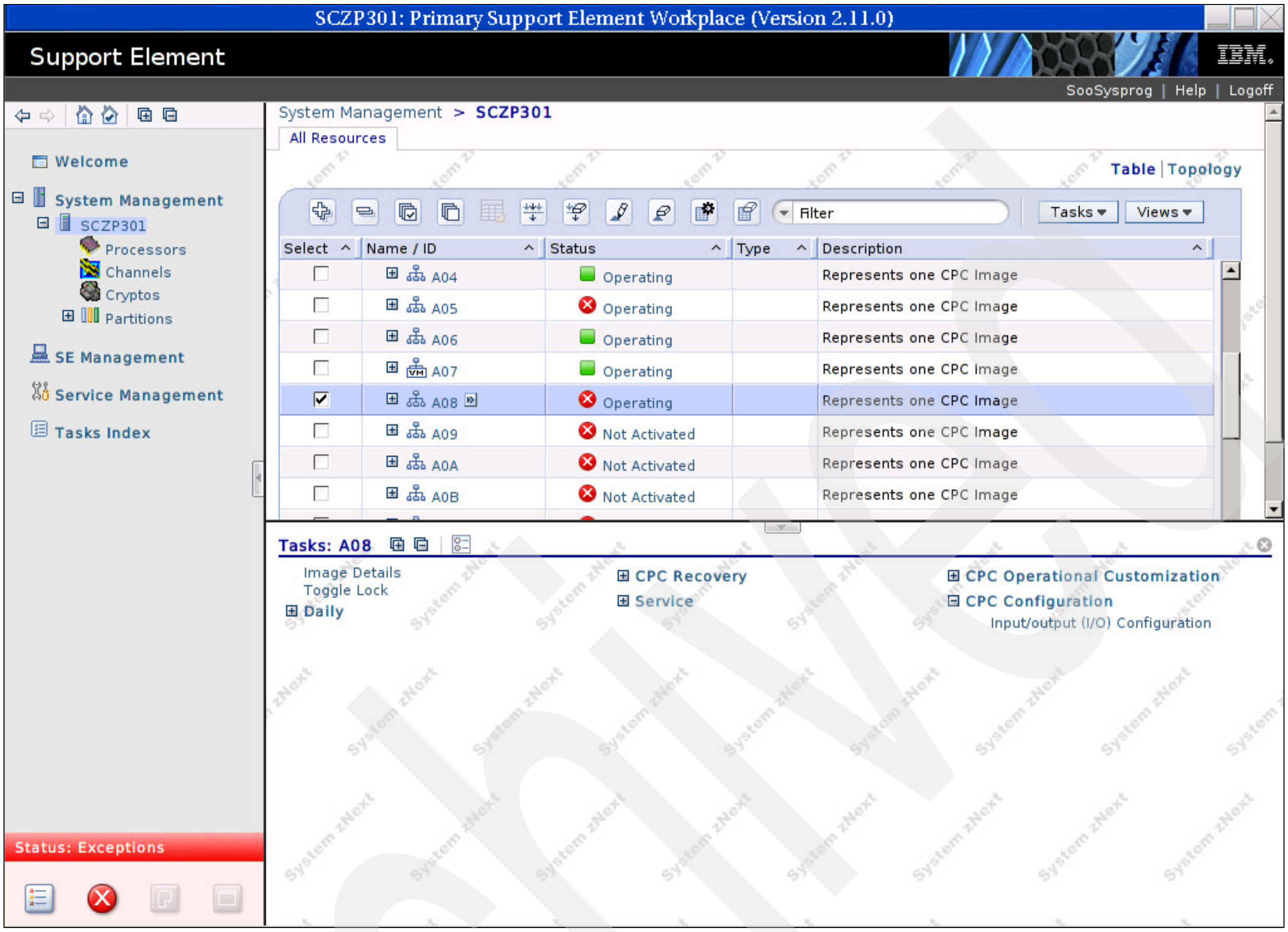
Note: Refer to the *Stand-Alone Input/Output Configuration Program User's Guide* SB10-7152 for detailed information about the following steps.

Copy the IOCP statements that were generated using HCD Option 2.3, Build IOCP input data set onto a USB flash memory drive.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817, as opposed to a remote web browser, and select the new 2817, assuming it has been defined to the Defined CPCs Work Area.
2. Perform a power-on reset using one of the Reset profiles and Starter IOCDSs provided with the processor during installation. This POR creates an environment on the processor that allows you to run the Stand-Alone IOCP process.
3. When the power-on reset is complete, activate one of the logical partitions with at least 128 MB of storage and use this partition to run the I/O Configuration Program.
4. Under Systems Management, click **Systems** to expand the list.
5. Under Systems, click the system to select it (in this example, SCZP301).
6. On the Tasks tab, select **Recovery** → **Single Object Operations** → **Yes**.
7. Under Systems Management, click the system to select it (in this example, SCZP301).

8. Under Partitions, check the LPAR you want to use to run the Stand-Alone IOCP program in (in this example, A08) (Figure 7-70).

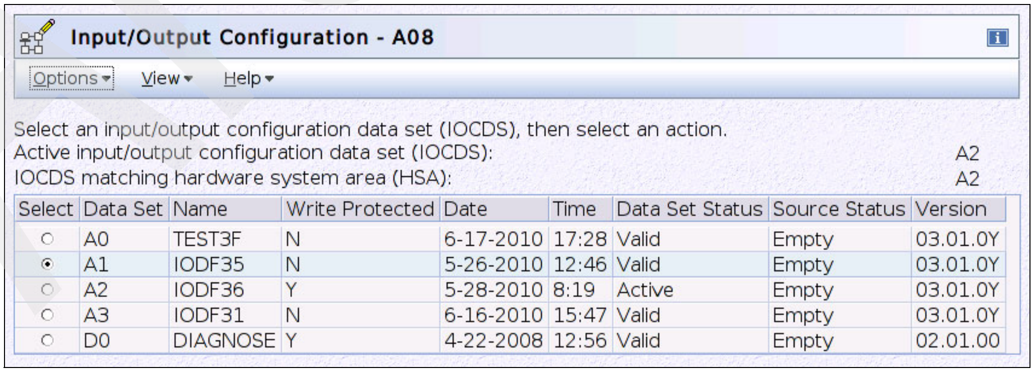


Select	Name / ID	Status	Type	Description
☐	A04	🟩 Operating		Represents one CPC Image
☐	A05	☒ Operating		Represents one CPC Image
☐	A06	🟩 Operating		Represents one CPC Image
☐	A07	🟩 Operating		Represents one CPC Image
☑	A08	☒ Operating		Represents one CPC Image
☐	A09	☒ Not Activated		Represents one CPC Image
☐	A0A	☒ Not Activated		Represents one CPC Image
☐	A0B	☒ Not Activated		Represents one CPC Image

Figure 7-70 Support Element partition selected for SAIOCP program load

9. On the Tasks tab, select **CPC Configuration** → **Input/output (I/O) Configuration**.

10. Click the radio button for the data set into which you want to load the IOCDS (in this example, A1) (Figure 7-71).



Select an input/output configuration data set (IOCDS), then select an action.

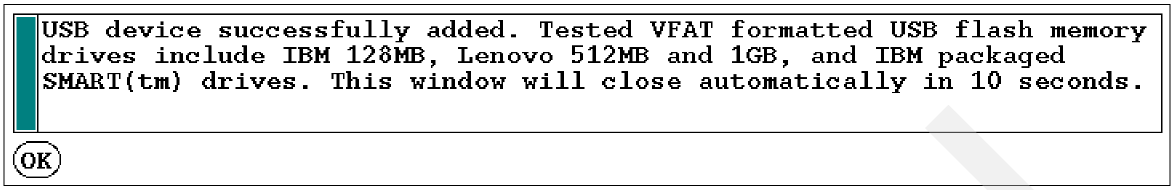
Active input/output configuration data set (IOCDS): A2

IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
○	A0	TEST3F	N	6-17-2010	17:28	Valid	Empty	03.01.0Y
●	A1	IODF35	N	5-26-2010	12:46	Valid	Empty	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 7-71 SAIOCP IOCDS selection for build

11. Insert the USB flash memory drive that contains the IOCP text. Wait for the driver insertion message to open (Figure 7-72).

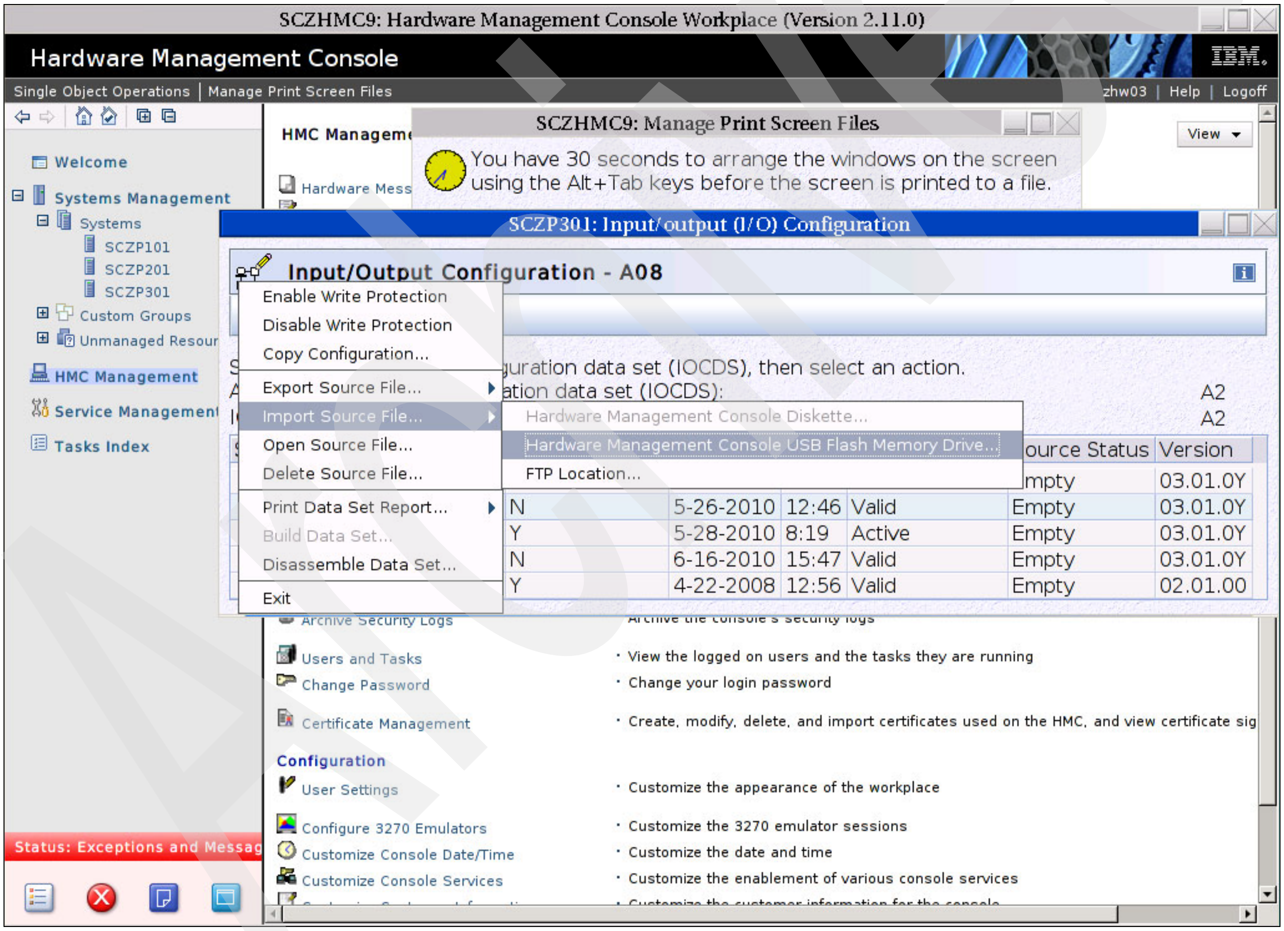


USB device successfully added. Tested VFAT formatted USB flash memory drives include IBM 128MB, Lenovo 512MB and 1GB, and IBM packaged SMART(tm) drives. This window will close automatically in 10 seconds.

Figure 7-72 SAIOCP USB drive insertion message

> **Tip:** Only files in the root directory of the USB flash memory drive can be read by the HMC; any folders or their content will not be read.

12. Select **Options** → **Import Source File** → **Hardware Management Console USB Flash Memory Drive.** (Figure 7-73).



You have 30 seconds to arrange the windows on the screen using the Alt+Tab keys before the screen is printed to a file.

guration data set (IOCDS), then select an action.

ation data set (IOCDS): A2

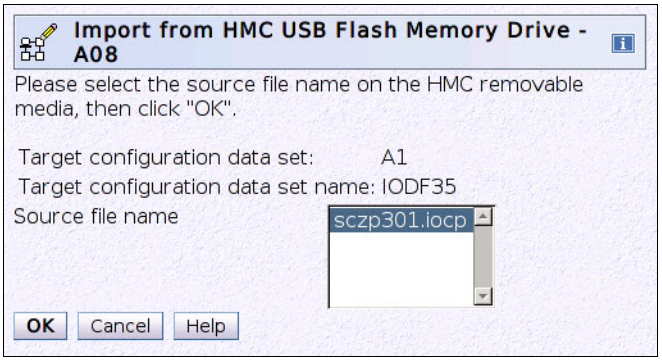
A2

				ource Status	Version
				mpty	03.01.0Y
N	5-26-2010	12:46	Valid	Empty	03.01.0Y
Y	5-28-2010	8:19	Active	Empty	03.01.0Y
N	6-16-2010	15:47	Valid	Empty	03.01.0Y
Y	4-22-2008	12:56	Valid	Empty	02.01.00

- Archive the console's security logs
- View the logged on users and the tasks they are running
- Change your login password
- Create, modify, delete, and import certificates used on the HMC, and view certificate sig
- Customize the appearance of the workplace
- Customize the 3270 emulator sessions
- Customize the date and time
- Customize the enablement of various console services
- Customize the customer information for the console

Figure 7-73 SAIOCP Import source file

13. Select the source file name and click **OK** (Figure 7-74).



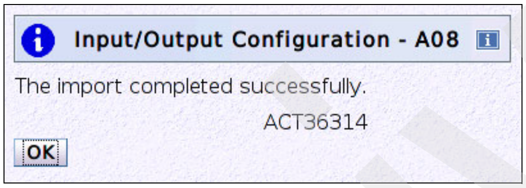
Import from HMC USB Flash Memory Drive - A08

Please select the source file name on the HMC removable media, then click "OK".

Target configuration data set: A1
Target configuration data set name: IODF35
Source file name sczp301.iocp

Figure 7-74 SAIOCP Select source file

14. The source file is now read from the USB flash memory drive. Click **OK**.

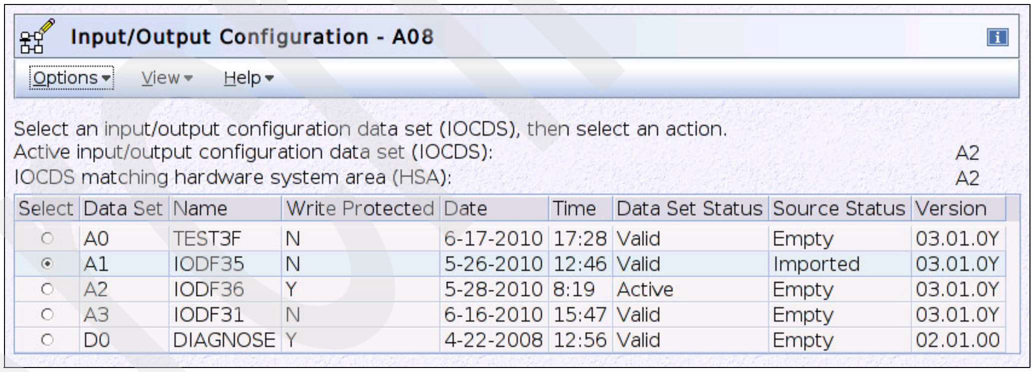


Input/Output Configuration - A08

The import completed successfully.
ACT36314

Figure 7-75 SAIOCP Source file imported

15..Note that the Source Status says Imported (Figure 7-76).



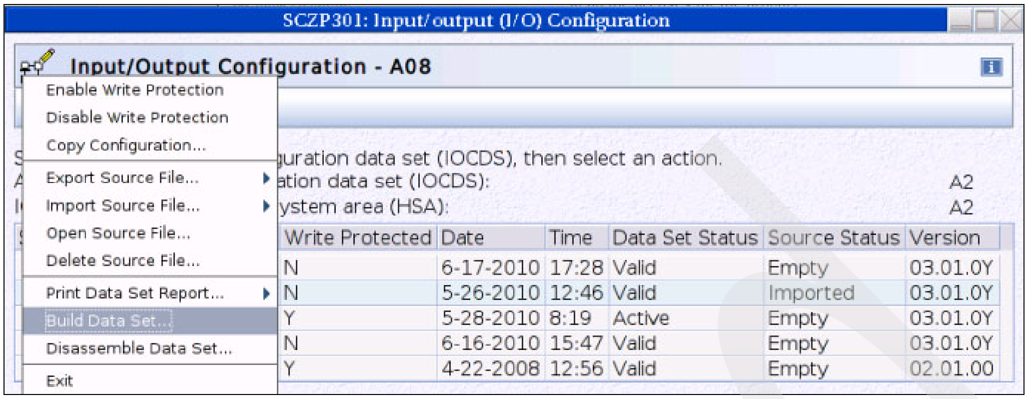
Input/Output Configuration - A08

Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
○	A0	TEST3F	N	6-17-2010	17:28	Valid	Empty	03.01.0Y
●	A1	IODF35	N	5-26-2010	12:46	Valid	Imported	03.01.0Y
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 7-76 SAIOCP IOCDS Source status changed to Imported

16. Select **Options** → **Build Data Set** (Figure 7-77).

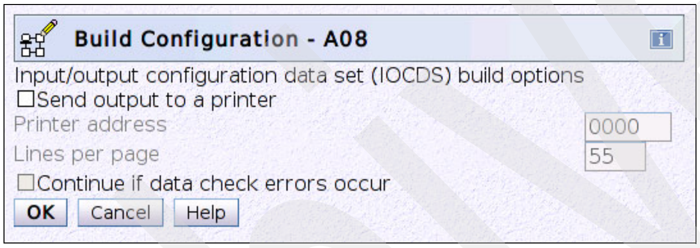


guration data set (IOCDS), then select an action.
ation data set (IOCDS): A2
ystem area (HSA): A2

Write Protected	Date	Time	Data Set Status	Source Status	Version
N	6-17-2010	17:28	Valid	Empty	03.01.0Y
N	5-26-2010	12:46	Valid	Imported	03.01.0Y
Y	5-28-2010	8:19	Active	Empty	03.01.0Y
N	6-16-2010	15:47	Valid	Empty	03.01.0Y
Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 7-77 SAIOCP Building the IOCDS

17. Select the desired build options and click **OK** (Figure 7-78).



Input/output configuration data set (IOCDS) build options

☐ Send output to a printer

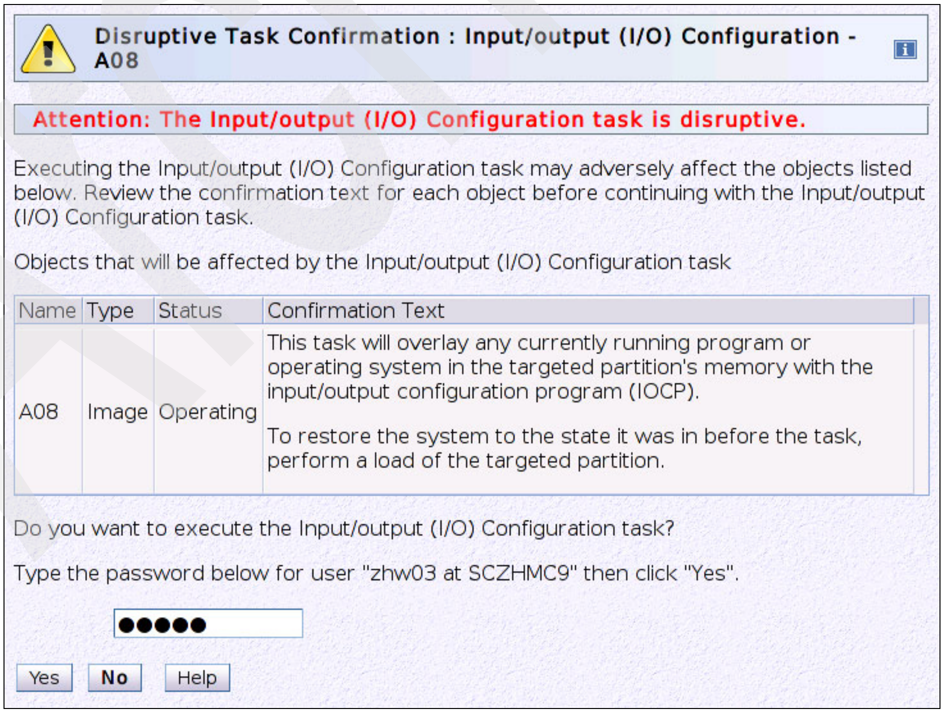
Printer address 0000

Lines per page 55

☐ Continue if data check errors occur

Figure 7-78 SAIOCP Build options

18. Note the Build warning message, enter your HMC password, and click **Yes** (Figure 7-79).



Attention: The Input/output (I/O) Configuration task is disruptive.

Executing the Input/output (I/O) Configuration task may adversely affect the objects listed below. Review the confirmation text for each object before continuing with the Input/output (I/O) Configuration task.

Objects that will be affected by the Input/output (I/O) Configuration task

Name	Type	Status	Confirmation Text
A08	Image	Operating	This task will overlay any currently running program or operating system in the targeted partition's memory with the input/output configuration program (IOCP). To restore the system to the state it was in before the task, perform a load of the targeted partition.

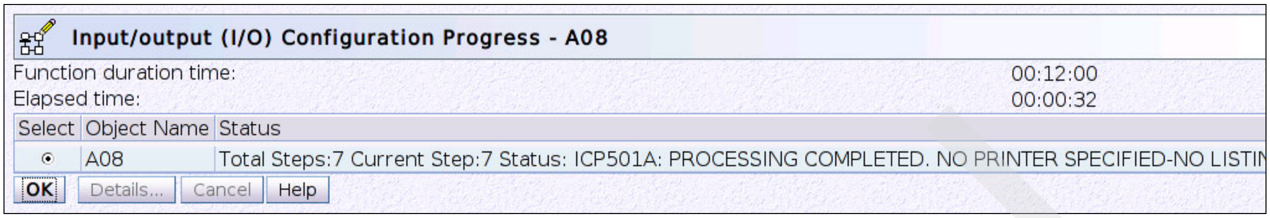
Do you want to execute the Input/output (I/O) Configuration task?

Type the password below for user "zhw03 at SCZHMC9" then click "Yes".

●●●●●

Figure 7-79 SAIOCP Build warning window

19. Status messages are displayed during the build process. After the build has completed successfully, the message shown in Figure 7-80 opens. Click **OK**.

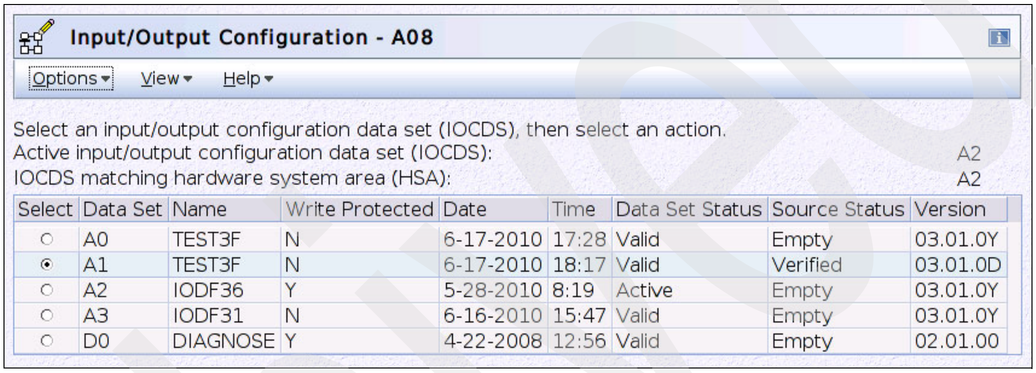


Function duration time: 00:12:00
Elapsed time: 00:00:32

Select	Object Name	Status
●	A08	Total Steps:7 Current Step:7 Status: ICP501A: PROCESSING COMPLETED. NO PRINTER SPECIFIED-NO LISTIN

Figure 7-80 SAIOCP build process status message

20. Note that the Source Status says Verified (Figure 7-81).



Select an input/output configuration data set (IOCDS), then select an action.
Active input/output configuration data set (IOCDS): A2
IOCDS matching hardware system area (HSA): A2

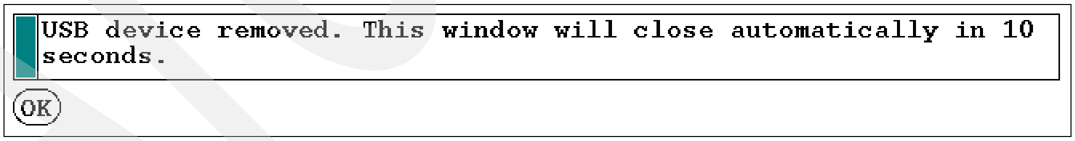
Select	Data Set	Name	Write Protected	Date	Time	Data Set Status	Source Status	Version
○	A0	TEST3F	N	6-17-2010	17:28	Valid	Empty	03.01.0Y
●	A1	TEST3F	N	6-17-2010	18:17	Valid	Verified	03.01.0D
○	A2	IODF36	Y	5-28-2010	8:19	Active	Empty	03.01.0Y
○	A3	IODF31	N	6-16-2010	15:47	Valid	Empty	03.01.0Y
○	D0	DIAGNOSE	Y	4-22-2008	12:56	Valid	Empty	02.01.00

Figure 7-81 SAIOCP IOCDS Source status changed to Verified

21. Select **Options** → **Exit** to end the IOCDS build process and deactivate the LPAR if it is no longer required.

This IOCDS is now ready to be selected from a Reset Profile and the 2817 may be activated (power-on reset) with the production IODF.

The USB flash memory drive may also now be removed. A drive removal message will open (Figure 7-82).



USB device removed. This window will close automatically in 10 seconds.

Figure 7-82 SAIOCP USB drive removal message

7.8 HMC: Steps for profile activation

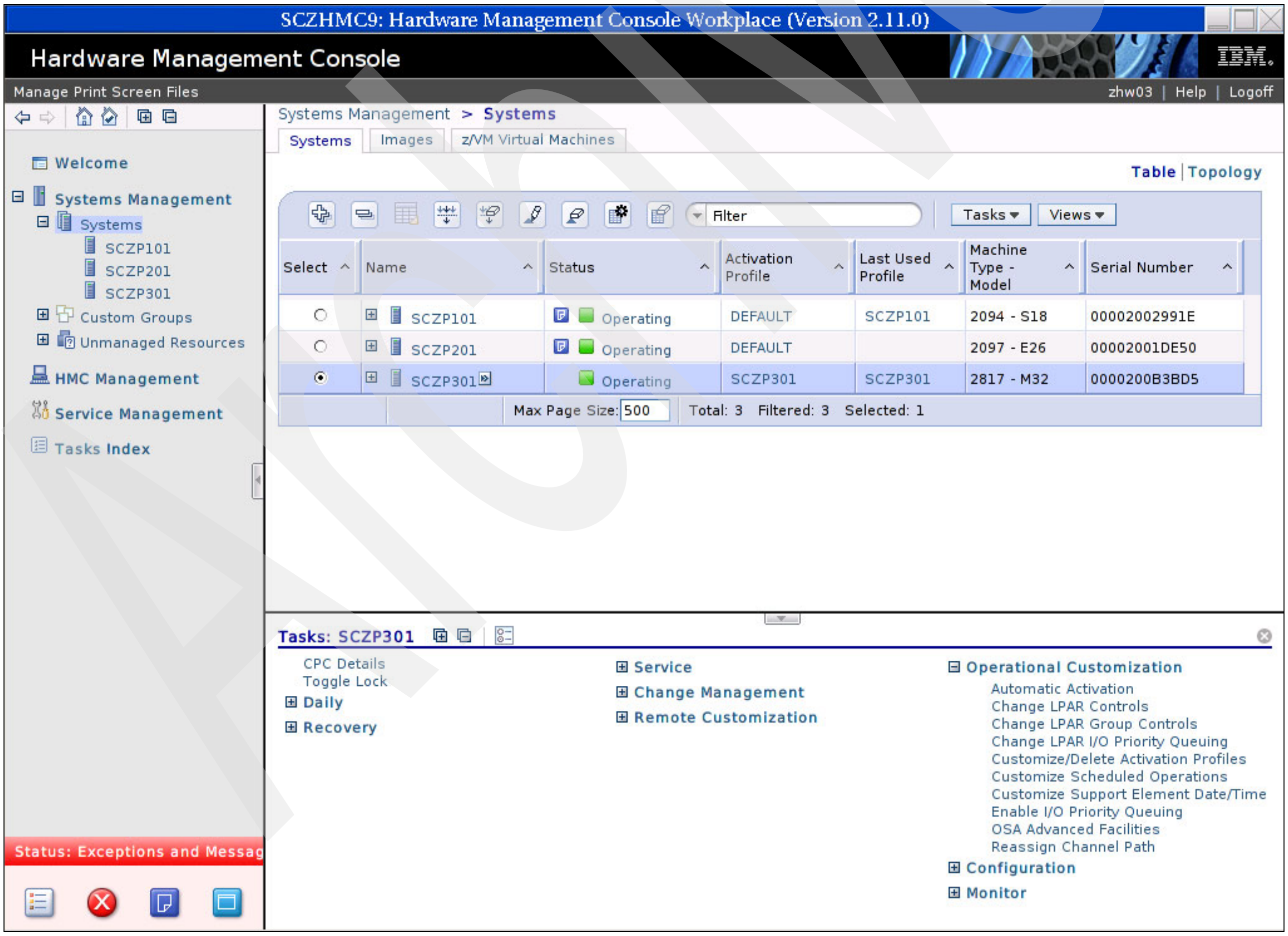
In this section, we provide the steps that are needed to activate your profile.

7.8.1 Building the Production Reset Profile and pointing it to the required IOCDS

Now that the IODF has been written to an IOCDS, a Reset (power-on reset) Profile needs to be built to point to that IOCDS. This Reset Profile is used to power-on reset the new 2817 after it has been handed over from the IBM service representative.

Perform the following steps:

1. Log on using SYSPROG authority to the HMC workstation supplied with the 2817 or use a remote web browser and select the new 2817.
2. Under Systems Management, click **Systems** to expand the list.
3. Under Systems, click the system to select it (in this example, SCZP301).
4. On the Tasks tab, click **Operational Customization** to expand it, and select **Customize/Delete Activation Profiles**. (Figure 7-83).



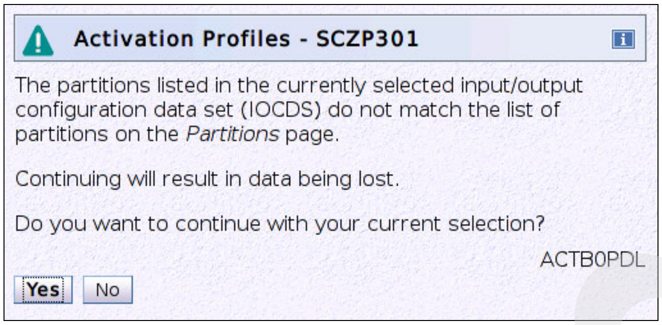
Select	Name	Status	Activation Profile	Last Used Profile	Machine Type - Model	Serial Number
○	SCZP101	Operating	DEFAULT	SCZP101	2094 - S18	00002002991E
○	SCZP201	Operating	DEFAULT		2097 - E26	00002001DE50
●	SCZP301	Operating	SCZP301	SCZP301	2817 - M32	0000200B3BD5

Max Page Size: 500 Total: 3 Filtered: 3 Selected: 1

Figure 7-83 Customize Activation Profile

5. Select the DEFAULT Reset Profile and click **Customize profile**.

6. Save this DEFAULT profile with a new profile name to be referred to when the power-on reset is required (for example, TESTRESET).
7. Select the new profile and click **Customize profile**.
8. Click the IOCDS that you just updated in the previous step. The ACTB0PDL message is displayed (Figure 7-84).



The partitions listed in the currently selected input/output configuration data set (IOCDS) do not match the list of partitions on the *Partitions* page.

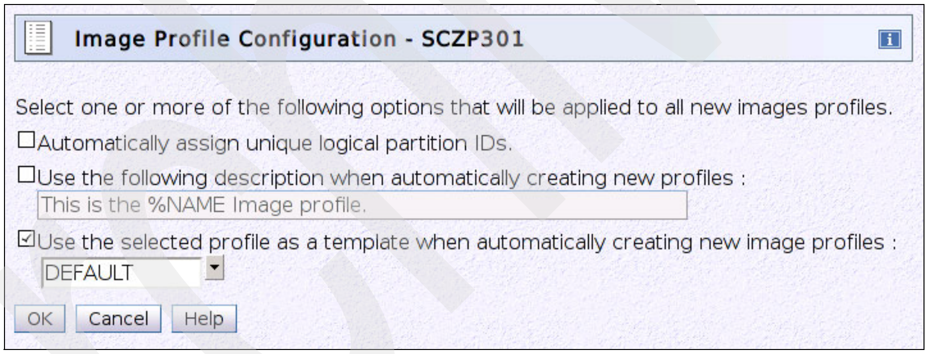
Continuing will result in data being lost.

Do you want to continue with your current selection?

ACTB0PDL

Figure 7-84 Activation Profiles: ACTB0PDL message

9. Depending on the circumstances, you may want to answer **Yes** or **No**. You might want to review the Partition Activation List. In our example, we click **Yes**.
10. HMC retrieves any Image profiles that match the LPAR names defined in the IOCDS that was selected and gives us the option to create new Image profiles for ones that it could not retrieve. We selected the last option. Click **OK** (Figure 7-85).



Select one or more of the following options that will be applied to all new images profiles.

☐ Automatically assign unique logical partition IDs.

☐ Use the following description when automatically creating new profiles :

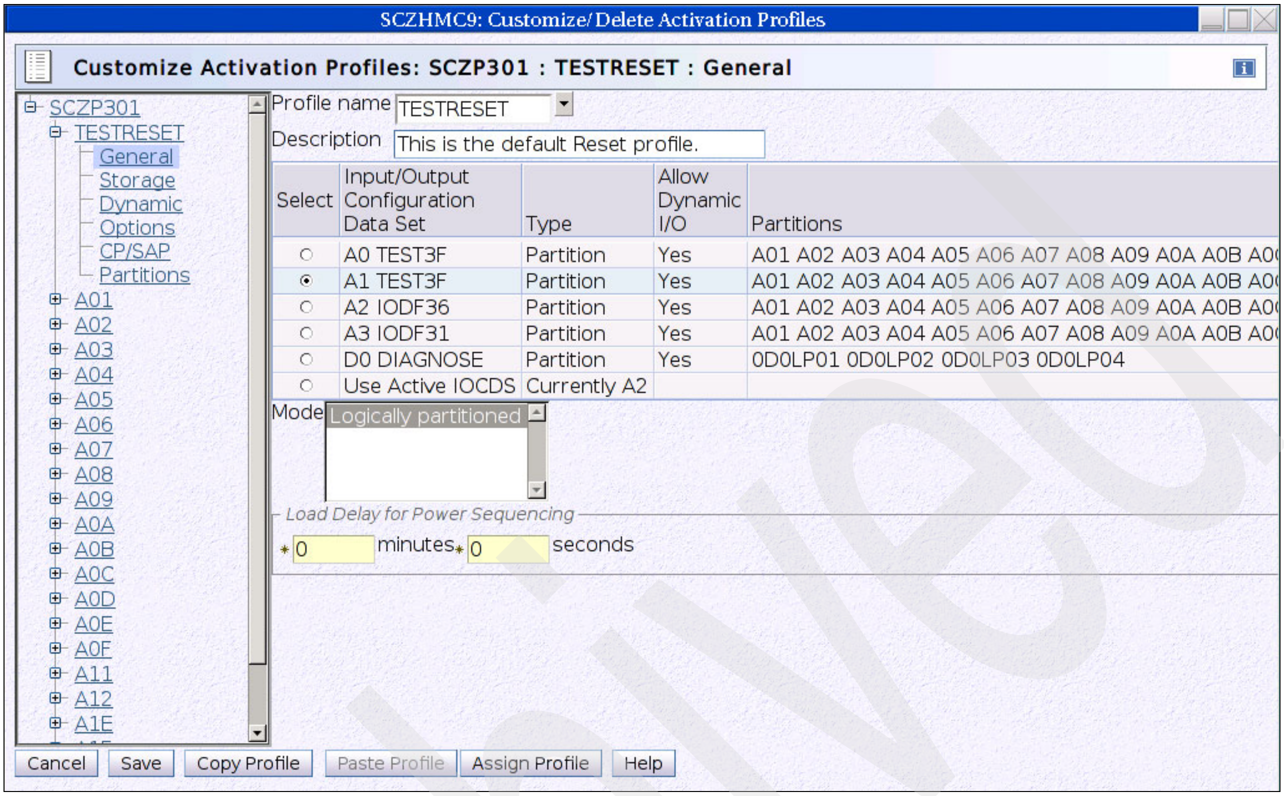
This is the %NAME Image profile.

☑ Use the selected profile as a template when automatically creating new image profiles :

DEFAULT

Figure 7-85 Image Profile automatic build options

11. Note that the list of LPARs that have been retrieved and built based on the LPARs that were defined in the selected IOCDS. Click **Save** (Figure 7-86).



Profile name TESTRESET

Description This is the default Reset profile.

Select	Input/Output Configuration Data Set	Type	Allow Dynamic I/O	Partitions
○	A0 TEST3F	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
●	A1 TEST3F	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A2 IODF36	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	A3 IODF31	Partition	Yes	A01 A02 A03 A04 A05 A06 A07 A08 A09 A0A A0B A0
○	D0 DIAGNOSE	Partition	Yes	0D0LP01 0D0LP02 0D0LP03 0D0LP04
○	Use Active IOCDS	Currently A2		

Mode Logically partitioned

Load Delay for Power Sequencing

* 0 minutes * 0 seconds

Figure 7-86 Reset and Image profile list

7.8.2 Building/Verifying Image Profiles

While still in the Reset Profile, you can now review the Image Profile attributes.

7.8.3 Building/Verifying Load Profiles

Create Load (IPL) Profiles using the "DEFAULTLOAD" Load profile as a skeleton for all the logical partitions for which you are performing an IPL on this processor.

7.8.4 Building/Verifying Load Members in SYS#.IPLPARM

You might require additional Load Members defined in SYS#.IPLPARM for this processor.

Additionally, if you used the HWNAME parameter to point to the Processor ID, then this should be updated to point to the new Processor ID (in this example, from SCZP201 to SCZP301).

7.8.5 Server Time Protocol configuration

The Server Time Protocol (STP) configuration should be reviewed to ensure that the correct External Time Source has been configured and that you are connected to the correct Coordinated Time Network.

Refer to Chapter 8, “Server Time Protocol setup” on page 415 for more detailed information about setting up your STP environment.

7.8.6 Performing a power-on reset of the 2817

When the new 2817 installation has been completed, the IBM service representative performs a power-on reset with a Diagnostic IOCDS.

After this POR has been completed and the IBM service representative is satisfied with the state of the processor, the service representative will hand over the processor to you. Perform another power-on reset using the Reset Profile created in the previous step.

The 2817 is now ready to be activated (power-on reset) using the Production Reset Profile.

8

Server Time Protocol setup

Server Time Protocol (STP) introduced a concept called Coordinated Timing Network (CTN). A Coordinated Timing Network is a collection of servers and Coupling Facilities that are time-synchronized to a time value called Coordinated Server Time (CST).

A CTN can be configured in two ways:

- An STP-only CTN that does not require a Sysplex Timer.
- A Mixed CTN (External Time Reference and STP), which requires a Sysplex Timer. The Sysplex Timer provides the timekeeping information in a Mixed CTN. Even though the IBM zEnterprise 196 does not support attachment to a Sysplex Timer, it can participate in a Mixed CTN that has either a IBM System z10 or IBM System z9 synchronized to the Sysplex Timer. This configuration maintains the ability of enterprises to concurrently migrate from an existing ETR network to a Mixed CTN and from a Mixed CTN to an STP-only CTN

This chapter describes the STP setup when a new z196 is installed.

We discuss the following topics:

- STP configuration overview
- Configuring the HMC as an NTP server
- External time source setup for STP
- Adding the z196 to an existing CTN
- Creating a new STP-only CTN

8.1 STP configuration overview

Server Time Protocol (STP) is a server-wide facility that is implemented in the Licensed Internal Code (LIC) as a chargeable feature. STP is designed to substitute the External Time Reference (ETR) architecture that was used to synchronize and maintain the time for various servers coupled together in a Parallel Sysplex. Even though the z196 does not support ETR, it still can participate in a Mixed CTN. It is possible to have a z196 server as a Stratum 2 or Stratum 3 server in a Mixed CTN (Figure 8-1).

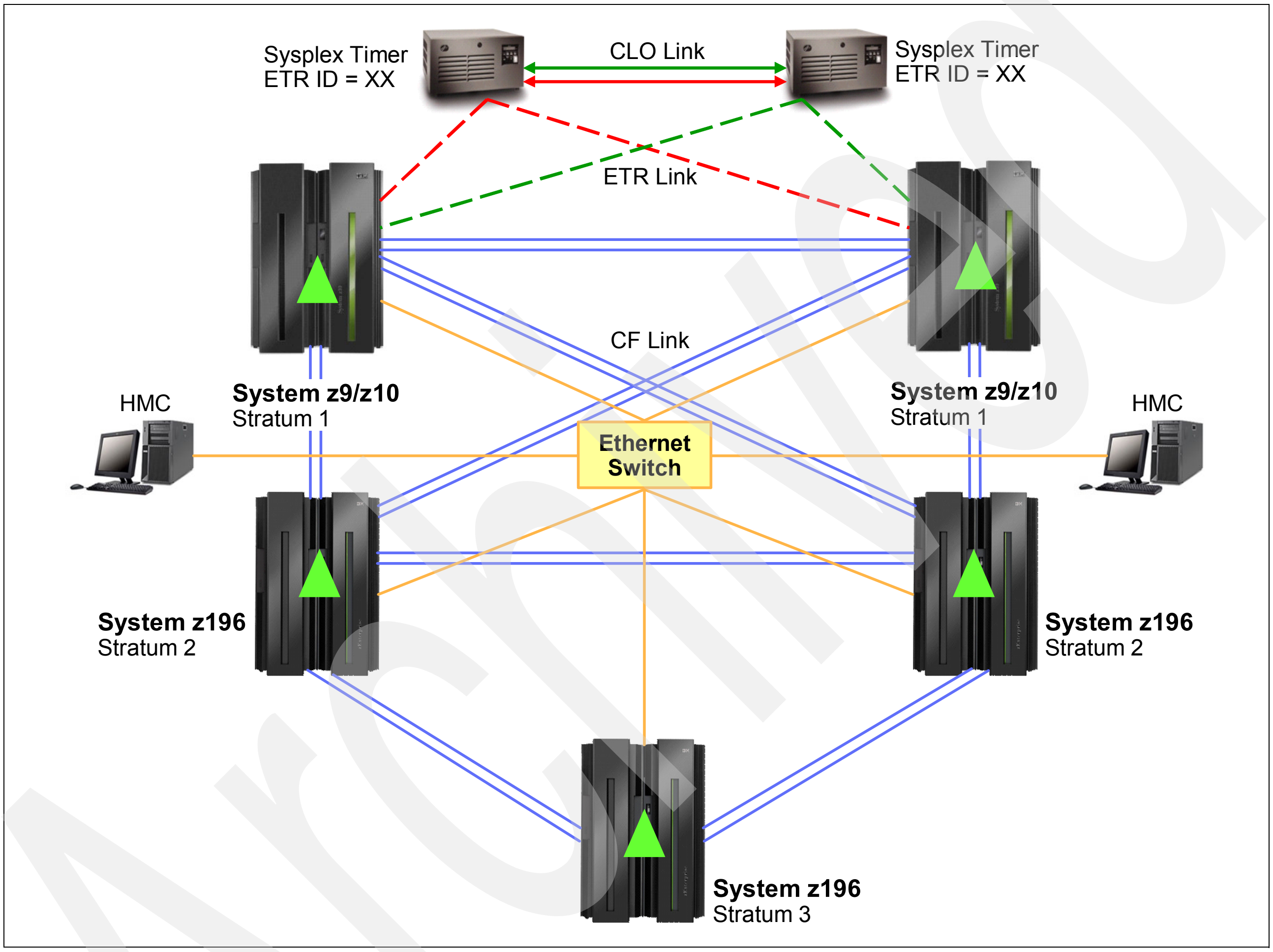


Figure 8-1 Mixed CTN with z196 connectivity

This setup maintains the ability of enterprises to concurrently migrate from an existing ETR network to a Mixed CTN and from a Mixed CTN to an STP-only CTN.

Note: A z196 cannot be in the same sysplex as any processor prior to z9. Similarly, a z196 cannot be in the same CTN as anything older than a z9.

8.1.1 Network Time Protocol server used as an external time source

To retrieve time information used to steer the Coordinated Server Time (CST), STP uses the Network Time Protocol (NTP) client running on the Support Element (SE). An NTP client requires a LAN connection to an NTP server.

To provide NTP data to the NTP client on the SE, you have two options:

- The HMC connected to the SE LAN acts as an NTP server (NTP Stratum 2 or above).
- You receive time information from a stand-alone NTP server (NTP Stratum 1 or above) through the SE LAN.

The NTP server or the NTP server with pulse per second configured as the ETS must be attached directly to the SE LAN. This requirement can be seen in some environments as a potential security concern. The SE LAN is considered in many configurations to be a private dedicated LAN and must be kept as isolated as possible. Providing a HMC the capability to act as an NTP server mitigates this security concern. The NTP server configured on the HMC can access another NTP server through a separate LAN connection. A user can define multiple NTP servers on the HMC.

The Simple Network Time Protocol (SNTP) client running on the SE can be connected to one HMC network adapter (eth0), as shown in Figure 8-2. The other HMC network adapter (eth1) is connected to the corporate network. Configuring an NTP server on the HMC can also be considered as a backup solution to provide NTP server redundancy. Note that the NTP server configured on the HMC is not capable of providing a pulse per second output.

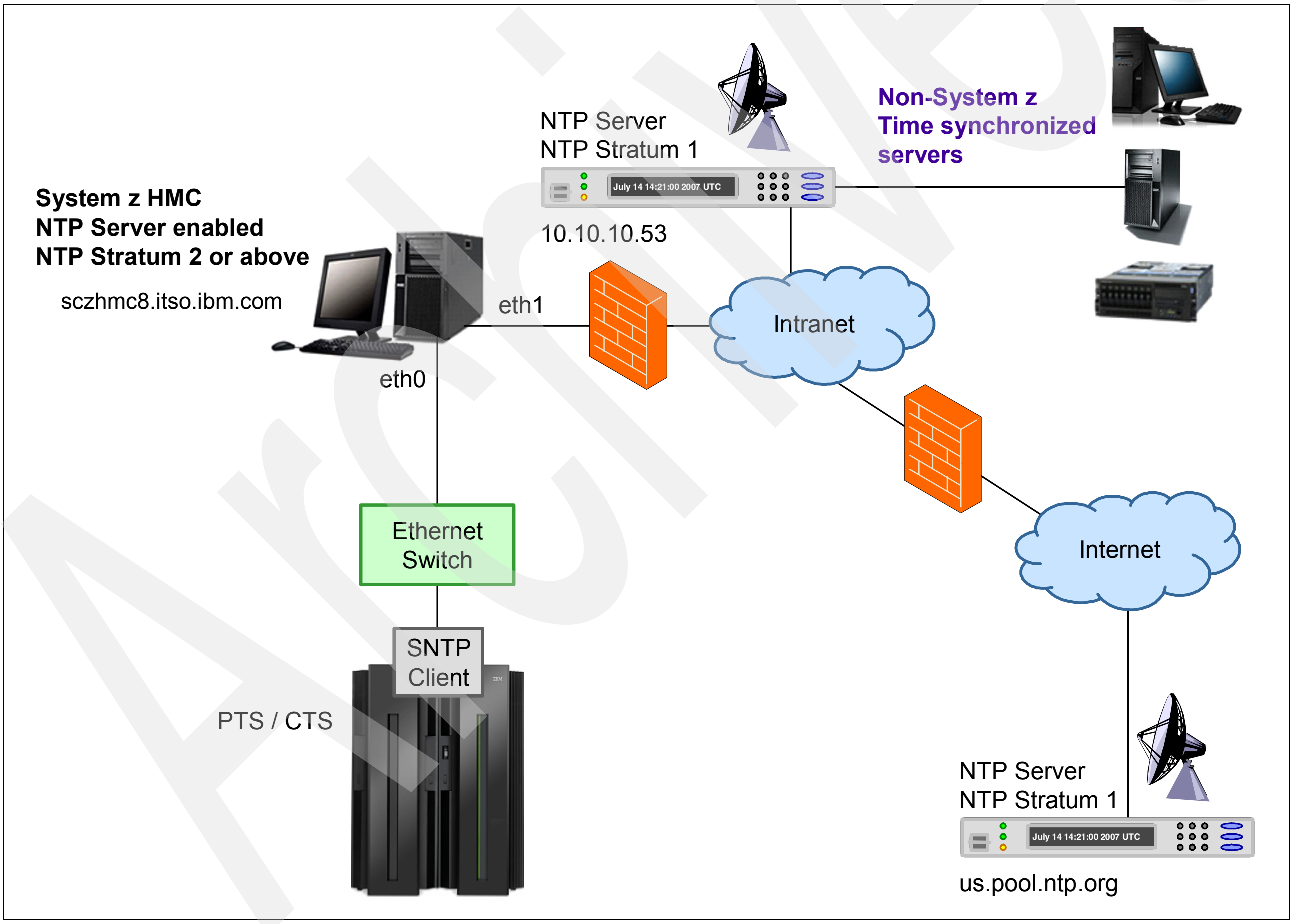


Figure 8-2 Example configuration: NTP server on HMC

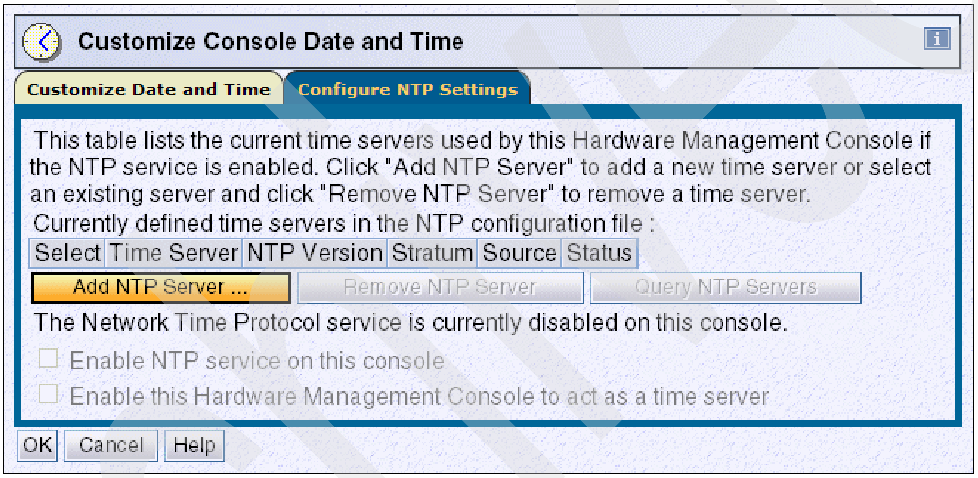
8.2 Configuring the HMC as an NTP server

In this section, we describe how the HMC can maintain time accuracy through an NTP server, connected to the corporate network or available from the NTP pool on the Internet. We also discuss how to enable the HMC to act as an NTP server that can be used as an External Time Source for the CTN.

The NTP server capability on the HMC addresses the potential security concerns that users might have about attaching NTP servers directly to the HMC/SE LAN. Note that when using the HMC as the NTP server, there is no pulse per second capability available.

To configure the HMC as an NTP server, perform the following steps:

1. Click **Customize Console Date and Time** on the appropriate HMC. This task is available in the HMC Management section.
2. Select the Configure NTP Settings tab (Figure 8-3).



This table lists the current time servers used by this Hardware Management Console if the NTP service is enabled. Click "Add NTP Server" to add a new time server or select an existing server and click "Remove NTP Server" to remove a time server.

Currently defined time servers in the NTP configuration file :

Select	Time Server	NTP Version	Stratum	Source	Status

The Network Time Protocol service is currently disabled on this console.

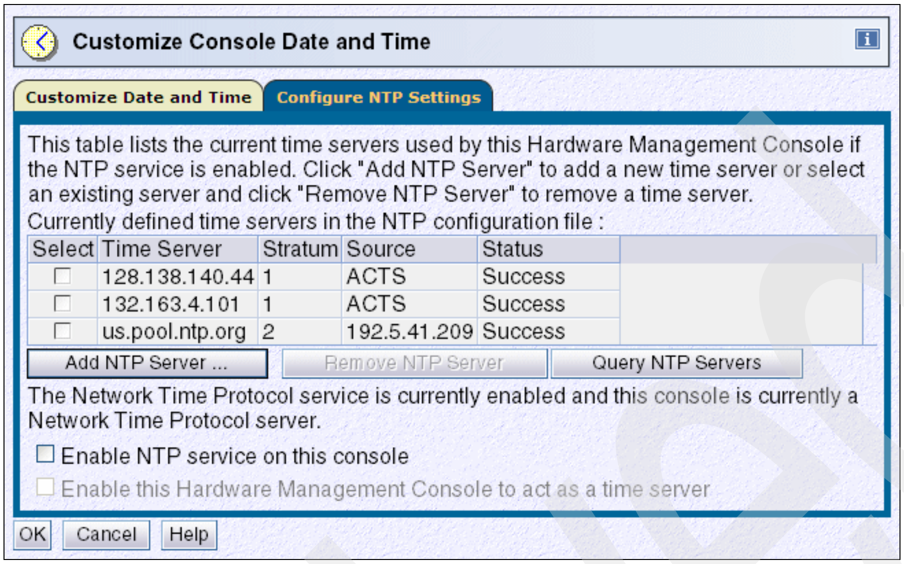
☐ Enable NTP service on this console

☐ Enable this Hardware Management Console to act as a time server

Figure 8-3 Customize Console Date and Time

3. Click the **Add NTP Server...** button. A window opens and prompts you for the server host name or the IP address of a known NTP server. You can define an NTP server that is accessible in the network (as shown in Figure 8-2 on page 417). Using a web address requires the user to customize and enable Domain Name Services on the HMC. To perform this task, select **Customize Network Settings** → **Name services** in the Hardware Management Console Setting Work Area.

After adding one or more NTP Servers to the HMC, the Customize Console Date and Time window will look similar to Figure 8-4.



Customize Console Date and Time

This table lists the current time servers used by this Hardware Management Console if the NTP service is enabled. Click "Add NTP Server" to add a new time server or select an existing server and click "Remove NTP Server" to remove a time server.

Currently defined time servers in the NTP configuration file :

Select	Time Server	Stratum	Source	Status
☐	128.138.140.44	1	ACTS	Success
☐	132.163.4.101	1	ACTS	Success
☐	us.pool.ntp.org	2	192.5.41.209	Success

The Network Time Protocol service is currently enabled and this console is currently a Network Time Protocol server.

☐ Enable NTP service on this console

☐ Enable this Hardware Management Console to act as a time server

Figure 8-4 Customize Console Date and Time: Configure NTP with NTP servers defined

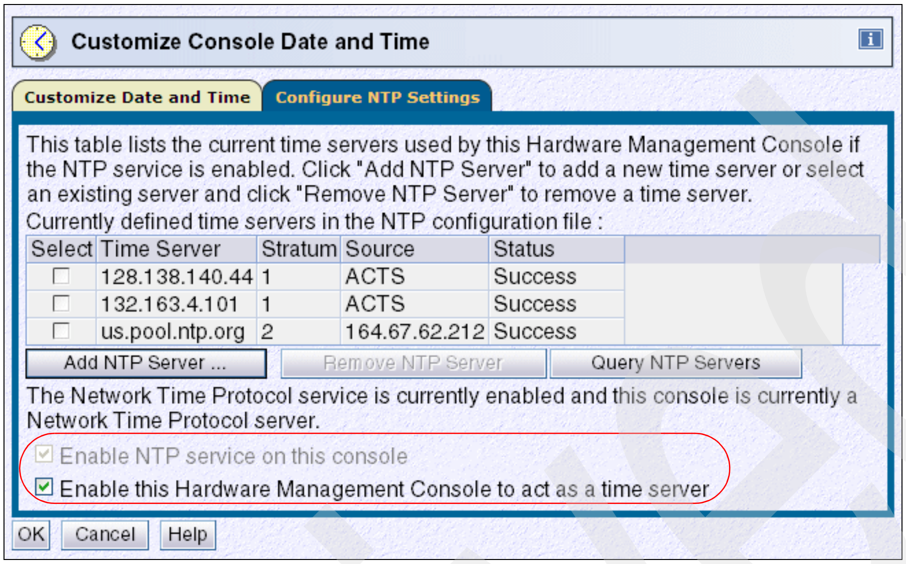
The newly added NTP server (IP address 128.138.140.44 and IP address 132.163.4.101) is the NTP stratum 1 server, where the clock source is ACTS (refer to Table 8-1 on page 428), while the NPT stratum 2 server, which is the internet time service (`us.pool.ntp.org`), is reached by using IP address 192.5.41.209.

Success in the Status column indicates that you know have a valid and useful time source for this HMC. Click the **Query NTP Servers** button to check the validity of all the listed NTP servers. The Select column is used only to remove an NTP server from the HMC and *not* for selecting a NTP server as a primary server.

> **Note:** If more than one NTP servers have been defined, the user does not have the ability to specify which server is the primary server. The NTP service on HMC will take any defined NTP server and try to contact it. If it succeeds, that server will be used as the time source, until either the server in question is no longer available or the console is rebooted. If it cannot communicate with that server, it will try another one in the list.

To enable the Network Time Protocol service on the HMC, the user must check the **Enable NTP service on this console** check box, select **OK**, and confirm the upcoming message window.

At this point, the HMC has the NTP service enabled and gets its time from an NTP server. To enable the NTP server function on the HMC, the **Enable this Hardware Management Console to act as a time server** check box must be checked, as shown in Figure 8-5.



This table lists the current time servers used by this Hardware Management Console if the NTP service is enabled. Click "Add NTP Server" to add a new time server or select an existing server and click "Remove NTP Server" to remove a time server.

Currently defined time servers in the NTP configuration file :

Select	Time Server	Stratum	Source	Status
☐	128.138.140.44	1	ACTS	Success
☐	132.163.4.101	1	ACTS	Success
☐	us.pool.ntp.org	2	164.67.62.212	Success

The Network Time Protocol service is currently enabled and this console is currently a Network Time Protocol server.

☑ Enable NTP service on this console

☑ Enable this Hardware Management Console to act as a time server

Figure 8-5 Customize Console Date and Time: Enabled as an NTP server

After **OK** is clicked, this HMC is able to act as an NTP server using an external time source (ETS) for the STP setup.

8.3 External time source setup for STP

To maintain accurate time, the STP facility supports connectivity to an external time source. Using an external time source, regular adjustments can be performed either manually or automatically.

In a mixed Coordinated Timer Network (CTN), if the Sysplex Timer has an external time source configured, it will be used and accurate time will be maintained by the Sysplex Timer. The Sysplex Timer ETS setup and operation is not discussed in this book.

In an STP-only CTN, the Sysplex Timer is no longer used. Therefore, if an external time source is used to maintain accurate time, it should be configured as follows:

- Migrating from a mixed CTN to an STP-only CTN.
- Using a new STP-only CTN. If the ETS is used to initialize the Coordinated Server Time (CST), the ETS must be configured before the time is initialized.

The ETS can be accessed by:

- Dial-out to telephone time services.

  Using the dial-out to telephone time service consists of two steps:

  a. Configure a Hardware Management Console (HMC) to dial-out to telephone time services. At the Customize Outbound Connectivity task on the HMC, select both of the following check boxes to enable the configuration of the external time source:

     - Enable local system as a call-home server.
     - Allow external time source dialing using the local modem.

Note: Configuration of the ETS should be done on multiple HMCs to have an alternate HMC for ETS queries.

b. Add scheduled operations to the Preferred Time Server (PTS) and the Backup Time Server (BTS), if applicable, to access the ETS. The HMC and the Support Element (SE) support automatic retrieval of the time from a time service and automatic update of CST on a scheduled basis.

   Setting up a schedule to dial out to the time service automatically can be done from the HMC. One of the following operations can be requested:

   - A single scheduled operation at a specified date and time.
   - A recurring scheduled operation that occurs at a specified frequency.

   Scheduled operations that are executed by a server that is not the Current Time Server are ignored. At the scheduled time, the SE requests the HMC to dial out to the time service, the HMC sends the difference with the time obtained from the service to the STP facility, which then makes gradual adjustments by steering the CST to the time obtained from the external time source.

- Connection to an NTP server:
  - Without a pulse per second (PPS) output

    The NTP server must be defined on the SE of the servers that can be assigned as the Current Time Server. NTP becomes active after a server is configured as the Current Time Server within the CTN.

  - With a PPS output

    The PPS output signal provides higher accuracy (within 10 microseconds) than the HMC dial-out function or an NTP server without PPS (within 100 milliseconds).

    In addition to defining the NTP server with PPS on the SE of the z196 server operating as the CTS, the z196 needs to be connected to an NTP server with PPS ports at the external clock reference (ECF) cards. Each of the two standard ECF cards on z196 servers have a PPS port (for a coaxial cable connection) that can be used by STP in conjunction with the NTP client

The ETS configuration of the PTS and the BTS can be different. For example, the PTS may use NTP, while the BTS is configured for dial-out from the HMC. The actual ETS type being used depends on which server is currently the Current Time Server. A CTS change may result in using a different ETS being used to steer the CTS.

Note: Independent of the type of ETS configuration (dial-out HMC or NTP), synchronization to the ETS is requested by the Support Element of the CTS.

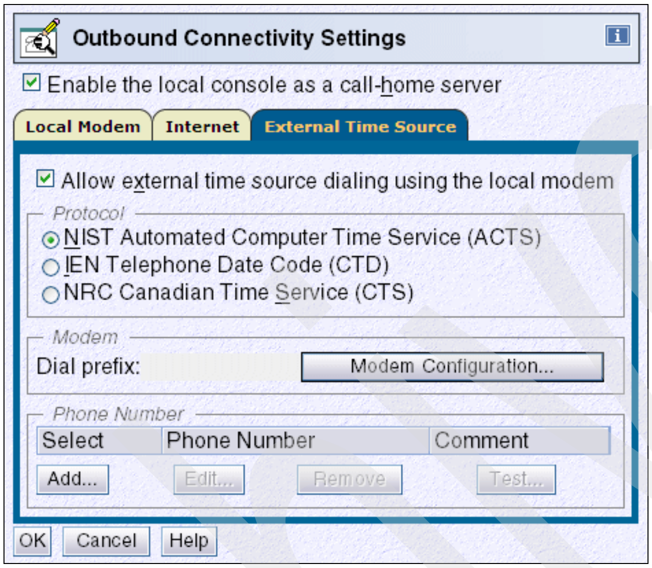
8.3.1 ETS dial-out configuration

The ETS dial-out setup has to be done as a two step approach. The HMC setup can be considered the first step of the ETS dial-out configuration. It makes the HMC capable of dialing out to a time service provider. In the second step, scheduled operations are added to the Support Element of those servers that are CTS candidates. This step is described in “SE setup for ETS dial-out configuration” on page 424.

HMC setup for ETS dial-out configuration

To configure the dial-out telephone connection, perform the following steps:

1. Select the **Service Management** task on the Hardware Management Console application.
2. Click the **Customize Outbound Connectivity** option available in the Work Panel. The Call-Home Server Consoles window that opens shows the call-home server assigned to this HMC.
3. Click the **Configure** button to open the Customize Outbound Connectivity window (Figure 8-6). Make sure the **Enable local system as a call-home server** check box is selected to enable configuration of the external time source.



Outbound Connectivity Settings

☑ Enable the local console as a call-home server

☑ Allow external time source dialing using the local modem

Protocol

● NIST Automated Computer Time Service (ACTS)

○ IEN Telephone Date Code (CTD)

○ NRC Canadian Time Service (CTS)

Modem

Dial prefix:

Select	Phone Number	Comment

Figure 8-6 Customize Outbound Connectivity: External Time Source

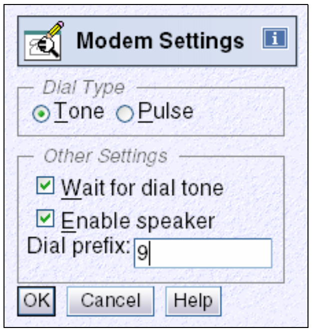
4. From the External Time Source tab, check **Allow external time source dialing using the local modem** to enable configuration of the protocol.

   Three protocols are available:

   - National Institute of Standards and Technology (NIST), representing the Automated Computer Time Service (ACTS), typically used in the USA
   - Instituto Elettrotecnico Nazionale (IEN), representing the Telephone Date Code (CTD), typically used in Europe
   - National Research Council (NRC), representing the Canadian Time Service (CTS), typically used in Canada

   For each country, the time service must be contacted to verify the protocol they support and the phone number to be used.

5. Click the **Modem Configuration** button. The Customize Modem Settings window allows you to specify tone or pulse dialing, wait for dial tone, enable speaker, and dial prefix (Figure 8-7). Make the appropriate selections and click **OK**.



Dial Type

● Tone ○ Pulse

Other Settings

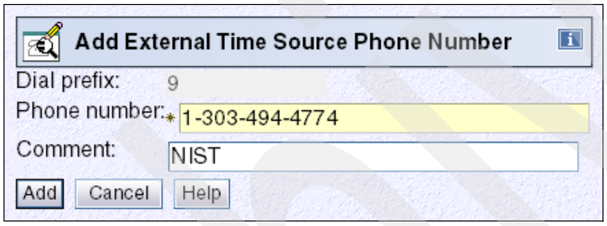
☑ Wait for dial tone

☑ Enable speaker

Dial prefix: 9

Figure 8-7 Customize Modem Settings window

6. After the Customize Modem Setting task has been completed, the telephone number can be added by clicking **Add** in the External Time Source tab. Figure 8-8 shows the Add External Time Source Phone Number window.



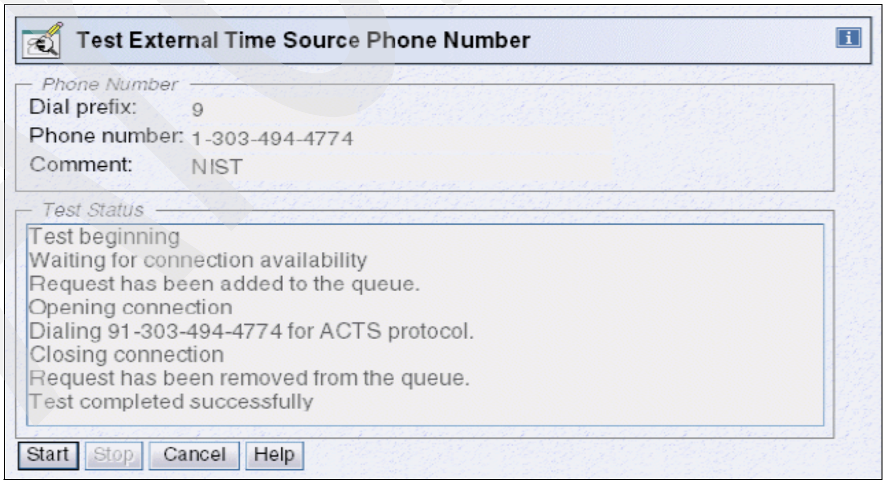
Dial prefix: 9

Phone number:* 1-303-494-4774

Comment: NIST

Figure 8-8 Add External Time Source Phone Number window

7. When the dial-out phone number has been added, the **Test** button in the Customize Outbound Connectivity panel becomes selectable and should be clicked to ensure that the correct configuration and connectivity to the ETS service provider has been accomplished. An example output of a successful test is shown in Figure 8-9.



Phone Number

Dial prefix: 9

Phone number: 1-303-494-4774

Comment: NIST

Test Status

```
Test beginning
Waiting for connection availability
Request has been added to the queue.
Opening connection
Dialing 91-303-494-4774 for ACTS protocol.
Closing connection
Request has been removed from the queue.
Test completed successfully
```

Figure 8-9 Test External Time Source Phone Number

This completes the first step of the ETS dial-out configuration.

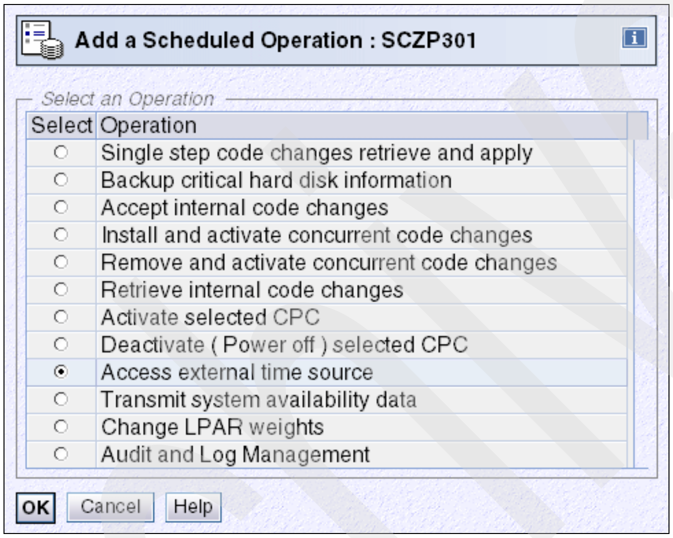
The HMC is now capable of handling ETS requests. We recommend configuring a second HMC for ETS dial-out capability to have redundancy in case of an HMC failure. This redundancy can be achieved by performing the same steps for the second HMC that has all the CTS candidates in its server group defined.

SE setup for ETS dial-out configuration

The second part of the ETS dial-out configuration adds scheduled operations to the Support Element of those servers that are CTS candidates (PTS and BTS) and are using the HMC ETS dial-out function.

Perform the following steps:

1. Select the Server as the target object, then select **Operational Customization** → **Customize Scheduled Operations** → **Options** → **New**. This action opens the Add a Scheduled Operation window (Figure 8-10).



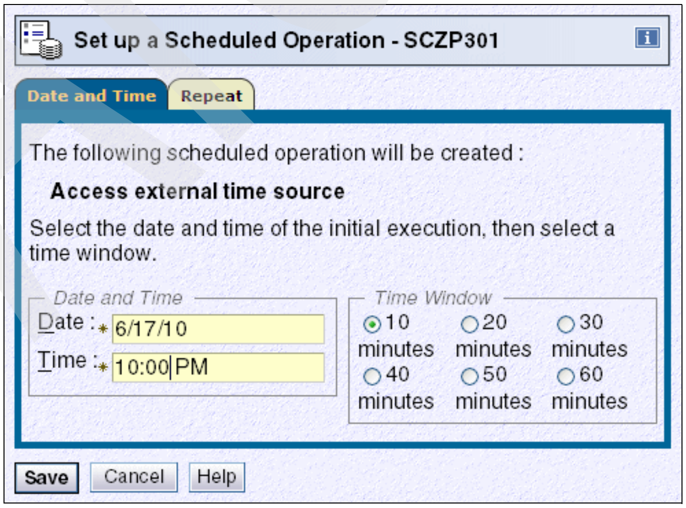
Add a Scheduled Operation : SCZP301

Select an Operation

Select	Operation
○	Single step code changes retrieve and apply
○	Backup critical hard disk information
○	Accept internal code changes
○	Install and activate concurrent code changes
○	Remove and activate concurrent code changes
○	Retrieve internal code changes
○	Activate selected CPC
○	Deactivate (Power off) selected CPC
●	Access external time source
○	Transmit system availability data
○	Change LPAR weights
○	Audit and Log Management

Figure 8-10 Add a Scheduled Operation

2. Select the **Access external time source radio** button and click **OK**. The Set up a Scheduled Operation window opens (Figure 8-11).



Set up a Scheduled Operation - SCZP301

The following scheduled operation will be created :

Access external time source

Select the date and time of the initial execution, then select a time window.

Date and Time

Date : * 6/17/10

Time : * 10:00 PM

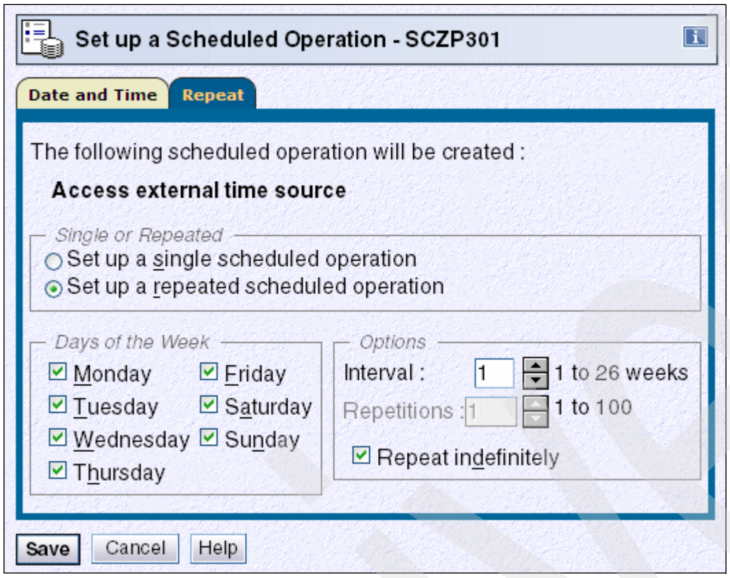
Time Window

● 10 minutes ○ 20 minutes ○ 30 minutes

○ 40 minutes ○ 50 minutes ○ 60 minutes

Figure 8-11 Set up a Scheduled Operation/Date and Time

3. Enter a date and time when the scheduled operation should be performed. The default Time Window setting of 10 minutes should be sufficient in case this scheduled operation is prevented by any resource constraint. For the ETS query, we recommend that a repeated scheduled operation be set up for periodic time adjustment to continuously maintain time accuracy. By selecting the **Repeat** tab, you can set a repeat option (Figure 8-12).



Set up a Scheduled Operation - SCZP301

The following scheduled operation will be created :

Access external time source

Single or Repeated

○ Set up a single scheduled operation
● Set up a repeated scheduled operation

Days of the Week

☑ Monday
☑ Tuesday
☑ Wednesday
☑ Thursday
☑ Friday
☑ Saturday
☑ Sunday

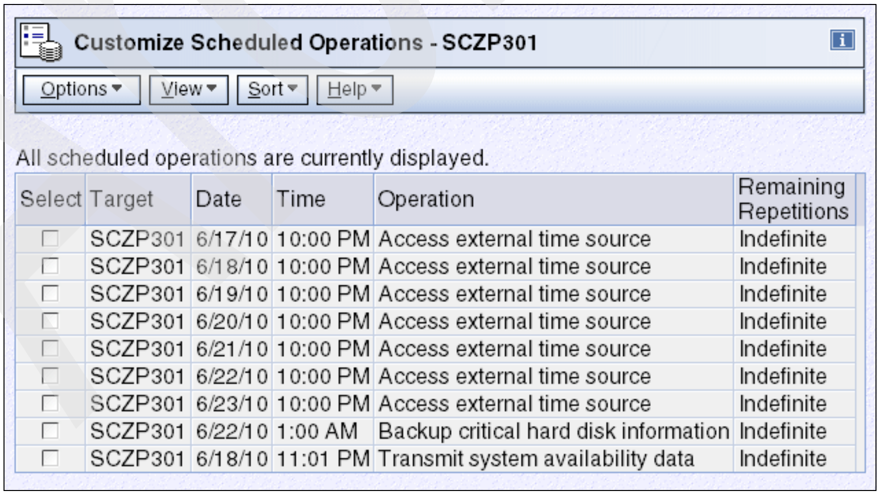
Options

Interval : 1 1 to 26 weeks
Repetitions : 1 1 to 100
☑ Repeat indefinitely

Figure 8-12 Set up a Scheduled Operation/Repeat

4. Select the **Set up a repeated scheduled operation** radio button. Depending on the time accuracy requirement, select one or more days the ETS should be contacted. Selecting an interval of one week means that the ETS device will be contacted once a week on the days previously selected. Check **Repeat indefinitely** to make sure this scheduled operation never expires.

The Customize Scheduled Operations window shows the access external time source operations in the scheduler list (Figure 8-13).



Customize Scheduled Operations - SCZP301

All scheduled operations are currently displayed.

Select	Target	Date	Time	Operation	Remaining Repetitions
☐	SCZP301	6/17/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/18/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/19/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/20/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/21/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/22/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/23/10	10:00 PM	Access external time source	Indefinite
☐	SCZP301	6/22/10	1:00 AM	Backup critical hard disk information	Indefinite
☐	SCZP301	6/18/10	11:01 PM	Transmit system availability data	Indefinite

Figure 8-13 Display Customize Scheduled Operations

As previously mentioned, this scheduled operation setup needs to be done for those SEs that are using the HMC ETS dial-out function, so the same scheduled operation setup might be necessary.

Note: No user message is displayed on the HMC when a dial-out to the external time source occurs. But when STP generates a time adjustment, an entry message is generated in the Support Element Console Events log. To visualize the console log from the HMC application, first select the CTS and then select **Recovery** → **Single Object Operation** to log on to the Support Element.

From the SE workplace, select **Service Management** → **View Console Events**.

8.3.2 Configuring NTP as the external time source

To retrieve time information used to steer the Coordinated Server Time (CST), STP uses the Simple Network Time Protocol (SNTP) client running on the Support Element. The NTP server or the NTP server with pulse per second configured as the ETS requires a LAN connection to the SE LAN. The NTP server can be either an external time source device available from several timekeeping device manufacturers, a local NTP server, or an NTP server configured on the HMC, as described in 8.2, “Configuring the HMC as an NTP server” on page 418. When using the HMC as the NTP server, there is no pulse per second capability available.

STP uses time adjustment from the NTP server configured on the Current Time Server (CTS). The Support Element on the Primary Time Server / Current Time Server (PTS/CTS) must be configured to communicate with an NTP server. Only the CTS is being used to steer the CST. However, in an STP-only CTN where the NTP client function is used, we recommend configuring the NTP function on each server that can potentially have a role in the CTS.

If the Primary Time Server / Current Time Server (PTS/CTS) fails, the Backup Time Server (BTS), if configured, takes over the CTS role and is able to steer the CST to its external time source. In case the NTP server configured to the PTS fails, the BTS calculates the required adjustment and propagates it to the PTS. Coupling connectivity is used for this communication.

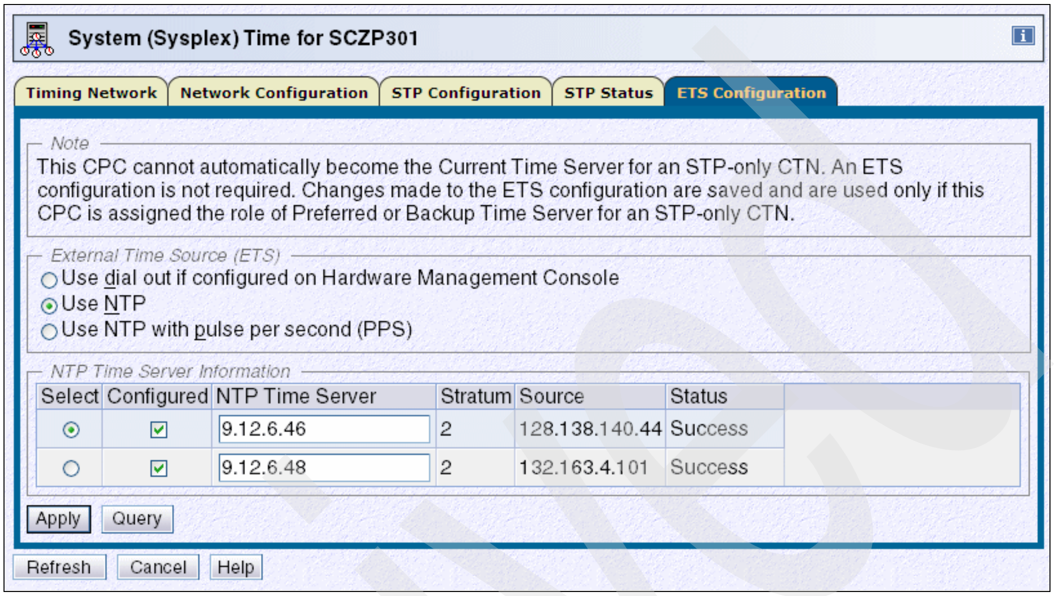
NTP server without pulse per second option

To configure the NTP Time Server ETS, perform the following steps:

1. Select the server to be set up for NTP on the HMC.

2. Click the **System (Sysplex) Time** option in the Tasks section. Select the **ETS Configuration** tab (Figure 8-14).

   The ETS Configuration tab is displayed for all servers that support NTP to allow an ETS configuration for every server that could potentially become the CTS in the future.



Note

This CPC cannot automatically become the Current Time Server for an STP-only CTN. An ETS configuration is not required. Changes made to the ETS configuration are saved and are used only if this CPC is assigned the role of Preferred or Backup Time Server for an STP-only CTN.

External Time Source (ETS)

○ Use dial out if configured on Hardware Management Console
● Use NTP
○ Use NTP with pulse per second (PPS)

NTP Time Server Information

Select	Configured	NTP Time Server	Stratum	Source	Status
●	☑	9.12.6.46	2	128.138.140.44	Success
○	☑	9.12.6.48	2	132.163.4.101	Success

Figure 8-14 ETS Configuration: Use NTP

3. Select the **Use NTP** radio button to display the NTP server information table. When at least one **Configured** check box is selected, it indicates that the IP address or URL entered should be used as the NTP server address. The use of a URL requires that the SE be customized with Domain Name Services enabled.

   Select **Customize Network Settings** → **Name services** in the Support Element Console Applications. Refer to *z196 Support Element Operations Guide (V2.11.0),* SC28-6896 for information about how to customize network settings for the Support Element.

   Up to two NTP servers can be configured for each supported CPC. A preferred NTP server is chosen by selecting the appropriate **Select** radio button. This NTP server is called the *selected* NTP server.

4. Clicking the **Query** button will test the designated servers and the Stratum level, Source, and Status table fields for the corresponding NTP server will be completed, as shown in Figure 8-14, and described as follows.

   – The Status column displays Success if the related NTP server is accessible. A list of possible status fields is available by clicking the **Help** button within the ETS Configuration tab.

- The Source field contains a description of the time source for the NTP server provided as information by the NTP server. Typically, the source for Stratum 1 servers for the NTP will be GPS, or radio signals, such as WWV. A list of examples of known Stratum 1 source values is shown in Table 8-1. For NTP servers not at Stratum 1, this field contains the IP address of the higher stratum NTP server. This field is blank if the server is not available.
- The Stratum column shows the stratum level of the ETS source for the NTP server.

Table 8-1 NTP Stratum 1 clock sources

NTP source ID	Displayed source text	Description of source ID
ACTS	ACTS	NIST telephone modem service
CESM	Cesium	Calibrated Cesium clock
CHU	CHU	Ottawa (Canada) Radio 3330, 7335, 14760 kHz
DCF	DCF	Mainflingen (Germany) Radio 77.5 kHz
GOES	GOES	Geostationary Orbit Environment Satellite
GPS	GPS	Global Positioning Service
HBG	HBG	Prangins, HB 75 kHz
IRIG	IRIG	Inter-Range Instrumentation Group
JJY	JJY	Fukushima, JP 40 kHz, Saga, JP 60 kHz
LOCL	Local	Uncalibrated local clock
LORC	LORAN-C	LORAN-C radio-navigation system
MSF	MSF	Rugby (UK) Radio 60 kHz
OMEG	OMEGA	OMEGA radio-navigation system
PPS	PPS	Calibrated quartz clock or other pulse-per-second source
PTB	PTB	PTB (Germany) telephone modem service
RBDM	Rubidium	Calibrated Rubidium clock
TDF	TDF	Allouis (France) Radio 164 kHz
USNO	USNO	USNO telephone modem service
WWV	WWV	Ft. Collins (US) Radio 2.5, 5, 10, 15, 20 MHz
WWVB	WWVB	Boulder (US) Radio 60 kHz
WWVH	WWVH	Kaui, Hawaii (US) Radio 2.5, 5, 10, 15 MHz

5. Click the **Apply** button to set the NTP server ETS configuration (Figure 8-14 on page 427). The configuration takes effect immediately and the NTP server configuration will be saved on the Support Element if only one NTP server is configured. If two NTP servers are configured, clicking the **Apply** button will cause a verification of the NTP servers first. This is intended to help the user chose the best NTP server as the selected one. At the end of the verification process, and with the selection made, the configuration will be saved on the SE and the ETS will be used.

After the NTP servers are configured and applied, the selected NTP server is used for time adjustments.

NTP server accessibility is checked once every 10 minutes, with a time adjustment issued every hour. In the case of NTP server access failures, or changes in stratum level or source ID, a hardware message is posted. No user message is displayed on the HMC when STP accesses the NTP server.

When a time adjustment is requested, a message is generated in the Support Element Console Events log. Sample messages are shown in Table 8-2.

Table 8-2 Support Element Console Events

Date	Time	Console Event
09/30/2009	15:07:13.360	This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source at NTP server 9.12.6.48 [0.000842 seconds].
09/30/2009	14:07:13.390	This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source at NTP server 9.12.6.48 [-0.001838 seconds].
09/30/2009	13:07:13.300	This CPC is requesting an adjustment to the Coordinated Server Time after contacting an External Time Source at NTP server 9.12.6.48 [0.001748 seconds].

To visualize the console log from the HMC application, first select the CTS, then perform the following steps:

1. Select **Recovery** → **Single Object Operations** to log on to the Support Element.
2. From the SE workplace, select **Service Management** → **View Console Events**.

NTP server with pulse per second option

The pulse per second output option, offered by some NTP server hardware vendors, is used in addition to the NTP time information. The time accuracy of an STP-only CTN has been improved by adding the capability to configure an NTP server that has a pulse per second (PPS) output signal. This type of device is available worldwide from several vendors that provide network timing solutions.

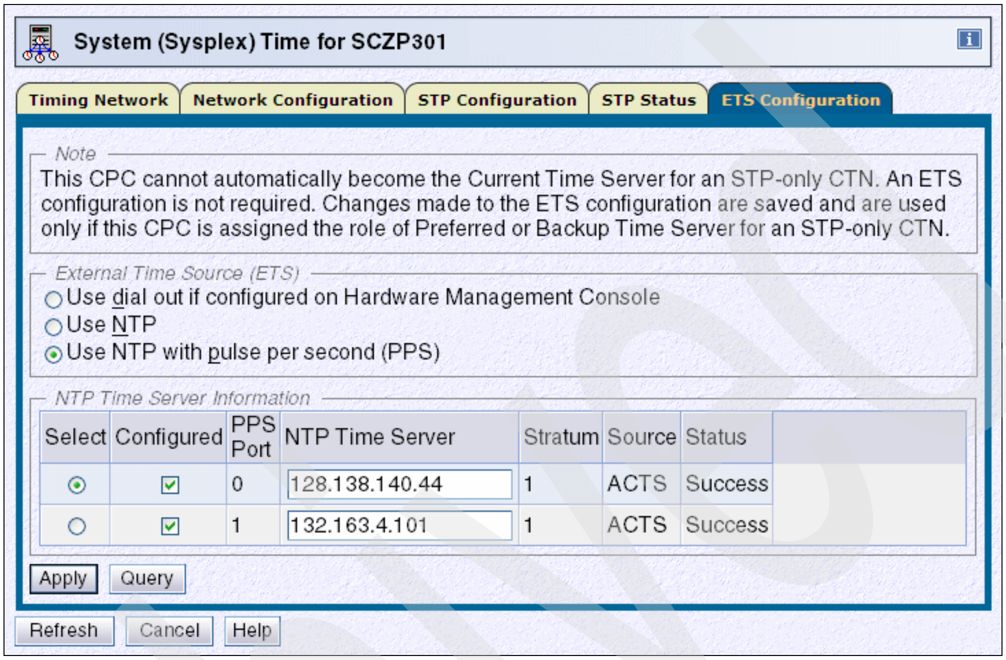
Note: The NTP server that can be configured on the HMC is not able to provide a PPS signal.

STP has been designed to track to the highly stable, accurate PPS signal from the NTP server, and maintain an accuracy of 10 microseconds, as measured at the PPS input of the System z server. In comparison, STP configured to use a dial-out time service or an NTP server without the pulse per second output option is designed to provide a time accuracy of 100 milliseconds to the ETS.

The PPS output is connected to the PPS ports on the external clock reference (ECF) cards of the z196.

To configure the NTP server with PPS, perform the following steps:

1. Select the server to be set up for the NTP with PPS on the HMC.
2. Click the **System (Sysplex) Time** option in the Tasks section and select the **ETS Configuration** tab (Figure 8-15).



Note

This CPC cannot automatically become the Current Time Server for an STP-only CTN. An ETS configuration is not required. Changes made to the ETS configuration are saved and are used only if this CPC is assigned the role of Preferred or Backup Time Server for an STP-only CTN.

External Time Source (ETS)

○ Use dial out if configured on Hardware Management Console
○ Use NTP
● Use NTP with pulse per second (PPS)

NTP Time Server Information

Select	Configured	PPS Port	NTP Time Server	Stratum	Source	Status
●	☑	0	128.138.140.44	1	ACTS	Success
○	☑	1	132.163.4.101	1	ACTS	Success

Figure 8-15 ETS Configuration: Use NTP with pulse per second (PPS)

3. Selecting the **Use NTP with pulse per second (PPS)** radio button displays the NTP Time Server Information table. When at least one **Configured** check box is selected, the IP address or web address entered in the NTP Time Server column will be used as the NTP server address. The use of a URL requires that the SE be customized with Domain Name Services enabled. Use the **Customize Network Settings** → **Name services** task in the Support Element Console Applications. Refer to *z196 Support Element Operations Guide (V2.11.0),* SC28-6896 for information about how to customize network settings for the Support Element.

   The PPS Port column indicates the NTP server to PPS port correlation. As shown in Figure 8-15, PPS Port 0 corresponds to the NTP server defined in the upper row of the NTP Time Server Information table. The PPS output of this NTP server needs to be connected to PPS port 0 on the ECF card. PPS Port 1 corresponds to the NTP server defined in the lower row of the NTP Time Server Information table. The PPS output of this NTP server needs to be connected to PPS port 1 on the ECF card. The *zEnterprise Installation Manual - Physical Planning,* GC28-6897 provides a description and location of the ECF feature cards.

   Note: The user is responsible for defining the correct NTP server IP address and connecting the corresponding PPS port to the correct ECF card port.

4. Up to two NTP servers can be configured for each supported CPC. A preferred NTP server is chosen by selecting the appropriate **Select** radio button. This NTP server is called the *selected* NTP server.

5. Clicking the **Query** button tests the designated servers, and the Stratum level, Source, and Status table fields for the corresponding NTP server are completed, as shown in Figure 8-14 on page 427, and described as follows:
   - The Status column displays Success if the related NTP server is accessible. A list of possible status fields is available by clicking the **Help** button within the ETS Configuration tab.
   - The Source field contains a description of the time source for the NTP server provided as information by the NTP server. Typically, the source for Stratum 1 servers for the NTP will be GPS, or radio signals, such as WWV. A list of examples of known Stratum 1 source values is shown in Table 8-1 on page 428. For NTP servers not at Stratum 1, this field contains the IP address of the higher stratum NTP server. This field is blank if the server is not available.
   - The Stratum column shows the stratum level of the ETS source for the NTP server.
6. Click the **Apply** button to set the NTP server ETS configuration (Figure 8-14 on page 427). The configuration takes effect immediately and the NTP server configuration will be saved on the Support Element if only one NTP server is configured. If two NTP servers are configured, clicking the **Apply** button will cause a verification of the NTP servers first. This is intended to help the user chose the best NTP server as the selected one. At the end of the verification process and after the selection has been made, the configuration will be saved on the SE and the ETS will be used.

Once the NTP servers are configured and applied, the selected NTP server is used for time adjustments.

NTP server accessibility is checked once every 10 minutes, with a time adjustment issued every hour. In the case of NTP server access failures, or changes in stratum level or source ID, a hardware message is posted. No user message is displayed on the HMC when STP accesses the NTP server.

When a time adjustment is requested, a message is generated in the Support Element Console Events log. Sample messages are shown in Table 8-2 on page 429.

To visualize the console log from the HMC application, first select the CTS, and then perform the following steps:

1. Select **Recovery** → **Single Object Operations** to log on to the Support Element.
2. From the SE workplace, select **Service Management** → **View Console Events**.

8.4 Adding the z196 to an existing CTN

The starting point for this implementation is a Mixed CTN consisting of one or more servers and Sysplex Timers. The purpose of this section is to describe how to implement a z196 into this existing Mixed CTN.

The server can be added in two different ways:

- A Mixed CTN, but just using STP timing mode.

  The starting point for this implementation is a Mixed CTN consisting of one or more servers and Sysplex Timers. The z196 can join this Mixed CTN by using STP timing mode.

  It is assumed that the z196 has coupling link or STP only coupling link connectivity to the existing CTN. For more information about coupling links and STP connectivity, refer to *Server Time Protocol Planning Guide*, SG24-7280.

- An STP-only CTN.

> **Note:** Connections to IBM eServer zSeries z890 or z990 are not supported for z196. Therefore, the Stratum 1 or Stratum 2 server that is used as a time source for a z196 *cannot* be a z890 or z990.

8.4.1 Setting the CTN ID

In this section, we discuss setting the CTN ID. The CTN ID is an identifier that is used to indicate whether the server has been configured to be part of a CTN and, if so configured, identifies the CTN.

The CTN ID uses the format STP Network ID - ETR Network ID, and is the basis for the establishment of the Coordinated Timing Network.

The format of these fields is CTN ID = "*cccccccc* - *xx*", where "*cccccccc*" is the STP Network ID and "*xx*" is the ETR Network ID.

The STP Network ID is case sensitive and is one to eight characters. The valid characters are A–Z, a–z, 0–9, '-', and '_'.

The ETR Network ID is always empty for an STP-only CTN.

8.4.2 Adding the z196 to an existing Mixed CTN in STP timing mode

The starting point for this implementation is a Mixed CTN consisting of one or more servers and Sysplex Timers. The purpose of this section is to describe how to implement the z196 to this existing Mixed CTN using STP timing mode

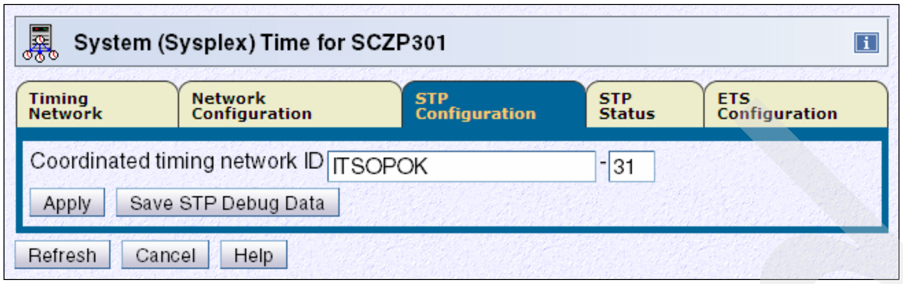
In our configuration, we show a Mixed CTN consisting of a 2094 server and a 2097 server. The z196 server SCZP301 will be added to this CTN using STP timing mode.

If STP is enabled, the new z196 can be configured to join the CTN. This is always done by setting the CTN ID on the new server. Even when the new server cannot be connected to the Sysplex Timer, it can be configured to join the Mixed CTN using STP timing mode. The z196 to be added needs to have coupling link connectivity to other STP-configured servers in the CTN so that STP messages can flow between servers.

The addition of a new server is accomplished by defining its CTN ID to match the CTN ID already in use by the Mixed CTN.

STP Configuration tab

From the STP Configuration tab, enter the STP ID and the ETR Network ID (Figure 8-16).


System (Sysplex) Time for SCZP301

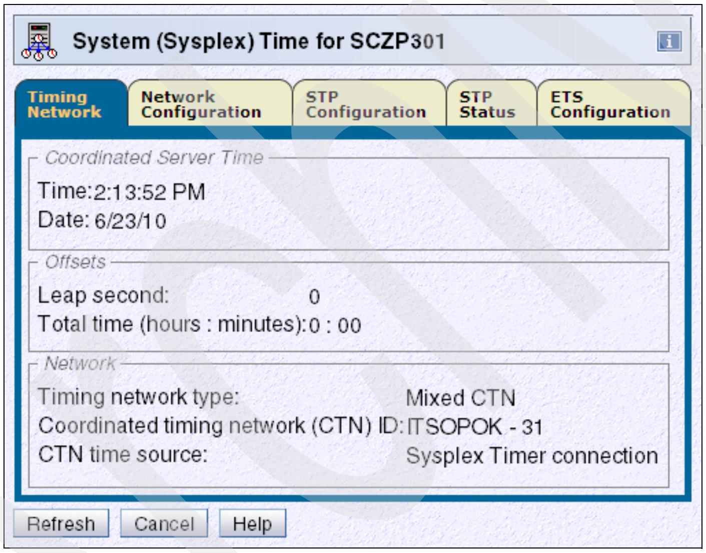
Coordinated timing network ID ITSOPOK - 31

Figure 8-16 System (Sysplex) Time: STP Configuration tab define STP and ETR ID

Click **Apply**. The CTN ID for the server becomes [ITSOPOK] - [31], which is inline with the value defined for the Mixed CTN. If the server has coupling link connectivity to other Stratum 1 or Stratum 2 servers in the Mixed CTN, STP automatically joins the server to the Mixed CTN.

Verification

The server STP configuration can be verified from the Timing Network tab (Figure 8-17).


System (Sysplex) Time for SCZP301

Coordinated Server Time

Time:2:13:52 PM

Date: 6/23/10

Offsets

Leap second: 0

Total time (hours : minutes):0 : 00

Network

Timing network type: Mixed CTN

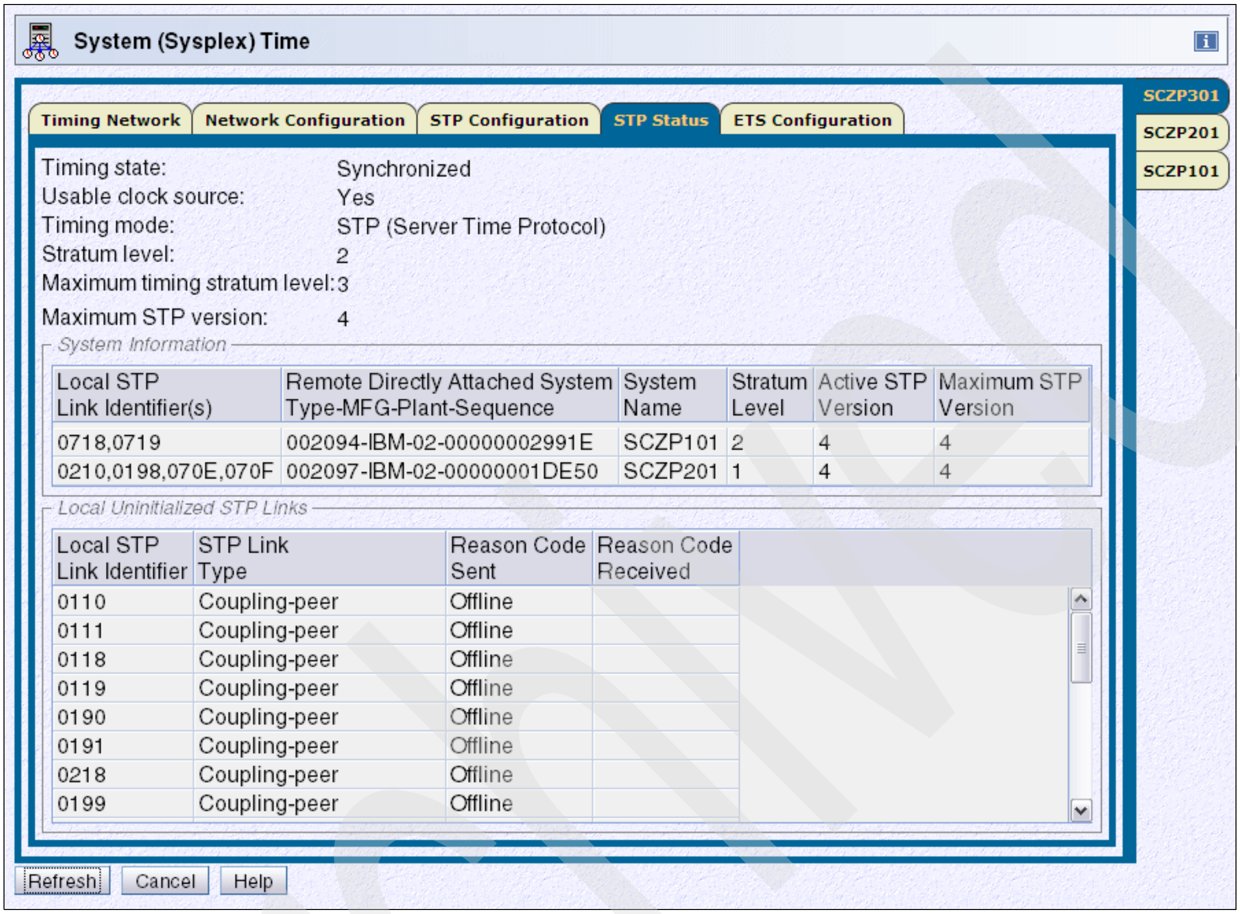
Coordinated timing network (CTN) ID: ITSOPOK - 31

CTN time source: Sysplex Timer connection

Figure 8-17 Timing Network tab: Mixed CTN for SCZP301

The Timing network type now indicates that the server is in a Mixed CTN, and is a member of a Coordinated Timing Network with CTN ID = [ITSOPOK] - [31].

The STP Status page shown in Figure 8-18 indicates that the server timing mode is STP. The STP Status tab also reflects the fact that coupling links are initialized for STP, because both ends of the link are configured. Similar information is now reflected on the STP Status tab at the other end of the links, that is, on the SCZP101 and SCZP201 servers.



Timing state: Synchronized
Usable clock source: Yes
Timing mode: STP (Server Time Protocol)
Stratum level: 2
Maximum timing stratum level: 3
Maximum STP version: 4

System Information

Local STP Link Identifier(s)	Remote Directly Attached System Type-MFG-Plant-Sequence	System Name	Stratum Level	Active STP Version	Maximum STP Version
0718,0719	002094-IBM-02-00000002991E	SCZP101	2	4	4
0210,0198,070E,070F	002097-IBM-02-00000001DE50	SCZP201	1	4	4

Local Uninitialized STP Links

Local STP Link Identifier	STP Link Type	Reason Code Sent	Reason Code Received
0110	Coupling-peer	Offline	
0111	Coupling-peer	Offline	
0118	Coupling-peer	Offline	
0119	Coupling-peer	Offline	
0190	Coupling-peer	Offline	
0191	Coupling-peer	Offline	
0218	Coupling-peer	Offline	
0199	Coupling-peer	Offline	

Figure 8-18 STP Status tab: Stratum 2 at SCZP301

After a z/OS image has an IPL performed on SCZP301, the response to the Display ETR command, message IEA386I, now shows the CTN ID with the CTN part and the ETR part, as shown in Example 8-1. The message also shows the synchronization mode along with the number of usable timing links.

Example 8-1 D ETR command and response in STP timing mode in a mixed CTN

```
IEA386I 10.51.52 TIMING STATUS 512
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 2
  CTN ID = ITSOPOK -31
  NUMBER OF USABLE TIMING LINKS = 2
```

The z196 is now part of the mixed CTN as configured and is using the Stratum 1 server as a time source. Further reconfigurations, such as migrating to an STP-only CTN, can be done by performing the procedures given in *IBM Server Time Protocol Implementation Guide,* SG24-7281.

8.4.3 Adding the z196 to an existing STP-only CTN

The starting point for this implementation is an STP-only CTN consisting of one or more servers. The purpose of this section is to describe how to implement the z196 into this existing STP-only CTN.

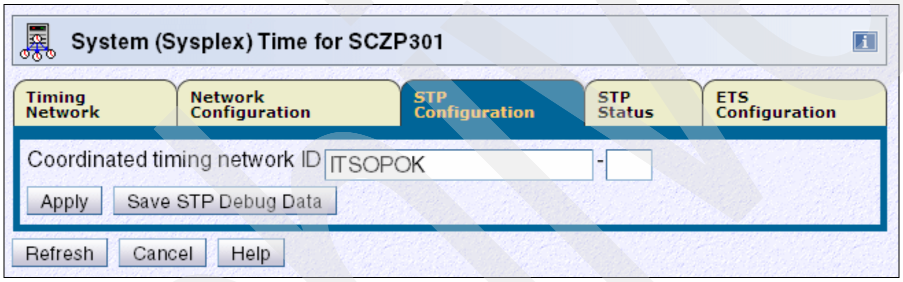
In our configuration, we show a STP-only CTN consisting of 2094 and 2097 servers. The z196 server SCZP301 is added to this CTN by using STP timing mode.

If STP is enabled, the new z196 can be configured to join the CTN. This task is always done by setting the CTN ID on the new server. The z196 to be added needs to have coupling link connectivity to other STP-configured servers in the CTN so that STP messages can flow between servers.

The addition of a new server is accomplished by defining its CTN ID to match the CTN ID already in use by the Mixed CTN.

Setting the STP-only Network ID

The STP Network ID is entered through the STP Configuration tab (Figure 8-19). The CTN ID must match the one already defined to the existing STP-only CTN.



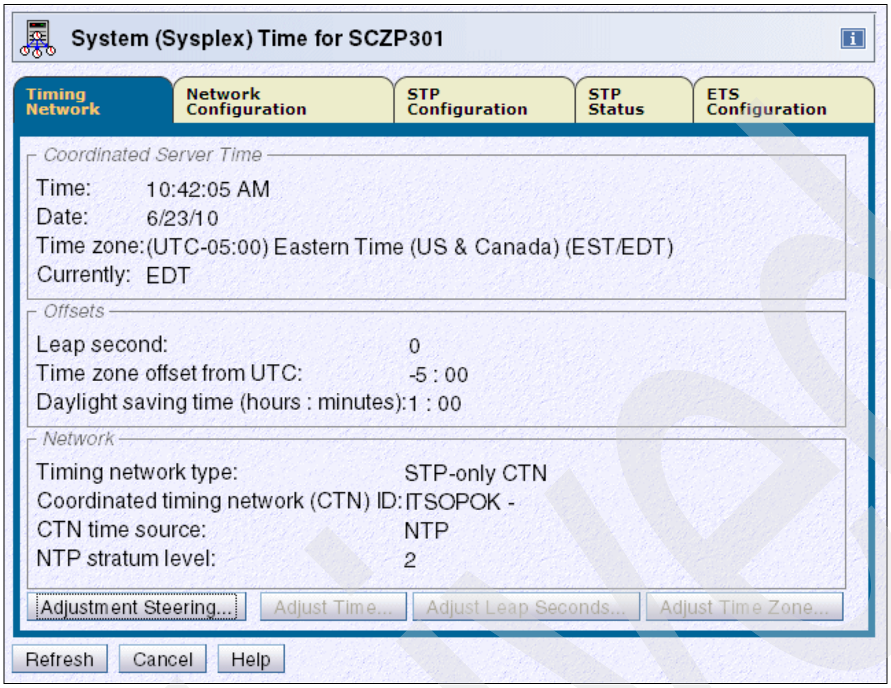
Coordinated timing network ID ITSOPOK -

Figure 8-19 System (Sysplex) Time: STP Configuration tab define STP ID

A message is posted after the CTN change has been successfully completed.

Verification

The server STP configuration can be verified from the Timing Network tab (Figure 8-20).



Coordinated Server Time

Time: 10:42:05 AM
Date: 6/23/10
Time zone:(UTC-05:00) Eastern Time (US & Canada) (EST/EDT)
Currently: EDT

Offsets

Leap second: 0
Time zone offset from UTC: -5 : 00
Daylight saving time (hours : minutes):1 : 00

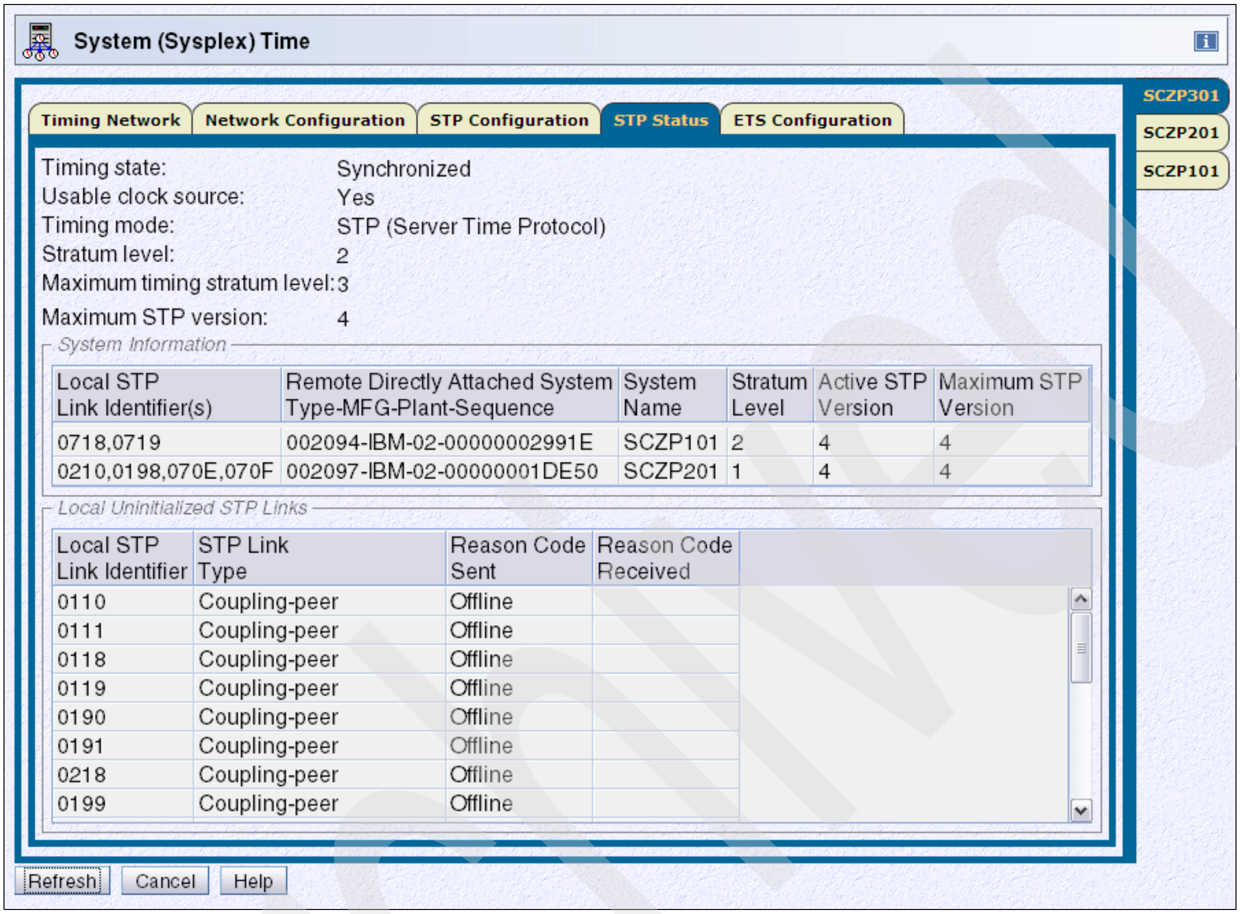
Network

Timing network type: STP-only CTN
Coordinated timing network (CTN) ID:ITSOPOK -
CTN time source: NTP
NTP stratum level: 2

Figure 8-20 Timing Network tab: SCZP301

The Timing network type now indicates that the server is in a STP-only CTN, and is a member of a Coordinated Timing Network with CTN ID = [ITSOPOK].

The STP Status page shown in Figure 8-21 indicates that the server timing mode is STP. The STP Status tab also reflects the fact that coupling links are initialized for STP, because both ends of the link are configured. Similar information is now reflected on the STP Status tab at the other end of the links, that is, the 2094 and 2097 servers.



Timing state: Synchronized
Usable clock source: Yes
Timing mode: STP (Server Time Protocol)
Stratum level: 2
Maximum timing stratum level: 3
Maximum STP version: 4

Local STP Link Identifier(s)	Remote Directly Attached System Type-MFG-Plant-Sequence	System Name	Stratum Level	Active STP Version	Maximum STP Version
0718,0719	002094-IBM-02-00000002991E	SCZP101	2	4	4
0210,0198,070E,070F	002097-IBM-02-00000001DE50	SCZP201	1	4	4

Local STP Link Identifier	STP Link Type	Reason Code Sent	Reason Code Received
0110	Coupling-peer	Offline	
0111	Coupling-peer	Offline	
0118	Coupling-peer	Offline	
0119	Coupling-peer	Offline	
0190	Coupling-peer	Offline	
0191	Coupling-peer	Offline	
0218	Coupling-peer	Offline	
0199	Coupling-peer	Offline	

Figure 8-21 STP Status tab: SCZP301

After a z/OS image has an IPL performed on the SCZP301 server, the response to the Display ETR command, message IEA386I, now shows the CTN ID (Example 8-2). The message also shows the synchronization mode along with the number of usable timing links.

Example 8-2 D ETR command and response in ETR mode

```
IEA386I 22.30.28 TIMING STATUS 160
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 2
  CTN ID = ITSOPOK
  THE STRATUM 1 NODE ID = 002097.E26.IBM.02.00000001DE50
  NUMBER OF USABLE TIMING LINKS =  8
  THIS STP NETWORK HAS NO SERVER TO ACT AS ARBITER
```

The z196 is now part of the CTN as configured and is using the Stratum 1 server as a time source. Further reconfigurations, such as changing the roles in the STP-only CTN, can be done by performing the procedures described in “Assigning roles” on page 438.

Assigning roles

If the new configuration consists of two or more servers, the second step is to assign other roles. The BTS role and optional Arbiter role (recommended for a CTN consisting of three or more servers) can be assigned (Figure 8-27). Because the CTS already exists, the Force configuration option is not required or recommended in this step.

Because the existing configuration consists of a 2094 and a 2097 server being assigned as PTS and BTS, we are showing the new z196 being configured as the Arbiter. Because the assignment of roles does have a significant effect on the recovery behavior of the CTN, you should have the planning tasks and checklist from *Server Time Protocol Planning Guide*, SG24-7280.

The z196 can be assigned as either:

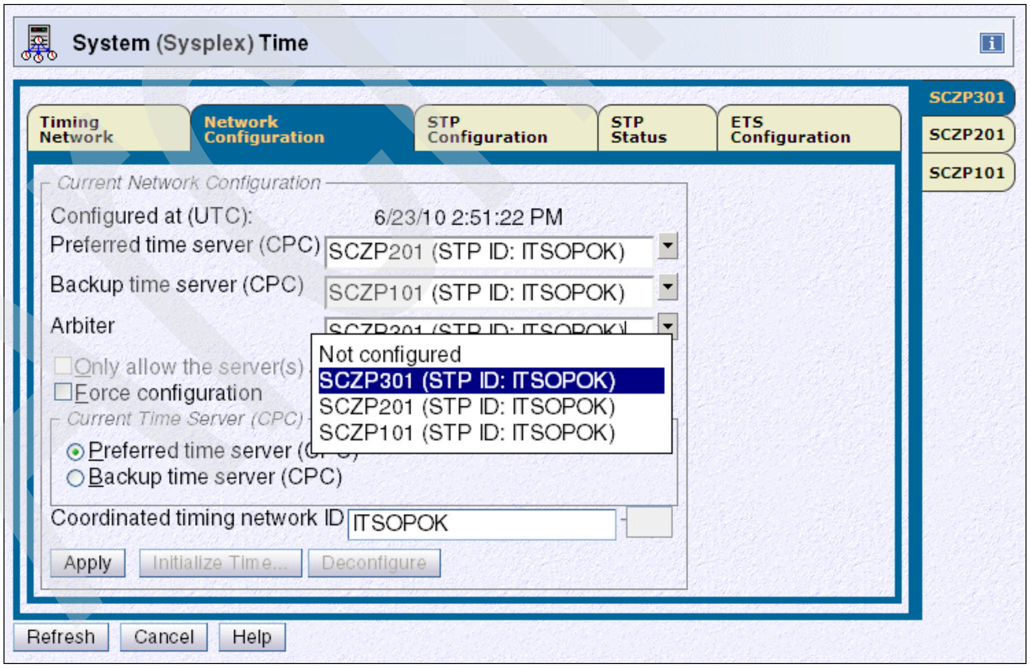
- The BTS, if the current configuration consists of only one server.
- The Arbiter, if the current configuration consists of two server.

You also can consider changing the role assignment of any existing server within the CTN. This action can be done in the same step, and you could even assign the PTS to the new z196.

When two or more servers are selected in the System (Sysplex) Time task, it is necessary to click the **Refresh** button to update the displayed configuration information for all servers.

Because assigning or changing roles must be considered a global change to the CTN, any change needs to be done from the server that will become the Current Time Server when the reconfiguration is complete.

In our example, SCZP301 is assigned as the Arbiter (Figure 8-22).



Configured at (UTC): 6/23/10 2:51:22 PM

Preferred time server (CPC) SCZP201 (STP ID: ITSOPOK)

Backup time server (CPC) SCZP101 (STP ID: ITSOPOK)

Arbiter SCZP301 (STP ID: ITSOPOK)

Not configured
SCZP301 (STP ID: ITSOPOK)
SCZP201 (STP ID: ITSOPOK)
SCZP101 (STP ID: ITSOPOK)

☐ Only allow the server(s)

☐ Force configuration

Current Time Server (CPC)

● Preferred time server (CPC)

○ Backup time server (CPC)

Coordinated timing network ID ITSOPOK

Figure 8-22 Network Configuration tab: Define SCZP301 as Arbiter

A Network Configuration Change Confirmation message is displayed, and when confirmed, the network will be updated and the process finishes with a message showing the status of the change.

Verification

- For verification from the HMC:

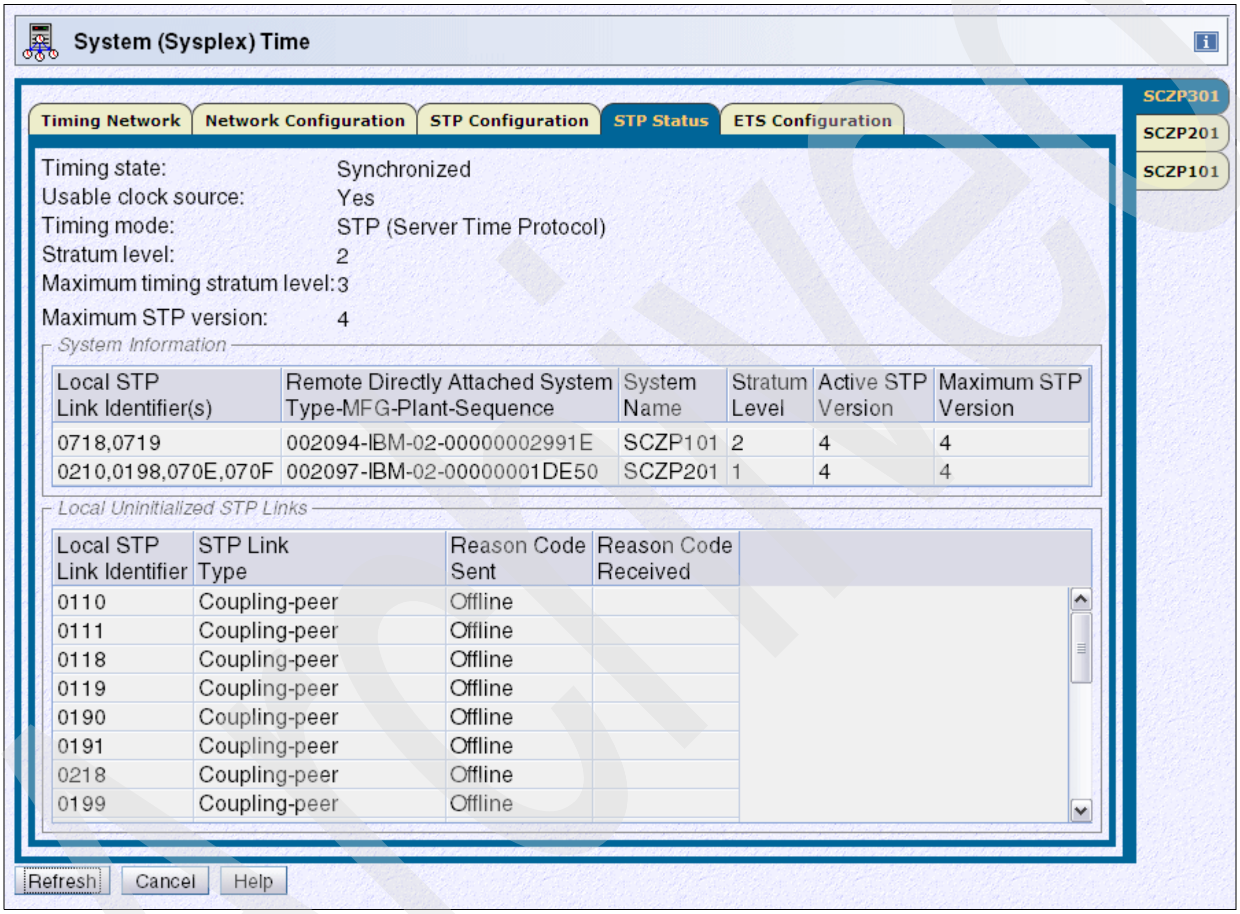
  To verify the successful activation of the STP-only CTN, select the **STP Status** tab (Figure 8-23). The STP status shows the following information:

  – The Timing state is Synchronized.

  – The Timing mode is STP.

  – The Stratum level is 2 because the z196 does have coupling link connectivity to the CTS.

  – The Local STP Timing links.



Timing state: Synchronized
Usable clock source: Yes
Timing mode: STP (Server Time Protocol)
Stratum level: 2
Maximum timing stratum level: 3
Maximum STP version: 4

System Information

Local STP Link Identifier(s)	Remote Directly Attached System Type-MFG-Plant-Sequence	System Name	Stratum Level	Active STP Version	Maximum STP Version
0718,0719	002094-IBM-02-00000002991E	SCZP101	2	4	4
0210,0198,070E,070F	002097-IBM-02-00000001DE50	SCZP201	1	4	4

Local Uninitialized STP Links

Local STP Link Identifier	STP Link Type	Reason Code Sent	Reason Code Received
0110	Coupling-peer	Offline	
0111	Coupling-peer	Offline	
0118	Coupling-peer	Offline	
0119	Coupling-peer	Offline	
0190	Coupling-peer	Offline	
0191	Coupling-peer	Offline	
0218	Coupling-peer	Offline	
0199	Coupling-peer	Offline	

Figure 8-23 STP Status tab for SCZP301: Stratum 2

- For verification from z/OS

  After a z/OS image has an IPL performed on the SCZP301 server, the response to the Display ETR command shows the Stratum level and synchronization status. The z/OS command Display ETR returns the IEA386I message, which displays the following information:

  – Synchronization mode
  – Stratum level
  – The node ID of the current Stratum 1 server in the CTN
  – The server role, if applicable
  – The number of usable timing links (does not apply for the CTS)

Example 8-3 shows the output of the Display ETR command for z/OS system images SC80 residing on the Arbiter of this STP-only CTN.

Example 8-3 Display ETR commands and responses

```
IEA386I 21.54.33 TIMING STATUS 149
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 2
  CTN ID = ITSOPOK
  THE STRATUM 1 NODE ID = 002097.E26.IBM.02.00000001DE50
  THIS IS THE ARBITER SERVER
  NUMBER OF USABLE TIMING LINKS =  8
```

The z196 is now part of the CTN as configured and is using STP as the time source. Information about further reconfigurations, such restarting the CTN, reassigning server roles, or changing offsets, can be found in the *IBM Server Time Protocol Implementation Guide,* SG24-7281.

8.5 Creating a new STP-only CTN

The starting configuration is an STP-enabled server that needs to be configured to be an STP-only CTN. In this section, we show a single server that creates a new CTN. After these tasks have been finished, additional servers can join this CTN by performing the procedure given in 8.4.3, "Adding the z196 to an existing STP-only CTN" on page 435.

The sequence of steps to configure an STP-only CTN is:

1. Set the CTN ID. In this case, it consists of only the STP ID portion.
2. Initialize the time. This includes setting the time zone, leap seconds, and date and time.
3. Assign the CTN role.

If using an ETS, dial-out, or NTP, access to the external time source must be configured and tested before setting up the CTN. More information about the dial-out function at the HMC and the required setup for the HMC/SE can be found in 8.3.1, "ETS dial-out configuration" on page 421.

8.5.1 Setting the CTN ID

In this section, we discuss setting the CTN ID. The CTN ID is an identifier that is used to indicate whether the server has been configured to be part of a CTN and, if so configured, identifies the CTN.

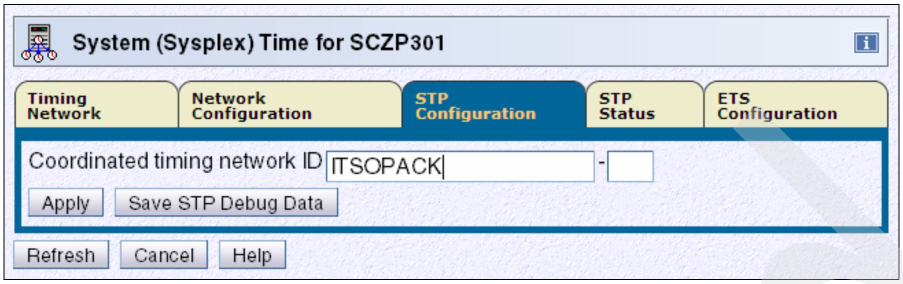
The CTN ID uses the format STP Network ID - ETR Network ID, and is the basis for the establishment of the Coordinated Timing Network.

The format of these fields is CTN ID = "*cccccccc - xx*", where "*cccccccc*" is the STP Network ID and "*xx*" is the ETR Network ID.

The STP Network ID is case sensitive and is one to eight characters. The valid characters are A–Z, a–z, 0–9, '-', and '_'.

The ETR Network ID is always empty for an STP-only CTN.

The STP Network ID is entered using the STP Configuration tab (Figure 8-24). The same CTN ID must be entered on every server that participates in the STP-only CTN.



Coordinated timing network ID ITSOPACK -

Figure 8-24 System (Sysplex) Time: STP Configuration tab at SCZP301

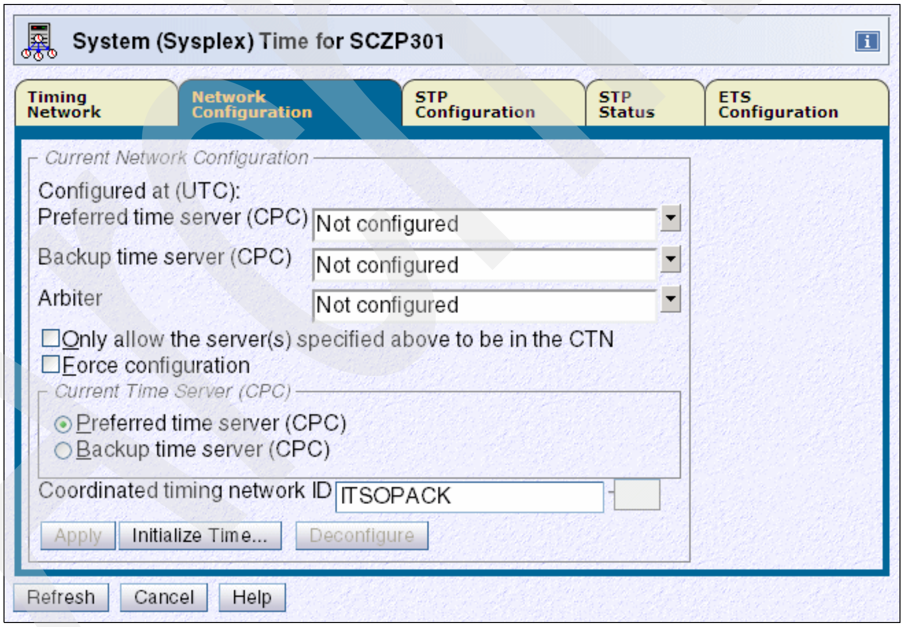
A success message will be posted after the CTN change has been completed.

Initializing the time

The Initialize Time button is only enabled if the CTS and PTS roles have not been assigned yet and only after the CTN ID has been defined for the server that will become the CTS and PTS.

Important: Initializing the time must be done on the server that will become the Current Time Server for the STP-only CTN.

The Initialize Time button is accessed from the Network Configuration tab (Figure 8-25).



Configured at (UTC):

Preferred time server (CPC) Not configured

Backup time server (CPC) Not configured

Arbiter Not configured

☐ Only allow the server(s) specified above to be in the CTN

☐ Force configuration

Current Time Server (CPC)

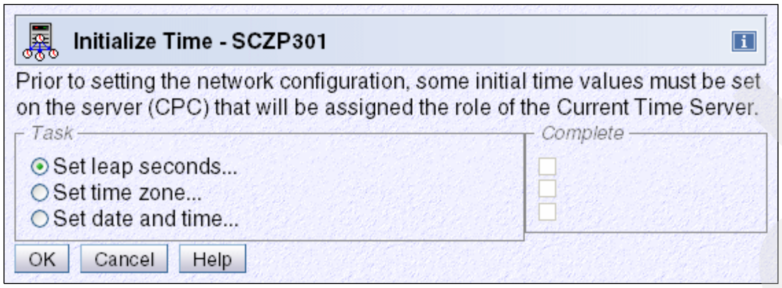
● Preferred time server (CPC)

○ Backup time server (CPC)

Coordinated timing network ID ITSOPACK

Figure 8-25 Network Configuration: Initialize Time button at SCZP301

Click **Initialize Time** to display the Initialize Time window (Figure 8-26). There are three radio buttons on the window, each representing a task that must be completed before a Network Configuration can be applied for an STP-only CTN.



Initialize Time - SCZP301

Prior to setting the network configuration, some initial time values must be set on the server (CPC) that will be assigned the role of the Current Time Server.

Task	Complete
● Set leap seconds...	☐
○ Set time zone...	☐
○ Set date and time...	☐

Figure 8-26 Initialize Time window

The three tasks related to initializing the time are:

- Set leap seconds
- Set time zone
- Set date and time.

As each task is completed, the corresponding box in the Complete column is marked with an complete sign.

Setting leap seconds

Since January 1, 1972, occasional corrections of exactly one second, called a leap second, have been inserted into the UTC time scale to keep UTC time within 0.9 second of UT1 at all times.

Leap seconds are either hypercritical or completely irrelevant, depending on the applications and business requirements:

- If there are specific accuracy requirements to provide UTC or GMT to the very second, at any instant, then leap seconds need to be considered.

  Some examples of such specific requirements might be legal or contractual requirements for time stamps to be within some tolerance of UTC Time, or if time stamps are used for time-dependant banking, scientific, or navigational purposes.

  To account for leap second corrections, the total accumulated number of leap seconds since January 1972 *must* be entered when setting the time.

- Most sites have little awareness of leap seconds and ongoing leap second adjustments, and therefore this setting can probably be ignored. If there are no specific requirements for leap seconds, then specify a leap second value of zero.

Figure 8-27 shows the initial Adjust Leap Seconds window. Although the installation might not be sensitive to leap seconds, a valid Leap Seconds Offset value must be entered to complete the Initialize Time task. If Leap Seconds are not used, enter a value of zero.

Adjust Leap Second Offset - SCZP301

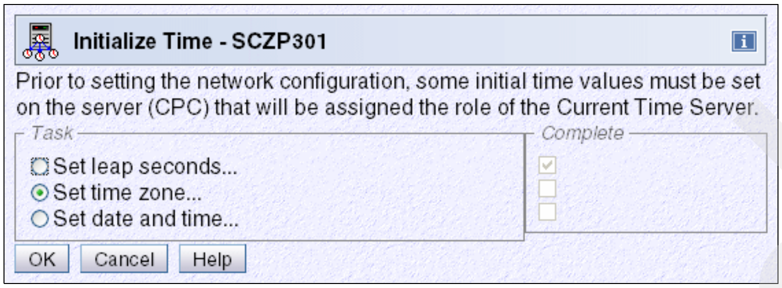
Current Leap Seconds

Offset 0

Figure 8-27 Initialize Time: Set leap seconds

Setting the time zone

The next step, shown in Figure 8-28, is setting the time zone.



Initialize Time - SCZP301

Prior to setting the network configuration, some initial time values must be set on the server (CPC) that will be assigned the role of the Current Time Server.

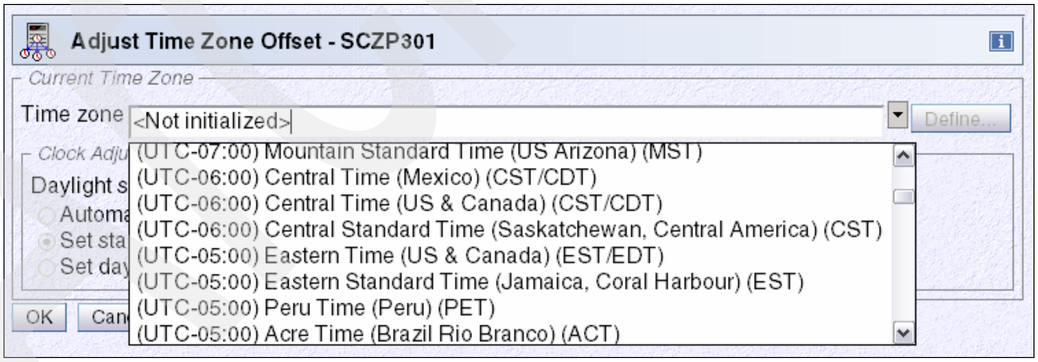
Figure 8-28 Initial Time: Set time zone

The current time zone must be set by selecting an entry from the Time zone drop-down menu. Click the time zone drop-down arrow to display a list of all the time zones that are supported (Figure 8-29). Each of the supported time zone entries has a defined offset from UTC, and might optionally have a time zone algorithm defined, which is used for daylight saving time offset adjustment purposes. The time zone algorithm defines:

- Daylight saving offset
- Daylight saving automatic adjustment information (optional):
  - Daylight saving date and time start algorithm
  - Daylight saving date and time end algorithm

Automatically adjust is selected by default when the time zone selected supports automatic adjustment of daylight saving time. Otherwise, this button is disabled.

Even if automatic adjustment is supported, the user still has the option of selecting **Set standard time** or **Set daylight saving time**. If automatic adjustment for daylight saving time is not supported by the selected time zone, the user must decide whether the time zone algorithm selected requires a daylight saving time adjustment and select the **Set standard time** or **Set daylight saving time** radio buttons accordingly.



Adjust Time Zone Offset - SCZP301

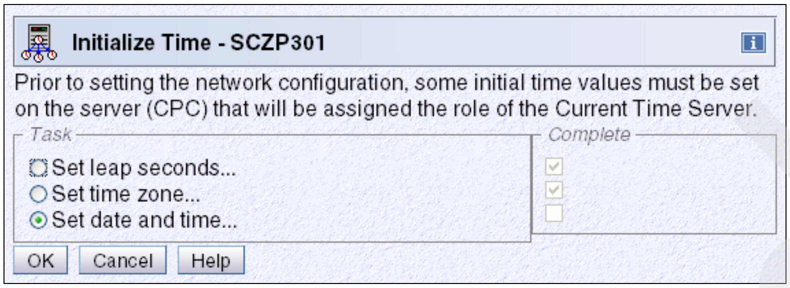
Time zone <Not initialized>

Figure 8-29 Time zone drop-down menu

If a time zone entry that meets the user requirements cannot be found, then one of the five user-defined time zones (that is, UD1 to UD5) may be used to define the desired time zone. If a user-defined time zone entry is selected, the Define button is enabled. More information about creating a user-defined time zone can be found in *Server Time Protocol Implementation Guide*, SG24-7281.

Setting the date and time

The final task in the sequence is to initialize the date and time (Figure 8-30).



Initialize Time - SCZP301

Prior to setting the network configuration, some initial time values must be set on the server (CPC) that will be assigned the role of the Current Time Server.

Task — Complete

○ Set leap seconds... ☑

○ Set time zone... ☑

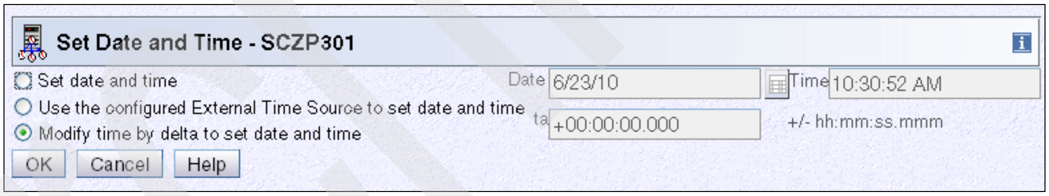
● Set date and time... ☐

Figure 8-30 Initial Time: Set date and time

Three different methods are available:

1. If the local date and time are set to specific values, click the **Set date and time** button. Date and time values can be entered in each field. The value entered is the current time from the Support Element of the server on which the configuration task is being performed. An icon is also available to display an additional calendar dialog window.
2. If an ETS is configured, either through dial-out or an NTP server, the date and time should be initialized by selecting the **Use External Time Source to set date and time** option. This action ensures that the Coordinated Server Time matches the time source. An external time source can be used to set the time to within +/- 100 milliseconds of the time provided from the external source, or, when an NTP server with PPS is used, the accuracy is provided in the range of +/- 10 microseconds.

   Click the **Use External Time Source to set date and time** option (Figure 8-31). Click **OK**.



Set Date and Time - SCZP301

○ Set date and time — Date 6/23/10 — Time 10:30:52 AM

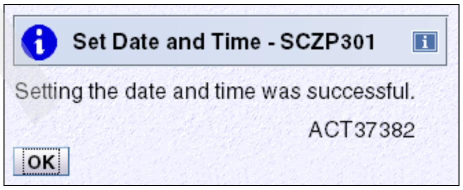
○ Use the configured External Time Source to set date and time

● Modify time by delta to set date and time — ta +00:00:00.000 — +/- hh:mm:ss.mmm

Figure 8-31 Set Date and Time with an External Time Source

STP accesses the ETS to calculate the difference between the server TOD clock and the time obtained from the external time source, either dial-out or an NTP server. When access to the ETS is successful, the resulting time value is not displayed to the user, but instead is passed directly to the STP facility when **OK** is clicked.

The ACT37382 message is displayed upon successful completion of the Set Date and Time operation (Figure 8-32). Click **OK**.



Set Date and Time - SCZP301

Setting the date and time was successful.

ACT37382

Figure 8-32 Set Date and Time successful: ACT 37382 message

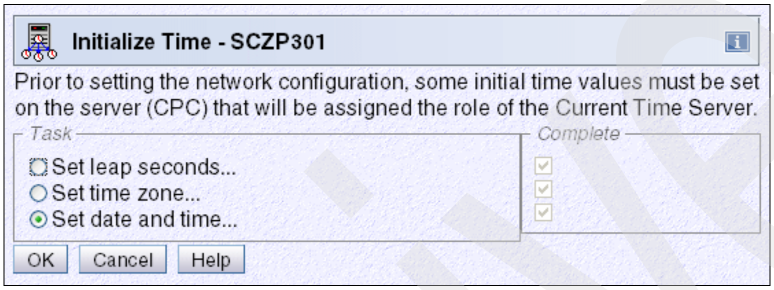
The Initialize Time window shown in Figure 8-30 opens again.

To verify the date and time set by accessing the external time source, the user can optionally select the **Set Date and Time** radio button a second time and click **OK**. It is the only way the user can verify the information obtained from the external time source. To leave the window without making any changes, click the **Cancel** button.

3. A delta value can be specified by clicking the **Modify time by delta to set date and time** button. The value specified is either positive (default) or negative and is entered in the +/-hh:mm:ss.mmm format.

Regardless of the method chosen, STP uses the information to calculate the Coordinated Server Time and set the server TOD clock when the **OK** button is clicked.

At this point, the three tasks on the Initialize Time window have a check mark in the Complete column (Figure 8-33). Click **Cancel** to exit the Initialize Time window and return to the Network Configuration tab.



Prior to setting the network configuration, some initial time values must be set on the server (CPC) that will be assigned the role of the Current Time Server.

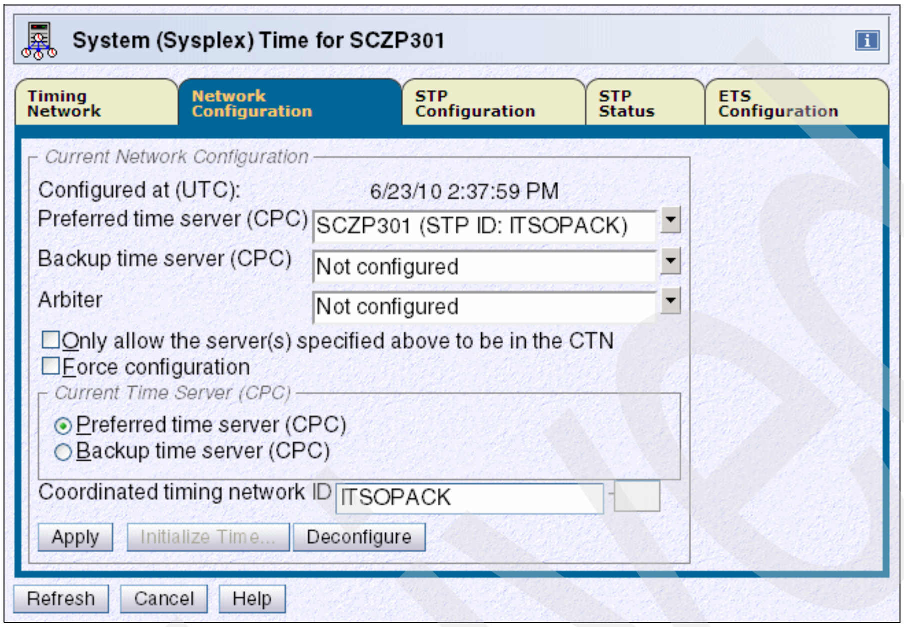
Task	Complete
○ Set leap seconds...	☑
○ Set time zone...	☑
● Set date and time...	☑

Figure 8-33 Initialize Time complete

The Coordinated Server Time will be passed to other participating servers in the CTN when the server roles and the Current Time Server are assigned, as described in 8.5.2, “Assigning the PTS role” on page 446.

8.5.2 Assigning the PTS role

Now that the Initialize Time task has been completed, the **Apply** button on the Network Configuration window is enabled (Figure 8-34). The server role can be assigned.



Configured at (UTC): 6/23/10 2:37:59 PM
Preferred time server (CPC) SCZP301 (STP ID: ITSOPACK)
Backup time server (CPC) Not configured
Arbiter Not configured
☐ Only allow the server(s) specified above to be in the CTN
☐ Force configuration

Current Time Server (CPC)
● Preferred time server (CPC)
○ Backup time server (CPC)

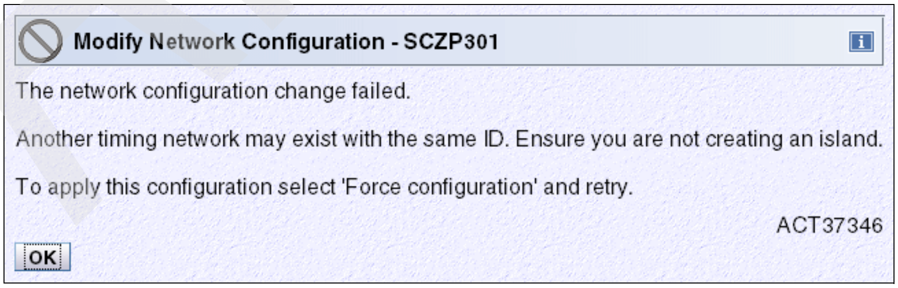
Coordinated timing network ID ITSOPACK

Figure 8-34 Network Configuration tab: After time initialization

Because this is the first server within this "new" CTN, we assign only the PTS role. Select the PTS from the drop-down list. The PTS is also going to be the CTS. Additional servers can be added to this CTN afterwards and configured as BTS and Arbiter (refer to 8.4.3, "Adding the z196 to an existing STP-only CTN" on page 435).

To configure a new STP-only CTN, begin by checking the **Force configuration** check box. This option specifies whether connectivity between the Preferred Time Server and other servers with a defined role are verified when a change in configuration is requested. Because this is a new STP-only CTN where there is no CTS configured yet, the **Force configuration** check box must be checked.

If the **Force configuration** check box is not used, the request is rejected and the ACT37346 message, shown in Figure 8-35, is displayed. Click **OK** to return to the Network Configuration tab.



The network configuration change failed.

Another timing network may exist with the same ID. Ensure you are not creating an island.

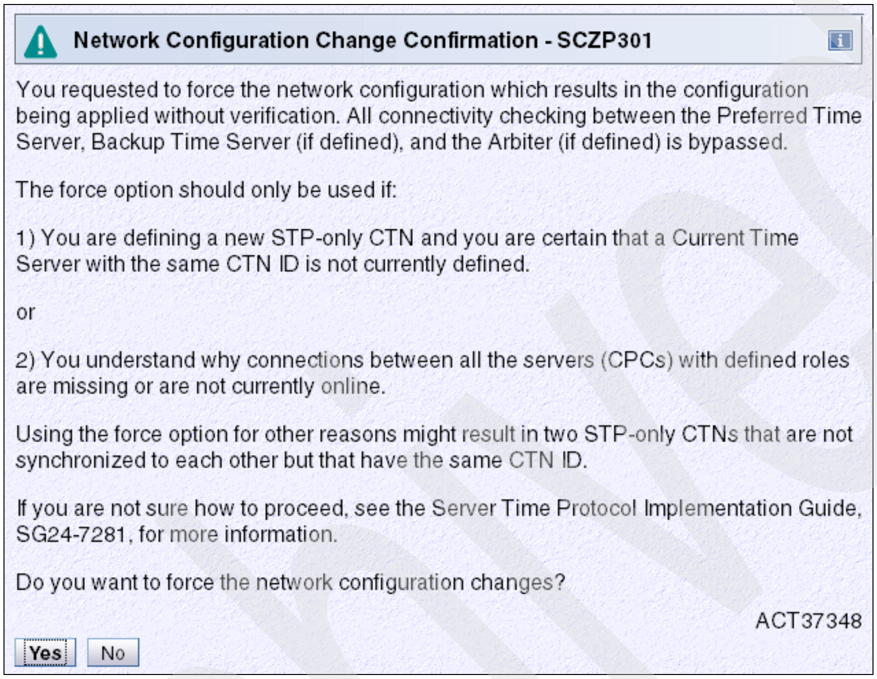
To apply this configuration select 'Force configuration' and retry.

ACT37346

Figure 8-35 Force configuration required: ACT37346 message

On the Network Configuration tab, the radio button in the Current Time Server section is pointing to the PTS. Because the PTS is the only server assigned, it has to be the CTS. Click the **Force configuration** check box; it *must* be specified when configuring a new STP-only CTN for the first time to bypass connectivity verification, because a Current Time Server does not yet exist.

Now that the Force configuration check box is selected, the ACT37348 Network Configuration Change Confirmation message is displayed (Figure 8-36). Click **Yes** to confirm.



Network Configuration Change Confirmation - SCZP301

You requested to force the network configuration which results in the configuration being applied without verification. All connectivity checking between the Preferred Time Server, Backup Time Server (if defined), and the Arbiter (if defined) is bypassed.

The force option should only be used if:

1) You are defining a new STP-only CTN and you are certain that a Current Time Server with the same CTN ID is not currently defined.

or

2) You understand why connections between all the servers (CPCs) with defined roles are missing or are not currently online.

Using the force option for other reasons might result in two STP-only CTNs that are not synchronized to each other but that have the same CTN ID.

If you are not sure how to proceed, see the Server Time Protocol Implementation Guide, SG24-7281, for more information.

Do you want to force the network configuration changes?

ACT37348

Figure 8-36 Network Force Configuration Change Confirmation: ACT37348 message

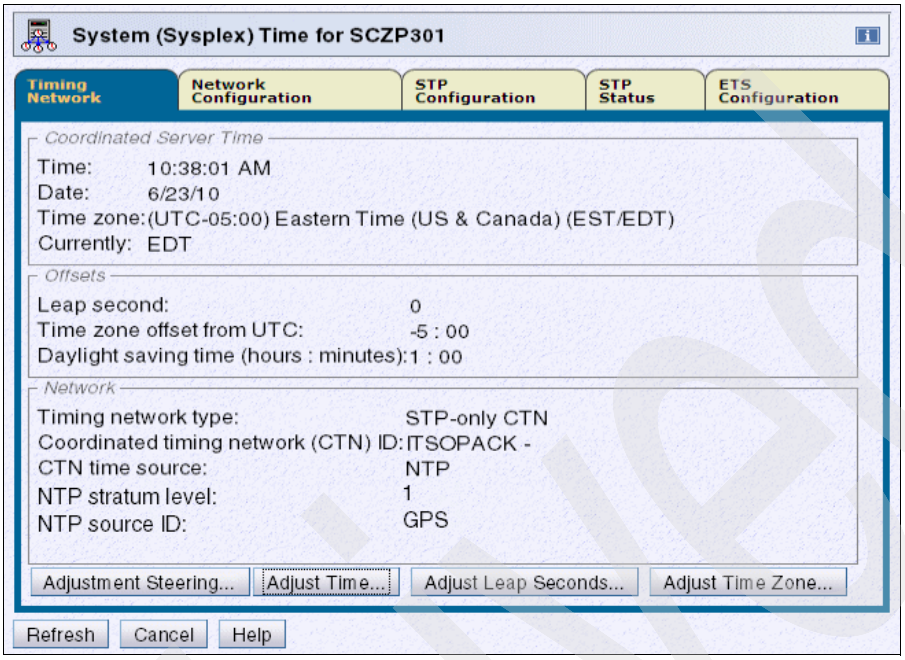
Assignment of the CTS globally transitions all servers with the same CTN ID to STP timing mode. This is confirmed by ACT3734 message.

Verification

To verify the settings for the STP-only CTN, you can check the settings either from the HMC or from the OS. The Sysplex Timer panels in the HMC delivers more information, such as usage of NTP and CF connection availability.

Verification from the HMC

To verify the successful activation of the STP-only CTN, select the **Timing Network** tab (Figure 8-37).



Coordinated Server Time

Time: 10:38:01 AM
Date: 6/23/10
Time zone:(UTC-05:00) Eastern Time (US & Canada) (EST/EDT)
Currently: EDT

Offsets

Leap second: 0
Time zone offset from UTC: -5 : 00
Daylight saving time (hours : minutes):1 : 00

Network

Timing network type: STP-only CTN
Coordinated timing network (CTN) ID:ITSOPACK -
CTN time source: NTP
NTP stratum level: 1
NTP source ID: GPS

Figure 8-37 System (Sysplex) Time: Timing Network tab

The Network portion indicates that:

- The timing network type is STP-only CTN.
- The CTN Time Source is an NTP server.
- The reference clock for the NTP server is the Global Positioning Service (GPS).

The CTN time source reflects from where the Coordinated Server Time is currently being steered. If the NTP server is a stratum 1 server, the user should expect to see one of the clock sources identified in Table 8-1 on page 428.

Verification from z/OS

After a z/OS image residing on the server goes through an IPL, the Stratum level and synchronization status can be verified from the z/OS side as well. The z/OS command Display ETR returns the IEA386I message, which displays the following information:

- Synchronization mode
- Stratum level
- The node ID of the current Stratum 1 server in the CTN
- The server role

Example 8-4 shows the output of the Display ETR command for z/OS system image SC80 on the PTS.

Example 8-4 Display ETR commands and responses

```
IEA386I 16.37.39 TIMING STATUS 151
SYNCHRONIZATION MODE = STP
  THIS SERVER IS A STRATUM 1
  CTN ID = ITSOPACK
```

```
  THE STRATUM 1 NODE ID = 002817.M32.IBM.02.0000000B3BD5
  THIS IS THE PREFERRED TIME SERVER
  THIS STP NETWORK HAS NO BACKUP TIME SERVER
  THIS STP NETWORK HAS NO SERVER TO ACT AS ARBITER
```

The Display XCF,SYSPLEX,ALL command indicates that the timing mode of Sysplex system images is STP (Example 8-5).

Example 8-5 Display XCF,S,ALL command and response

```
IXC335I  23.09.06  DISPLAY XCF 177
SYSPLEX WTSCPLX8
SYSTEM   TYPE SERIAL LPAR STATUS TIME         SYSTEM STATUS
SC80     2817 3BD5   01   06/26/2010 23:09:06 ACTIVE         TM=STP
SC81     2817 3BD5   03   06/26/2010 23:09:02 ACTIVE         TM=STP
```

This completes the STP-only CTN configuration. Additional servers can be added to this CTN using the procedures documented in 8.4.3, “Adding the z196 to an existing STP-only CTN” on page 435.

9

Crypto Express3 configuration

In this chapter, we provide information about Crypto Express3 configuration on an IBM zEnterprise 196. We cover cryptographic domains, configuration rules, and points to consider when planning for a nondisruptive installation of cryptographic features.

A step-by-step definition and configuration of the Crypto Express3 feature to a logical partition is explained.

We discuss the following topics:

- Crypto Express3 configuration overview
  - Configuration rules
  - Configuration planning
- Cryptographic definition
  - HMC/SE session to z196
  - Checking whether the CPACF DES/TDES enablement feature is installed
  - Logical partition cryptographic definition
  - Cryptographic configuration using the Support Element
- Activating and deactivating cryptographic coprocessors using the Integrated Cryptographic Service Facility

9.1 Crypto Express3 configuration overview

This section provides a brief overview of configuration rules and planning considerations.

9.1.1 Configuration rules

Each cryptographic coprocessor has 16 physical sets of registers or queue registers, each set belonging to a domain, as follows:

- A cryptographic domain index, from 0 to 15, is allocated to a logical partition by the definition of the partition in its image profile. The same domain must also be allocated to the ICSF instance running in the logical partition using the Options Data Set.
- Each ICSF instance accesses only the Master Keys or queue registers corresponding to the domain number specified in the logical partition image profile at the Support Element and in its Options Data Set. Each ICSF instance sees a logical cryptographic coprocessor consisting of the physical cryptographic engine and the unique set of registers (the domain) allocated to this logical partition.

The installation of the CP Assist for Cryptographic Functions (CPACF) DES/TDES enablement, Feature Code #3863, is required to enable the use of the Crypto Express3 feature. This feature enables:

- For data privacy and confidentially: Data Encryption Standard (DES), Triple Data Encryption Standard (TDES), and Advanced Encryption Standard (AES) for 128-bit, 192-bit and 256-bit keys,
- For key generation: Pseudo Random Number Generation (PRNG), Random Number Generation Long (RNGL) - 8 bytes to 8096 bytes, and Random Number Generation Long (RNG) with up to 4096-bit key RSA support,
- For message authentication code (MAC): Single-key MAC and Double-key MAC

You can also use Secure Hash Algorithm-1 (SHA-1) 160-bit or Secure Hash Algorithm-2 (SHA-2) for 224-, 256-, 384-, and 512-bit support. SHA-1 and SHA-2 are shipped enabled on all z196s and do not require the no-charge enablement feature.

The total number of Crypto Express3 features may not exceed eight per z196.

Each Crypto Express3 feature contains two PCI-X adapters. Each adapter can be configured as a cryptographic coprocessor or accelerator. During the feature installation, both PCI-X adapters are configured by default as coprocessors.

The Crypto Express3 feature does not use CHPIDs from the channel subsystem pool, but each feature is assigned two PCHIDs, one per PCI-X adapter.

Table 9-1 summarizes the cryptographic feature codes for z196.

Table 9-1 Cryptographic Feature codes

Feature Code	Description
#3863	CPACF DES/TDES enablement feature A prerequisite to use the CPACF (except for SHA-1, SHA-256, SHA-384, and SHA-512) and Crypto Express3 features.
#0864	Crypto Express3 feature A maximum of eight features can be ordered. Each feature contains two PCI-X cryptographic adapters.

Feature Code	Description
#0841/#0860	Trusted Key Entry (TKE) 7.0 workstation This workstation is optional and supports only Ethernet adapters to connect to a LAN. When the TKE option is chosen for key management of the PCI-X cryptographic adapters, a TKE workstation with the TKE 7.0 LIC or later is required.
#0860	TKE 7.0 LIC.
#0885	TKE Smart Card Reader.
#0884	TKE Additional Smart Cards.

9.1.2 Configuration planning

The z196 always operates in LPAR mode. The concept of “dedicated coprocessor” does not apply to the PCI-X adapter. A PCI-X adapter, whether configured as coprocessor or accelerator, is made available to logical partitions as directed by the domain assignment and the candidate list, regardless of the shared or dedicated status given to the CPs in the partition.

The z196 allows up to 60 logical partitions to be active concurrently. Each PCI-X adapter on a Crypto Express3 feature supports 16 domains, whether it is configured as a Crypto Express3 accelerator or a Crypto Express3 coprocessor.

When all 60 logical partitions on the z196 are active and require concurrent access to cryptographic functions provided by a PCI-X adapter, the configuration must include at least two Crypto Express3 features, but should have four for redundancy:

- For availability, assignment of multiple PCI-X adapters of the same type (Crypto Express3 accelerator or coprocessor) to one logical partition should be spread across multiple features.
- The use of retained private keys on a PCI-X adapter configured as a Crypto Express3 coprocessor creates an application single point of failure, because RSA-retained private keys are not copied or backed up.
- There is an intrusion latch within the PCI-X adapter logic that is set any time the feature is removed from the system. If the feature is re-installed, and power is applied, the coprocessor keys and secrets are zeroized and the intrusion latch is reset.

  If a TKE workstation is available, the PCI-X adapter can first be disabled from the TKE workstation before removing the feature from the system. In that case, when the feature is re-installed, the coprocessor keys and secrets are not zeroized, but the intrusion latch is reset and the coprocessor remains in the disabled state. The PCI-X adapter then can be enabled from the TKE and normal operations can resume.

  The definition of domain indexes and cryptographic coprocessor numbers in the Candidate list for each logical partition should be planned to prepare the cryptographic configuration. You can also define or change that cryptographic definition dynamically to an active logical partition with a running system. For more information, see “Change LPAR Cryptographic Controls function” on page 461.
- Crypto Express3 features can be installed concurrently when all physically requirements are fulfilled. Dynamically enabling a new PCI-X adapter to a partition requires that:
  - At least one usage domain index be defined to the logical partition.
  - The cryptographic coprocessor numbers be defined in the partition Candidate list.

- The same usage domain index can be defined more than once across multiple logical partitions. However, the cryptographic coprocessor number coupled with the usage domain index specified must be unique across all *active* logical partitions.

  The same cryptographic coprocessor number and usage domain index combination can be defined for more than one logical partition. This can be used, for example, to define a configuration for backup situations. In this case, only one of the logical partitions can be active at any one time.

- Newly installed Crypto Express3 features are assigned coprocessor numbers sequentially during the power-on-reset following the installation.

  However, when a Crypto Express3 feature is installed concurrently using the Nondisruptive Hardware Change task, it is possible for the installation to select an out-of-sequence coprocessor number from the unused range. In this case, the client should communicate the desired cryptographic coprocessor numbers to the IBM installation team.

  When the task is used to concurrently remove a PCI cryptographic feature, the coprocessor number is automatically freed.

  If Crypto Express3 features are moved during a push/pull upgrade, the existing coprocessor numbers are reset. Numbers are assigned sequentially on the new CPC, as they would be for a new installation.

Configuration planning requires that you distribute 16 domains for each PCI-X adapter, across 60 logical partitions, for up to 16 PCI-X adapters in a fully populated server.

Table 9-2 is a simplified configuration map. Each row identifies a PCI-X adapter and each column identifies a domain index number. Each cell entry indicates the logical partition to be assigned the cryptographic coprocessor number coupled with the usage domain index.

Table 9-2 Planning for logical partitions, domains, and PCI-X adapter numbers

	Adapter type	**Domain index 0**	**Domain index 1**	**Domain index 2**	**.../...**	**Domain index 14**	**Domain index 15**
PCI-X adapter 0	CEX3C/A	LP00 LP02	LP04	LP05			
PCI-X adapter 1	CEX3C/A	LP01 LP02					
PCI-X adapter 2	CEX3C/A						
.../...							
.../...							
PCI-X adapter 13	CEX3C/A						
PCI-X adapter 14	CEX3C/A						
PCI-X adapter 15	CEX3C/A						

This table illustrates, for example:

- Logical partitions LP00 and LP01 use domain 0, but are assigned different PCI-X adapters. There is no conflict. They can be concurrently active.
- Logical partition LP02 uses domain 0 on the set of cryptographic adapters already defined to LP00 and LP01. Therefore, partition LP02 cannot be active concurrently with either LP00 or LP01. However, the definition may be valid for backup situations.

- Logical partitions LP04 and LP05 use different domain numbers for PCI-X cryptographic adapter 0, so there is no conflict. This combination, domain number and cryptographic coprocessor number, is unique across partitions.

> **Important:** Any given combination of PCI-X adapter and domain index should contain only one *active* logical partition, because the combination of cryptographic coprocessor number and usage domain index must be unique across all *active* logical partitions.

Each PCI-X adapter provides 16 domains, and up to 60 partitions can be defined and active on the z196. To allow all 60 logical partitions to use cryptographic services, either accelerator or coprocessor, requires at a minimum two Crypto Express3 features without redundancy, or four Crypto Express3 features if redundancy is required.

For more detailed information regarding the Crypto Express3 feature for System z, refer to the following address:

`http://www.ibm.com/systems/z/advantages/security/solutions/index.html`

9.2 Cryptographic definition

This section provides detailed steps for configuring Crypto Express3 for z196.

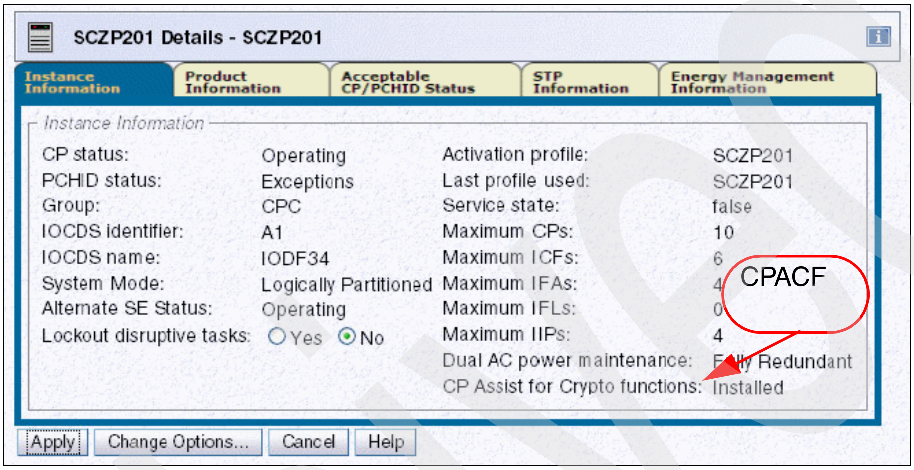
The z196 operates only in LPAR mode. For each logical partition that requires access to a PCI-X adapter, configured as either an accelerator or coprocessor, the required information has to be defined in the partition image profile. This ensures the proper use of the cryptographic features when the associated partition is activated.

Concurrent changes to the Crypto Express3 features and controls when the partition is already activated is also provided by the use of special functions at the Support Element (SE).

9.2.1 Checking whether the CPACF DES/TDES enablement feature is installed

The z196 CPACF DES/TDES (#3863) enables the DES and TDES algorithms on the CPACF. It is a prerequisite for using the Crypto Express3 feature. You have to verify whether the CPACF feature is properly installed on the processor before configuring cryptographic functions. This information is displayed in the Support Element (SE) and can be verified by performing the following steps:

1. Open the CPC Details menu of the desired CPC at the SE workplace. The CPC Details window opens (Figure 9-1).



CP status: Operating
PCHID status: Exceptions
Group: CPC
IOCDS identifier: A1
IOCDS name: IODF34
System Mode: Logically Partitioned
Alternate SE Status: Operating
Lockout disruptive tasks: ○ Yes ● No
Activation profile: SCZP201
Last profile used: SCZP201
Service state: false
Maximum CPs: 10
Maximum ICFs: 6
Maximum IFAs: 4
Maximum IFLs: 0
Maximum IIPs: 4
Dual AC power maintenance: Fully Redundant
CP Assist for Crypto functions: Installed

Figure 9-1 CPC Details: CPACF installed

2. Select the **Instance Information** tab to verify that the CPACF DES/TDES enablement feature is installed.

   – If the window shows CP Assist for Crypto Functions: Installed, the CPACF enablement feature code 3863 is enabled.

   – If the window shows CP Assist for Crypto Functions: Not Installed, then feature code 3863 is not installed. You can still customize the partition image profiles, but the cryptographic functions do not operate.

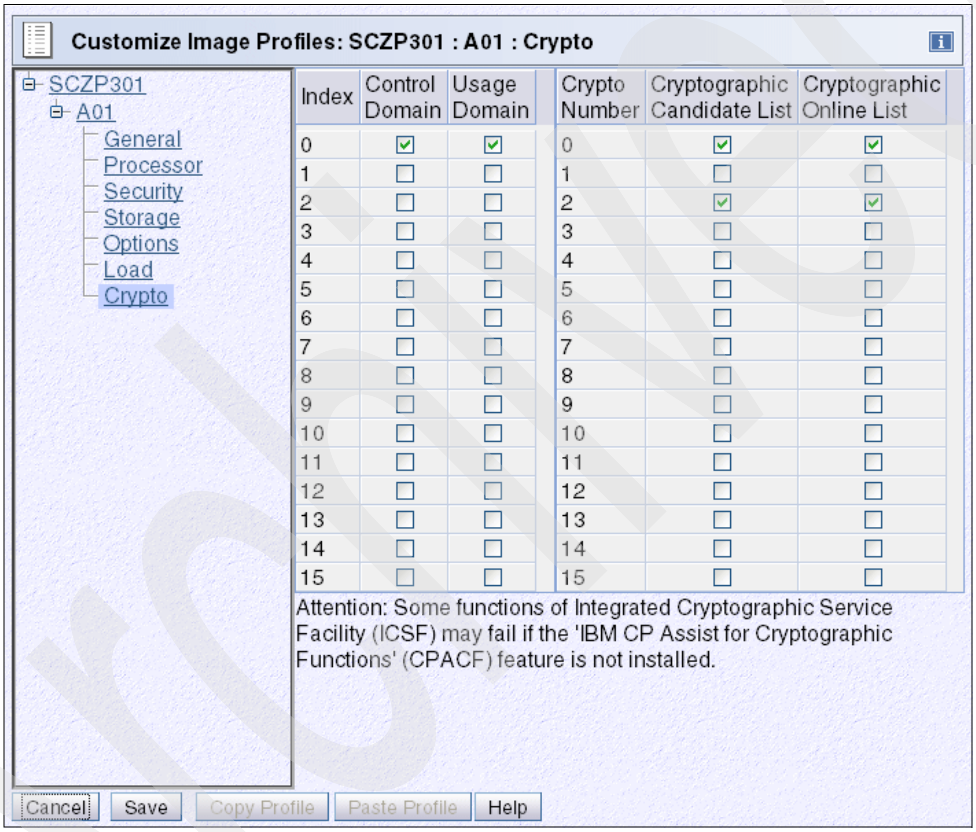
9.2.2 Logical partition cryptographic definition

The next step is to define the following cryptographic resources in the image profile for each partition:

- Usage domain index
- Control Domain Index
- PCI Cryptographic Coprocessor Candidate List
- PCI Cryptographic Coprocessor Online List

This task is accomplished by using the Customize/Delete Activation Profile task, located in the Operational Customization Group, either from the HMC or from the SE. You need to modify the cryptographic initial definition from the Crypto tab in the image profile, as shown in Figure 9-2. After this definition is modified, any changes to the image profile require a DEACTIVATE and ACTIVATE of the logical partition for the change take effect, so this kind of cryptographic definition is disruptive to a running system.

> **Note:** Operational changes can be made using the Change LPAR Cryptographic Controls task from the Support Element, which reflects the cryptographic definitions in the image profile for the partition. With this function, you can dynamically add and remove the cryptographic feature without stopping a running operating system. For details about how to use this function, refer to “Change LPAR Cryptographic Controls function” on page 461.



Index	Control Domain	Usage Domain	Crypto Number	Cryptographic Candidate List	Cryptographic Online List
0	☑	☑	0	☑	☑
1	☐	☐	1	☐	☐
2	☐	☐	2	☑	☑
3	☐	☐	3	☐	☐
4	☐	☐	4	☐	☐
5	☐	☐	5	☐	☐
6	☐	☐	6	☐	☐
7	☐	☐	7	☐	☐
8	☐	☐	8	☐	☐
9	☐	☐	9	☐	☐
10	☐	☐	10	☐	☐
11	☐	☐	11	☐	☐
12	☐	☐	12	☐	☐
13	☐	☐	13	☐	☐
14	☐	☐	14	☐	☐
15	☐	☐	15	☐	☐

Attention: Some functions of Integrated Cryptographic Service Facility (ICSF) may fail if the 'IBM CP Assist for Cryptographic Functions' (CPACF) feature is not installed.

Figure 9-2 Customize Image Profiles: Crypto

The cryptographic resource definitions have the following meanings:

- Usage domain index

  Identifies the cryptographic coprocessor domains assigned to the partition for all cryptographic coprocessors that are configured on the partition.

  The numbers selected must match the domain numbers entered in the Options data set when starting this partition instance of ICSF.

  The same usage domain index can be used by multiple partitions regardless to which CSS they are defined, but the combination PCI-X adapter number and usage domain index number must be unique across all active partitions.

- Control domain index

  Identifies the cryptographic coprocessor domain indexes that can be administered from this logical partition if it is being set up as the TCP/IP host for the TKE.

  The control domain index must include the usage domain index specified for the partition. If any selected usage domain index is not part of the control domain index selection, the update is rejected.

  But a logical partition's control domains can also include the usage domains of other logical partitions. Assigning multiple logical partitions' usage domains as control domains of a single logical partition allows you to use it to control their software setup.

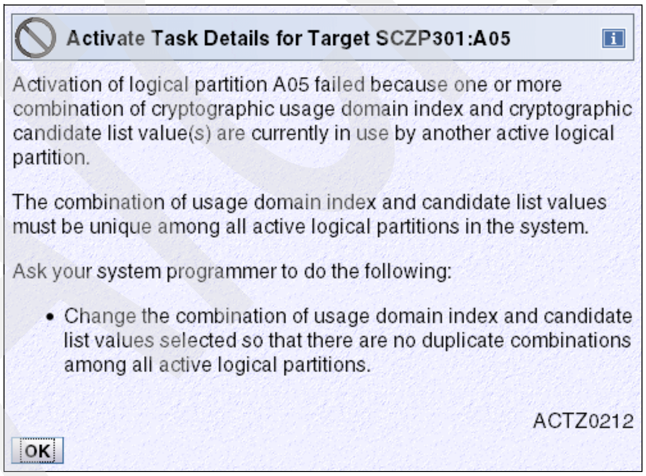
  If you are setting up the host TCP/IP in this logical partition to communicate with the TKE, the partition is used as a path to other domains' Master Keys. Indicate all the control domains you want to access (including this partition's own control domain) from this partition.

- PCI Cryptographic Coprocessor Candidate list

  Identifies the cryptographic coprocessor numbers that are eligible to be accessed by this logical partition. From the list, select the coprocessor numbers, from 0 to 15, that identify the PCI-X adapters to be accessed by this partition.

  When a cryptographic coprocessor number selected in the partition candidate list is not available to the partition when the partition is activated, either because it is configured off or not installed, no error condition is reported. The cryptographic coprocessor number is ignored and the activation process continues.

  If the cryptographic coprocessor number and usage domain index combination for the coprocessor selected is already in use by another active logical partition, the activation of the logical partition fails (Figure 9-3). In this conflicting case, you have to check the cryptographic information for all active logical partitions from the Summary tab of the View LPAR Cryptographic Controls task, as shown in Figure 9-5 on page 461, and resolve the error based on the collected data (assign a unique combination of PCI-X adapter number and usage domain index number).



Activate Task Details for Target SCZP301:A05

Activation of logical partition A05 failed because one or more combination of cryptographic usage domain index and cryptographic candidate list value(s) are currently in use by another active logical partition.

The combination of usage domain index and candidate list values must be unique among all active logical partitions in the system.

Ask your system programmer to do the following:

- Change the combination of usage domain index and candidate list values selected so that there are no duplicate combinations among all active logical partitions.

ACTZ0212

Figure 9-3 Activation of LPAR failed: ACTZ0212

- PCI Cryptographic Coprocessor Online list

  Identifies the cryptographic coprocessor numbers that are automatically brought online during logical partition activation. The numbers selected in the online list must also be part of the candidate list.

After the next partition activation, installed PCI Cryptographic Coprocessors that are in the partition's PCI Cryptographic Coprocessor Candidate list but not on the PCI Cryptographic Coprocessor Online list are in a "configured off" state (Standby). They can later be configured online to the partition by using the **Configure On/Off** option from the SE. For more information, see "Configuring a Crypto Express3 online or on a logical partition" on page 468.

When the partition is activated, no error condition is reported if a cryptographic coprocessor number selected in the partition's online list is not installed. The cryptographic coprocessor is ignored and the activation process continues.

When a cryptographic coprocessor number selected in the partition's online list has been previously configured off to the partition, it is automatically configured back on when the partition is next activated. The cryptographic online list is always selected from the image profile for each logical partition.

9.2.3 Cryptographic configuration using the Support Element

From the Support Element (SE), you can perform the following tasks:

- Display PCI Cryptographic Configuration.
- Display LPAR cryptographic controls (domain index and candidate/online lists for currently activate partitions).
- Reconfigure the coprocessor from/to accelerator.
- Configure a cryptographic coprocessor and accelerator On/Off to a logical partition.
- Change LPAR cryptographic controls to a logical partition.

These tasks require you to work from the Support Element; to get to the appropriate SE task, log on to the SE directly or click the **Single Object Operations** task from the HMC.

Cryptographic management

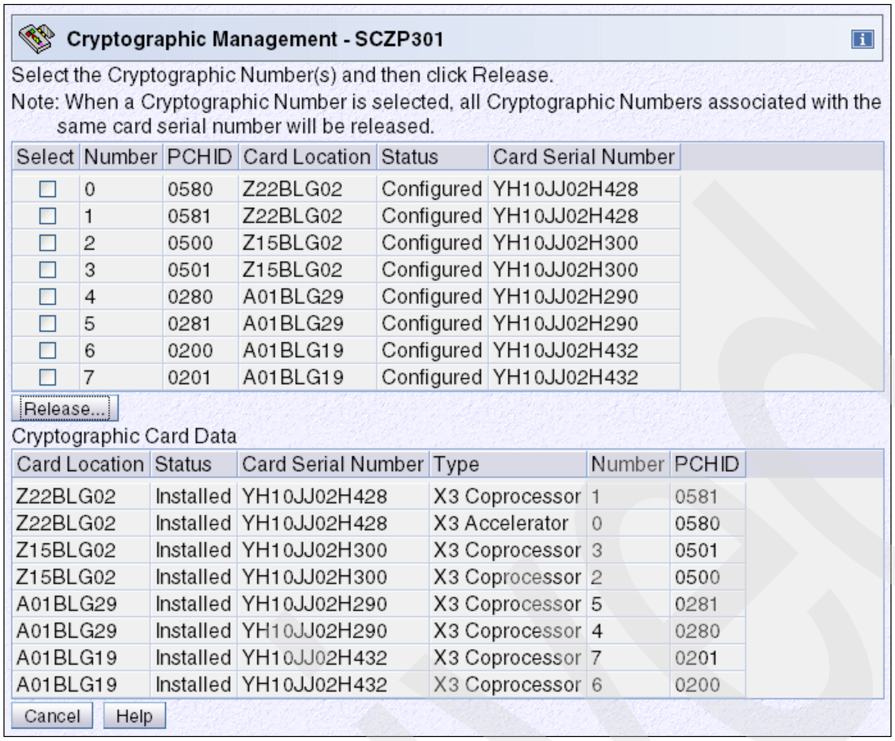
After selecting the CPCs, locate and click the **Cryptographic Management** task in the CPC Configuration section.

Figure 9-4 on page 460 shows the Cryptographic Management window. Use this window to obtain the installed cryptographic configuration (the association of the cryptographic number and the card serial number), as follows:

- View installed cryptographic features, with current status and assigned PCHID and coprocessor numbers. Each PCI-X adapter is assigned to a coprocessor number, in the range 0 to 15, as part of the configuration process. The assignment is made when the feature is installed.
- View coprocessor numbers that are still assigned to removed cryptographic features.
- Initiate the release of coprocessor numbers. The relationship should be removed only when a Crypto Express2 feature is permanently removed from the CPC.

  The release option removes the relationship between a PCI cryptographic feature serial number and the assigned coprocessor numbers. Removing the relationship allows the coprocessor numbers to be freed, and makes them available to be assigned to a new feature serial number.

Important: The coprocessor numbers are assigned to the feature serial number, *not* to the installed location. If a feature is removed from one location to be reinstalled in another, the coprocessor number assignment remains.



Select the Cryptographic Number(s) and then click Release.

Note: When a Cryptographic Number is selected, all Cryptographic Numbers associated with the same card serial number will be released.

Select	Number	PCHID	Card Location	Status	Card Serial Number
☐	0	0580	Z22BLG02	Configured	YH10JJ02H428
☐	1	0581	Z22BLG02	Configured	YH10JJ02H428
☐	2	0500	Z15BLG02	Configured	YH10JJ02H300
☐	3	0501	Z15BLG02	Configured	YH10JJ02H300
☐	4	0280	A01BLG29	Configured	YH10JJ02H290
☐	5	0281	A01BLG29	Configured	YH10JJ02H290
☐	6	0200	A01BLG19	Configured	YH10JJ02H432
☐	7	0201	A01BLG19	Configured	YH10JJ02H432

Cryptographic Card Data

Card Location	Status	Card Serial Number	Type	Number	PCHID
Z22BLG02	Installed	YH10JJ02H428	X3 Coprocessor	1	0581
Z22BLG02	Installed	YH10JJ02H428	X3 Accelerator	0	0580
Z15BLG02	Installed	YH10JJ02H300	X3 Coprocessor	3	0501
Z15BLG02	Installed	YH10JJ02H300	X3 Coprocessor	2	0500
A01BLG29	Installed	YH10JJ02H290	X3 Coprocessor	5	0281
A01BLG29	Installed	YH10JJ02H290	X3 Coprocessor	4	0280
A01BLG19	Installed	YH10JJ02H432	X3 Coprocessor	7	0201
A01BLG19	Installed	YH10JJ02H432	X3 Coprocessor	6	0200

Figure 9-4 SE: Cryptographic Management

View LPAR Cryptographic Controls task

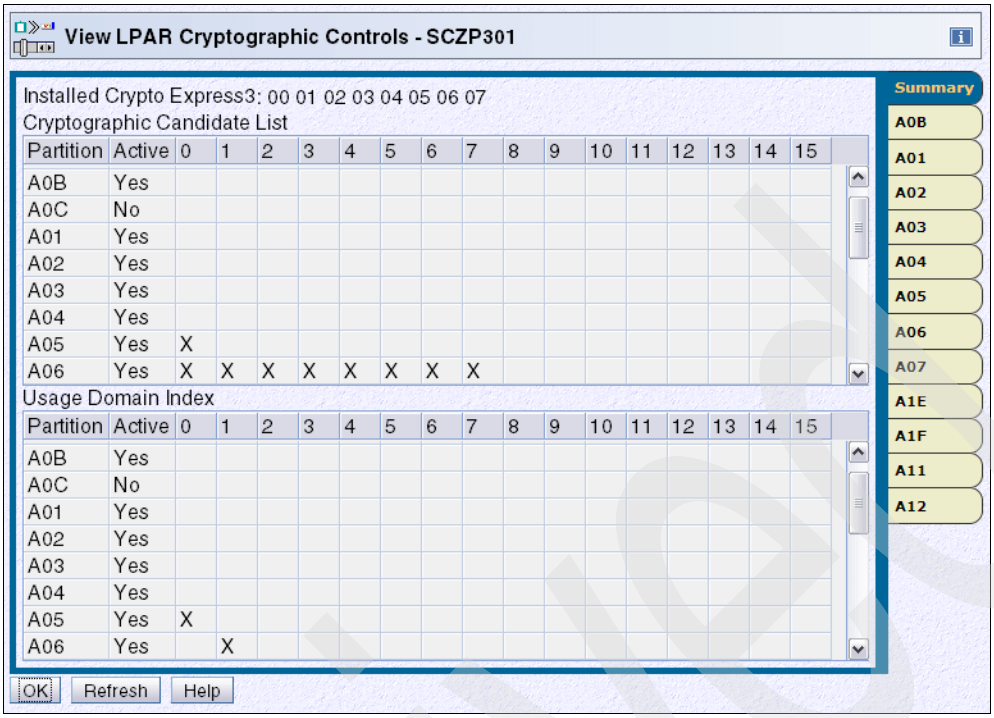
You can visualize active partition cryptographic definitions from the SE.

Select the CPCs, and locate and click the **View LPAR Cryptographic Controls** task in the CPC Operational Customization pane.

The resulting window displays the definition of Usage and Control domain indexes, and PCI Cryptographic candidate and online lists. The information is provided only for active logical partitions.

> **Note:** You can review the PCI Cryptographic candidate lists and usage domain indexes that are assigned for all active logical partition from the Summary tab shown in Figure 9-5 on page 461.
>
> The usage domain index, in combination with the cryptographic number selected in the candidate list, must be unique across all partitions defined to the CPC, so this new tab is useful when defining or changing the usage domain index for a logical partition.

This window is for informational purposes only. You can see the definitions, but you cannot change them using this window. Modifying the cryptographic coprocessor On/Off status requires the use of the Configure On/Off task, which is discussed in "Configuring a Crypto Express3 online or on a logical partition" on page 468.



Installed Crypto Express3: 00 01 02 03 04 05 06 07

Cryptographic Candidate List

Partition	Active	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A0B	Yes																
A0C	No																
A01	Yes																
A02	Yes																
A03	Yes																
A04	Yes																
A05	Yes	X															
A06	Yes	X	X	X	X	X	X	X	X								

Usage Domain Index

Partition	Active	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A0B	Yes																
A0C	No																
A01	Yes																
A02	Yes																
A03	Yes																
A04	Yes																
A05	Yes	X															
A06	Yes		X														

Figure 9-5 SE: View LPAR Cryptographic Controls

Change LPAR Cryptographic Controls function

For each logical partition, you can define a:

- Usage domain index
- Control domain index
- Cryptographic Coprocessor Candidate list
- Cryptographic Coprocessor Online list

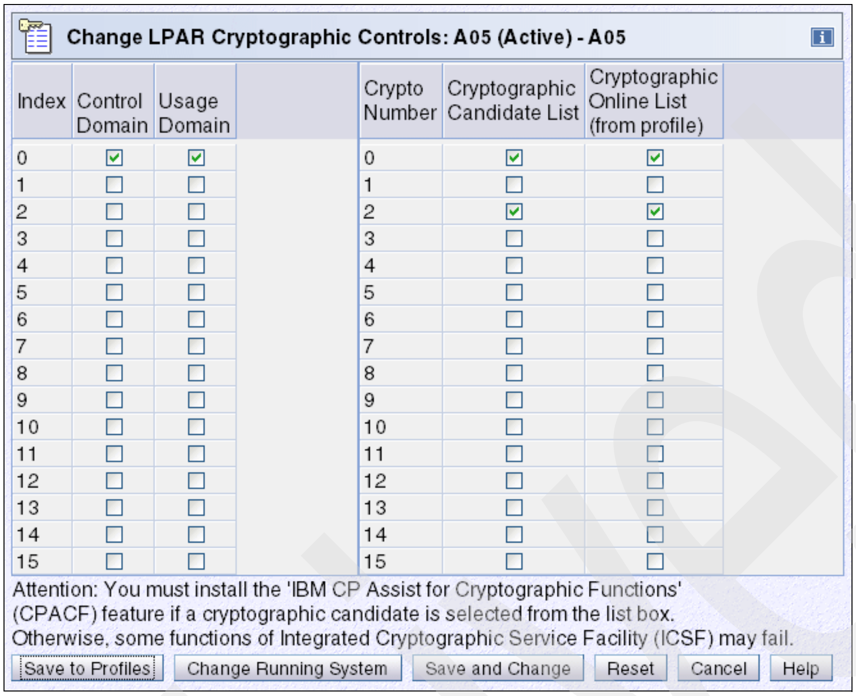
Using the Change LPAR Cryptographic Controls function included in the Support Element for the z196, you can perform the following operations:

- Add a cryptographic coprocessor to a logical partition for the first time.
- Add a cryptographic coprocessor to a logical partition already using a cryptographic coprocessor.
- Remove a cryptographic coprocessor from a logical partition.
- Zeroize or clear the cryptographic secure keys for a given usage domain.

Dynamic assignment of the cryptographic definition to the partition

All the cryptographic functions that are defined in the Image Profile as described in 9.2.2, “Logical partition cryptographic definition” on page 456 can be dynamically changed by using Change LPAR Cryptographic Controls at the Support Element.

Select the **Usage and Control domain** index and **Cryptographic Candidate and Online** list numbers that you want to assign (Figure 9-6).



Change LPAR Cryptographic Controls: A05 (Active) - A05

Index	Control Domain	Usage Domain	Crypto Number	Cryptographic Candidate List	Cryptographic Online List (from profile)
0	☑	☑	0	☑	☑
1	☐	☐	1	☐	☐
2	☐	☐	2	☑	☑
3	☐	☐	3	☐	☐
4	☐	☐	4	☐	☐
5	☐	☐	5	☐	☐
6	☐	☐	6	☐	☐
7	☐	☐	7	☐	☐
8	☐	☐	8	☐	☐
9	☐	☐	9	☐	☐
10	☐	☐	10	☐	☐
11	☐	☐	11	☐	☐
12	☐	☐	12	☐	☐
13	☐	☐	13	☐	☐
14	☐	☐	14	☐	☐
15	☐	☐	15	☐	☐

Attention: You must install the 'IBM CP Assist for Cryptographic Functions' (CPACF) feature if a cryptographic candidate is selected from the list box. Otherwise, some functions of Integrated Cryptographic Service Facility (ICSF) may fail.

Figure 9-6 Change LPAR Cryptographic Controls (Change Running System)

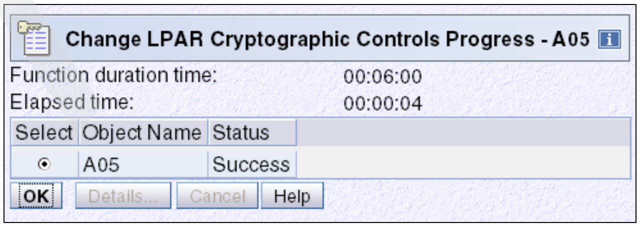
After checking the appropriate boxes, you can:

- Save this settings to the Image Profile without changing the running system.
- Change the running system without saving the definition to the Image Profile, which means after a reactivation of the partition your changes are lost.

> **Note:** Changes to the Cryptographic Coprocessor Online List are ignored when this option is chosen.

- Save the definitions to the Image Profile and activate the changes immediately to the partition.

When you add or change the control or usage domain index and cryptographic coprocessor number dynamically for a running system, a confirmation message is displayed. After processing, a status window opens and indicates the result of a dynamic addition or change of a cryptographic definition to an LPAR (Figure 9-7).



Change LPAR Cryptographic Controls Progress - A05

Function duration time: 00:06:00
Elapsed time: 00:00:04

Select	Object Name	Status
●	A05	Success

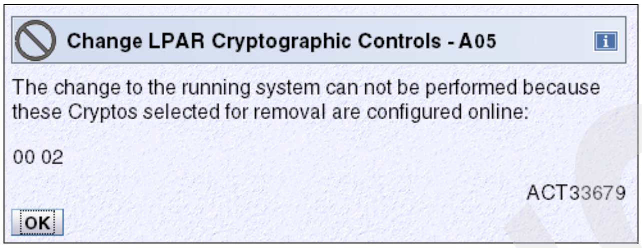
Figure 9-7 SE: Change LPAR Cryptographic Controls (Success)

Dynamic removal of the cryptographic definition

You can remove the cryptographic definition from a logical partition dynamically using the Change LPAR Cryptographic Controls task. This section discusses the related issues and describes the procedure.

Perform the following steps:

1. Before you change the cryptographic settings using the Change LPAR Cryptographic Controls task, check that the cryptographic lists you want to remove from a logical partition are offline (Standby). If you try to remove the lists dynamically while they are online, the change fails and you receive the message shown in Figure 9-8.



Change LPAR Cryptographic Controls - A05

The change to the running system can not be performed because these Cryptos selected for removal are configured online:

00 02

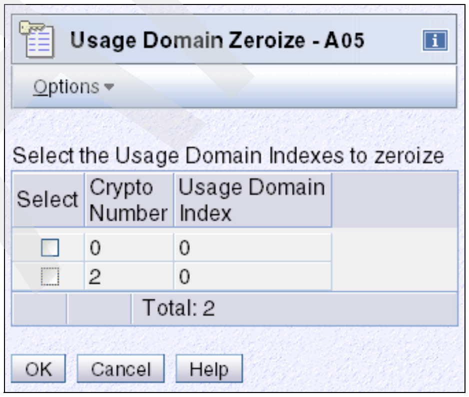
ACT33679

Figure 9-8 SE: Change LPAR Cryptographic Controls: ACT33679

In addition to adding or changing the cryptographic settings to a logical partition, you can remove the Control/Usage domains and Cryptographic Candidate lists for a logical partition from the Change LPAR Cryptographic Controls window (Figure 9-6 on page 462). After deselecting (clearing) the definitions for a logical partition, you remove a definition dynamically by clicking **Change Running System**. Saving the new configuration to the Image Profile without changing the running system is done by selecting **Save to Profiles,** and with **Save and Change**, the removal becomes concurrently active, and the removed cryptographic coprocessor will also not be used for the next image activation.

2. When you only remove the definition of the cryptographic lists, the zeroize window opens (Figure 9-9).

> **Note:** Because you cannot see at a glance all cryptographic information, including the usage domains for other logical partitions, remove, using the Change LPAR Cryptographic Controls task, the check for zeroize. For more information about zeroize, see "Reconfiguration of the PCI-X Adapter type" on page 464.



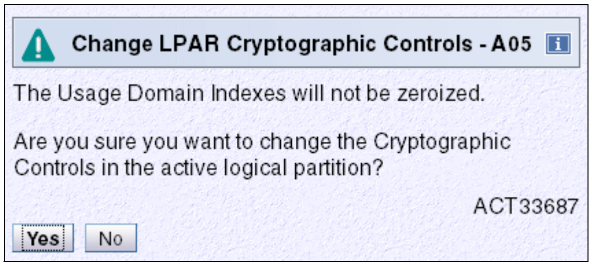
Usage Domain Zeroize - A05

Select the Usage Domain Indexes to zeroize

Select	Crypto Number	Usage Domain Index
☐	0	0
☐	2	0
	Total: 2	

Figure 9-9 SE: Change LPAR Cryptographic Controls Zeroize

Click **Yes** in the confirmation window (Figure 9-10) to change the cryptographic settings dynamically. After processing, a status window indicates the result of the dynamic change of the cryptographic definition to an LPAR**.**



The Usage Domain Indexes will not be zeroized.

Are you sure you want to change the Cryptographic Controls in the active logical partition?

ACT33687

Figure 9-10 SE: Change LPAR Cryptographic Controls: ACT33687

Reconfiguration of the PCI-X Adapter type

Each PCI-X Cryptographic adapter on a Crypto Express3 feature can be configured either as a coprocessor or as an accelerator. Each Crypto Express3 feature can be configured as:

- Two Crypto Express3 coprocessors
- One Crypto Express3 coprocessor and one accelerator
- Two Crypto Express3 accelerators

Whether it is configured as a coprocessor or an accelerator, each PCI-X Cryptographic adapter can be shared among 16 logical partitions.

Configuring a coprocessor as an accelerator

During the installation of a Crypto Express3 feature, both PCI-X Cryptographic adapters are configured by default as coprocessors. The reconfiguration is fully supported in Licensed Internal Code.

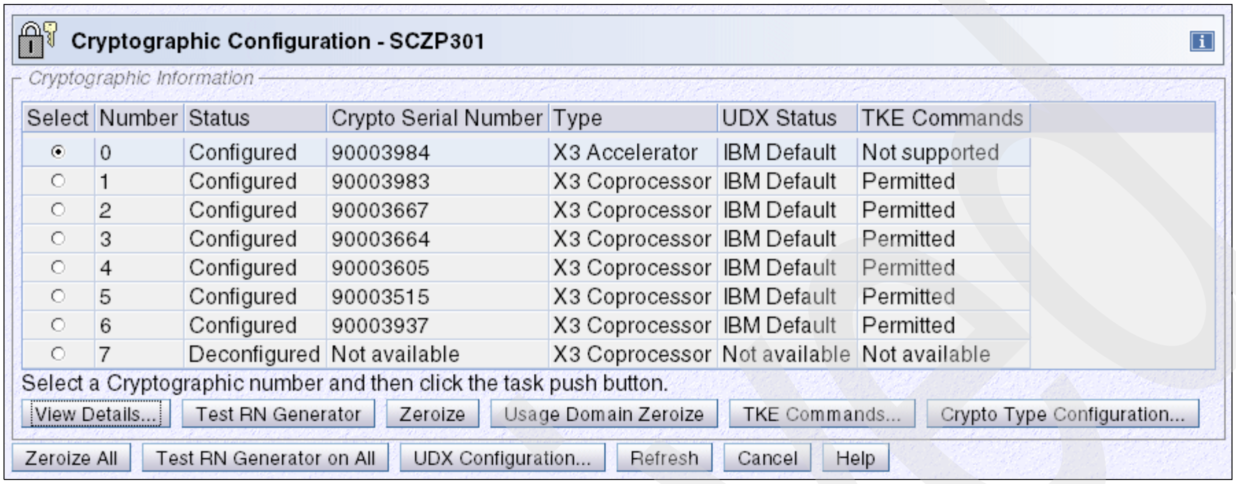
When a PCI-X adapter is configured as a coprocessor, it can still perform accelerator functions, albeit much more slowly than when configured as accelerator. When it is configured as an accelerator, it cannot perform coprocessor functions.

To reconfigure the PCI-X Adapter from coprocessor to accelerator, perform the following steps:

1. Select the CPC that has cryptographic coprocessor adapters you want to reconfigure and click the **Cryptographic Configuration** task in the CPC Configuration Group.

2. The reconfiguration is enabled only for PCI-X adapters that are Off, so make sure the PCI-X Cryptographic adapter status for that cryptographic coprocessor channel is Deconfigured (Figure 9-11).

   If necessary, set the PCI-X Cryptographic adapter to Off for all partitions that have it in their candidate list. To set the PCI-X Cryptographic adapter to Off, use the procedure described in “Configuring a Crypto Express3 online or on a logical partition” on page 468.



Select	Number	Status	Crypto Serial Number	Type	UDX Status	TKE Commands
●	0	Configured	90003984	X3 Accelerator	IBM Default	Not supported
○	1	Configured	90003983	X3 Coprocessor	IBM Default	Permitted
○	2	Configured	90003667	X3 Coprocessor	IBM Default	Permitted
○	3	Configured	90003664	X3 Coprocessor	IBM Default	Permitted
○	4	Configured	90003605	X3 Coprocessor	IBM Default	Permitted
○	5	Configured	90003515	X3 Coprocessor	IBM Default	Permitted
○	6	Configured	90003937	X3 Coprocessor	IBM Default	Permitted
○	7	Deconfigured	Not available	X3 Coprocessor	Not available	Not available

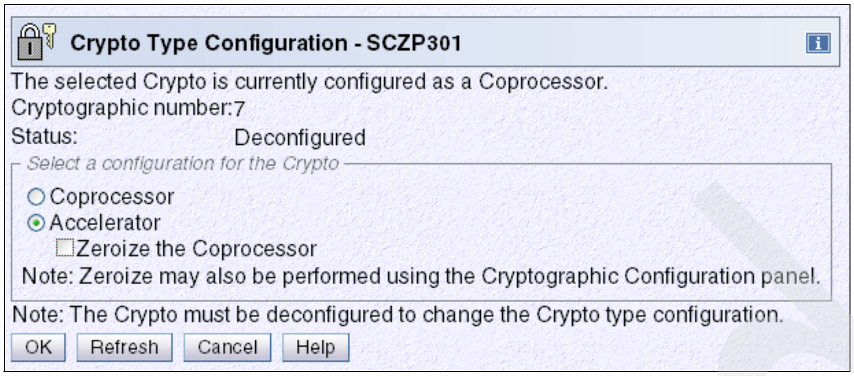
Select a Cryptographic number and then click the task push button.

Figure 9-11 SE: Cryptographic Configuration task (Deconfigured)

3. Select the number of the cryptographic coprocessor channel and click the **Crypto Type Configuration** option.
4. Change the configuration for the cryptographic coprocessor adapter. The selected cryptographic coprocessor channel is currently configured as a coprocessor (Figure 9-12 on page 466). Select **Accelerator**.

   When you select **Accelerator**, you can zeroize the selected coprocessor by checking the **Zeroize the Coprocessor** check box on the Crypto Type Configuration window. Clear the **Zeroize the Coprocessor** check box and click **OK**.

> **Caution:** Zeroizing one or all cryptographic coprocessors clears their configuration data and clears all cryptographic keys. Zeroizing all also erases configuration data from the support element hard drive (for example, UDX files). Cryptographic coprocessors should be zeroized manually only when absolutely necessary, typically when the cryptographic coprocessor configuration data must be erased completely. In normal cases, be sure to clear the check box for each cryptographic channel.



The selected Crypto is currently configured as a Coprocessor.
Cryptographic number:7
Status: Deconfigured

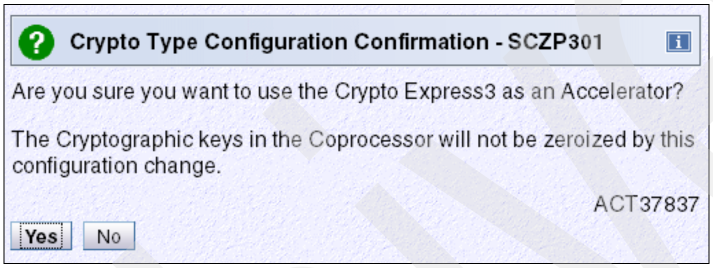
Select a configuration for the Crypto
○ Coprocessor
● Accelerator
  ☐ Zeroize the Coprocessor

Note: Zeroize may also be performed using the Cryptographic Configuration panel.

Note: The Crypto must be deconfigured to change the Crypto type configuration.

Figure 9-12 SE: Crypto Type Configuration (coprocessor to accelerator)

5. Click **Yes** (Figure 9-13).



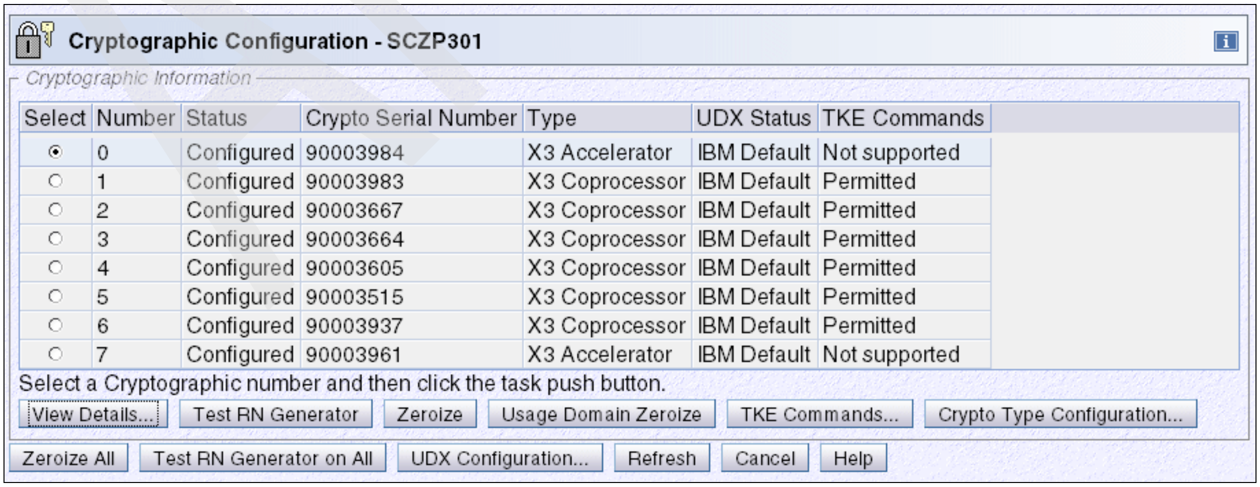
Are you sure you want to use the Crypto Express3 as an Accelerator?

The Cryptographic keys in the Coprocessor will not be zeroized by this configuration change.

ACT37837

Figure 9-13 Crypto Type Configuration Confirmation of accelerator

6. Check that your request completed successfully. Click **OK** to return to the Crypto Type Configuration window.
7. Click **Cancel** on the Crypto Type Configuration window to return to the Cryptographic Configuration window. You can confirm that the target cryptographic channel changed to the cryptographic accelerator type in the Cryptographic Configuration task window. The Crypto Serial Number and UDX Status will be Not available and TKE Commands Not supported until the cryptography is set Online again, as described in “Configuring a Crypto Express3 online or on a logical partition” on page 468. After performing this task and going back to the Cryptographic Configuration window, the information in Figure 9-14 is displayed.

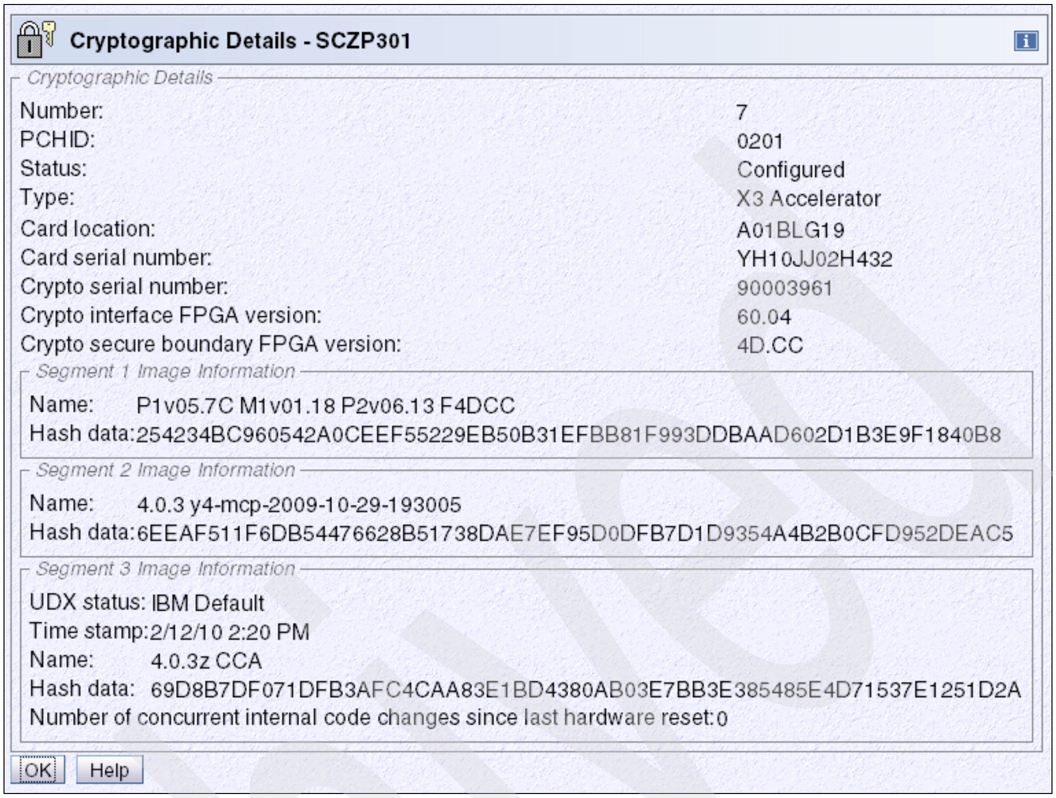


Select	Number	Status	Crypto Serial Number	Type	UDX Status	TKE Commands
●	0	Configured	90003984	X3 Accelerator	IBM Default	Not supported
○	1	Configured	90003983	X3 Coprocessor	IBM Default	Permitted
○	2	Configured	90003667	X3 Coprocessor	IBM Default	Permitted
○	3	Configured	90003664	X3 Coprocessor	IBM Default	Permitted
○	4	Configured	90003605	X3 Coprocessor	IBM Default	Permitted
○	5	Configured	90003515	X3 Coprocessor	IBM Default	Permitted
○	6	Configured	90003937	X3 Coprocessor	IBM Default	Permitted
○	7	Configured	90003961	X3 Accelerator	IBM Default	Not supported

Select a Cryptographic number and then click the task push button.

Figure 9-14 SE: Cryptographic Configuration (accelerator online)

8. Click **View Details** for detailed information (Figure 9-15).



Number: 7
PCHID: 0201
Status: Configured
Type: X3 Accelerator
Card location: A01BLG19
Card serial number: YH10JJ02H432
Crypto serial number: 90003961
Crypto interface FPGA version: 60.04
Crypto secure boundary FPGA version: 4D.CC

Name: P1v05.7C M1v01.18 P2v06.13 F4DCC
Hash data:254234BC960542A0CEEF55229EB50B31EFBB81F993DDBAAD602D1B3E9F1840B8

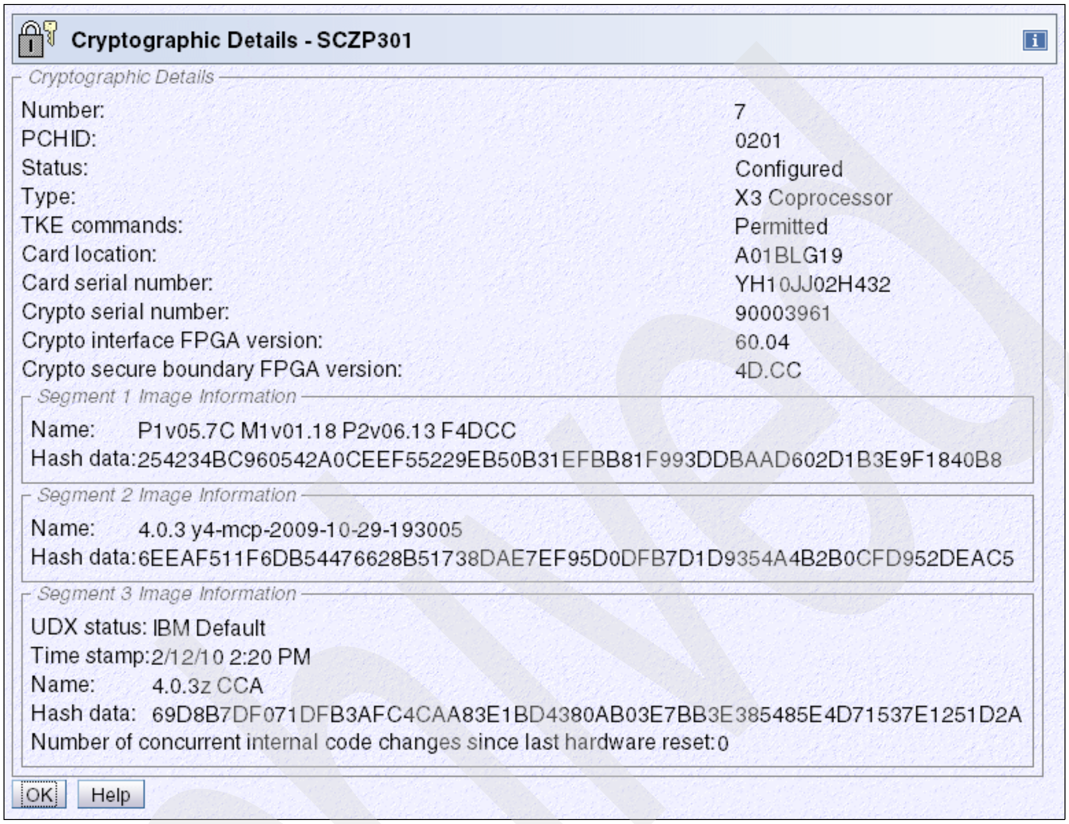
Name: 4.0.3 y4-mcp-2009-10-29-193005
Hash data:6EEAF511F6DB54476628B51738DAE7EF95D0DFB7D1D9354A4B2B0CFD952DEAC5

UDX status: IBM Default
Time stamp:2/12/10 2:20 PM
Name: 4.0.3z CCA
Hash data: 69D8B7DF071DFB3AFC4CAA83E1BD4380AB03E7BB3E385485E4D71537E1251D2A
Number of concurrent internal code changes since last hardware reset:0

Figure 9-15 SE: Cryptographic Details (Accelerator)

The Cryptographic Type is now a Crypto Express3 Accelerator. The adapter was not zeroized during the type-changing procedure.

This completes changing the type of the cryptographic configuration from an accelerator to a coprocessor. To change the accelerator back to a coprocessor, the same procedure can be used, but select Coprocessor instead of Accelerator, as shown in Figure 9-12 on page 466. The result of this change is shown in Figure 9-16.



Number: 7
PCHID: 0201
Status: Configured
Type: X3 Coprocessor
TKE commands: Permitted
Card location: A01BLG19
Card serial number: YH10JJ02H432
Crypto serial number: 90003961
Crypto interface FPGA version: 60.04
Crypto secure boundary FPGA version: 4D.CC

Name: P1v05.7C M1v01.18 P2v06.13 F4DCC
Hash data: 254234BC960542A0CEEF55229EB50B31EFBB81F993DDBAAD602D1B3E9F1840B8

Name: 4.0.3 y4-mcp-2009-10-29-193005
Hash data: 6EEAF511F6DB54476628B51738DAE7EF95D0DFB7D1D9354A4B2B0CFD952DEAC5

UDX status: IBM Default
Time stamp: 2/12/10 2:20 PM
Name: 4.0.3z CCA
Hash data: 69D8B7DF071DFB3AFC4CAA83E1BD4380AB03E7BB3E385485E4D71537E1251D2A
Number of concurrent internal code changes since last hardware reset: 0

Figure 9-16 SE: Cryptographic Details (Coprocessor)

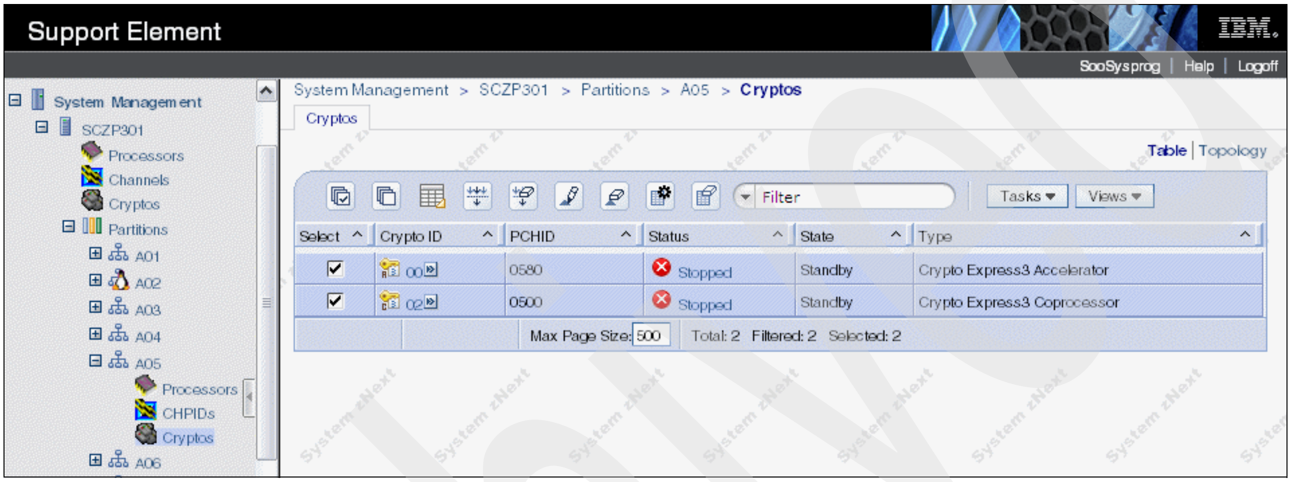
Configuring a Crypto Express3 online or on a logical partition

For some changes to the cryptographic settings to the logical partition, it is necessary to configure the Crypto Express3 online or offline. If you can reactivate (DEACTIVATE and ACTIVATE) the image for the logical partitions whose cryptographic online lists have been updated, then this dynamic operation is not needed.

Setting a Crypto Express3 to online

Perform the following steps:

1. From the SE, select the **Systems Management** function. Select the server, click **Partitions,** and then select the target logical partition. Click the **Cryptos** selection for the target logical partition. In the Contents of Cryptos window, select the Crypto IDs to be changed. In Figure 9-17, one cryptographic accelerator (00) and one coprocessor (02) to Logical Partition A05 are selected.
2. Click the **Configure On/Off** task under Crypto Service Operations. This task is used to control whether a Crypto ID is online or on standby (offline; only the definition of candidate list to that logical partition is affected) in the active configuration.

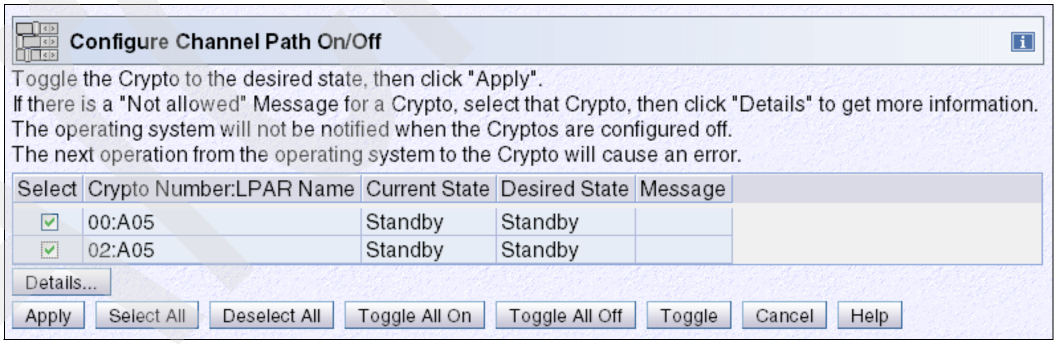


Select	Crypto ID	PCHID	Status	State	Type
☑	00	0580	Stopped	Standby	Crypto Express3 Accelerator
☑	02	0500	Stopped	Standby	Crypto Express3 Coprocessor

Max Page Size: 500 Total: 2 Filtered: 2 Selected: 2

Figure 9-17 SE Crypto Service Operations: Standby

3. Select the cryptographic coprocessor channel numbers you want and click **Toggle** to switch from Standby to Online. If you want choose multiple cryptographic channels at the same time, click **Toggle All On** (Figure 9-18).

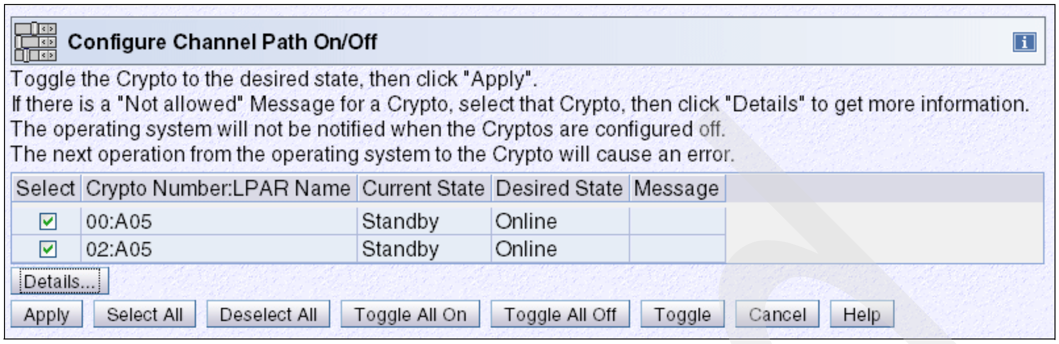


Toggle the Crypto to the desired state, then click "Apply".
If there is a "Not allowed" Message for a Crypto, select that Crypto, then click "Details" to get more information.
The operating system will not be notified when the Cryptos are configured off.
The next operation from the operating system to the Crypto will cause an error.

Select	Crypto Number:LPAR Name	Current State	Desired State	Message
☑	00:A05	Standby	Standby	
☑	02:A05	Standby	Standby	

Figure 9-18 SE: Config On/Off (all selected)

4. After confirming that your requested cryptographic coprocessor channels are set to Online, click the **Apply** button (Figure 9-19).



Configure Channel Path On/Off

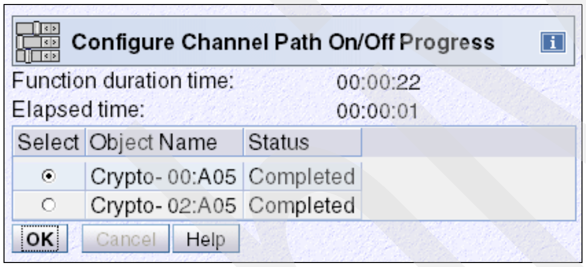
Toggle the Crypto to the desired state, then click "Apply".
If there is a "Not allowed" Message for a Crypto, select that Crypto, then click "Details" to get more information.
The operating system will not be notified when the Cryptos are configured off.
The next operation from the operating system to the Crypto will cause an error.

Select	Crypto Number:LPAR Name	Current State	Desired State	Message
☑	00:A05	Standby	Online	
☑	02:A05	Standby	Online	

Figure 9-19 SE: Config On/Off (Standby to Online)

5. Confirm that your request is completed (Figure 9-20). Click **OK**.

6. After checking that the current state of the channels has been changed to Online, click **Cancel** to return.



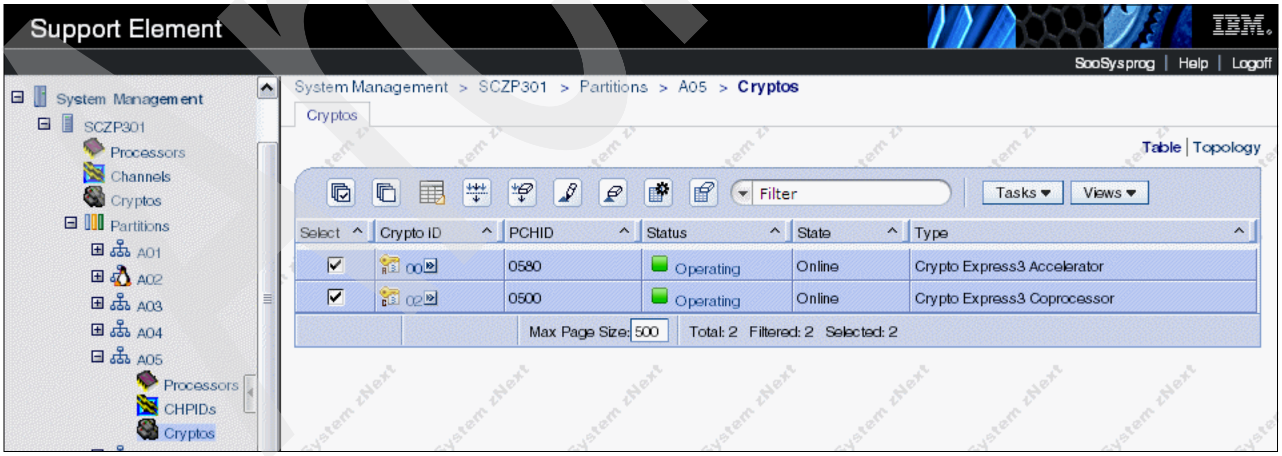
Configure Channel Path On/Off Progress

Function duration time: 00:00:22
Elapsed time: 00:00:01

Select	Object Name	Status
●	Crypto- 00:A05	Completed
○	Crypto- 02:A05	Completed

Figure 9-20 SE: Config On/Off (Completed

7. You can view the contents of the Cryptos window of the logical partition to confirm that the cryptographic channels are now in the Operating status (Figure 9-21).



Select	Crypto ID	PCHID	Status	State	Type
☑	00	0580	🟩 Operating	Online	Crypto Express3 Accelerator
☑	02	0500	🟩 Operating	Online	Crypto Express3 Coprocessor

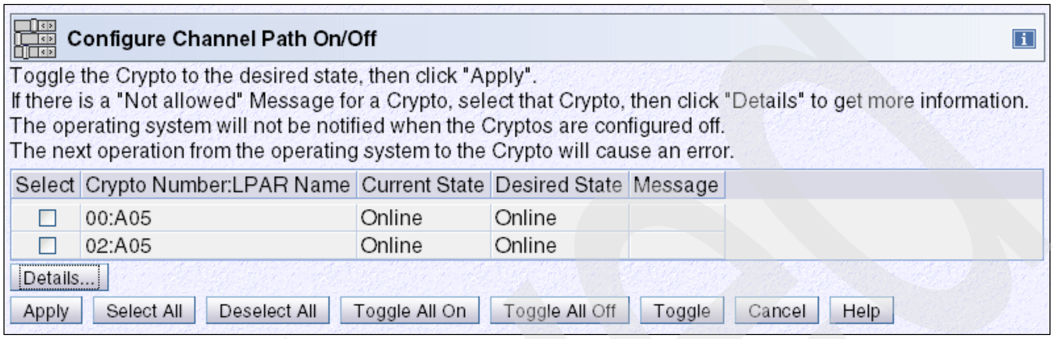
Max Page Size: 500 Total: 2 Filtered: 2 Selected: 2

Figure 9-21 SE Crypto Service Operations: Online

Changing a cryptographic channel to Standby (Offline) status

Perform the following steps:

1. Select the logical partition whose Crypto IDs will be changed to Standby. For example, we select two cryptographic coprocessors (00 and 02) that are currently in an online state. Click **Configure On/Off** task in Crypto Service Operations.
2. Select the cryptographic coprocessor channel numbers you want, and click **Toggle off** to switch from Online to Standby (Figure 9-22).

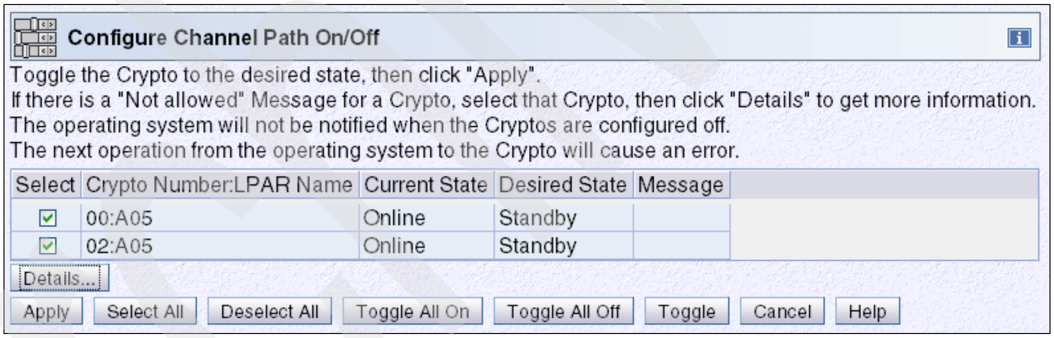


Toggle the Crypto to the desired state, then click "Apply".
If there is a "Not allowed" Message for a Crypto, select that Crypto, then click "Details" to get more information.
The operating system will not be notified when the Cryptos are configured off.
The next operation from the operating system to the Crypto will cause an error.

Select	Crypto Number:LPAR Name	Current State	Desired State	Message
☐	00:A05	Online	Online	
☐	02:A05	Online	Online	

Figure 9-22 SE: Config On/Off (online- toggle all off)

3. After confirming that the desired state for your requested cryptographic channel is Standby, click the **Apply** button (Figure 9-23).

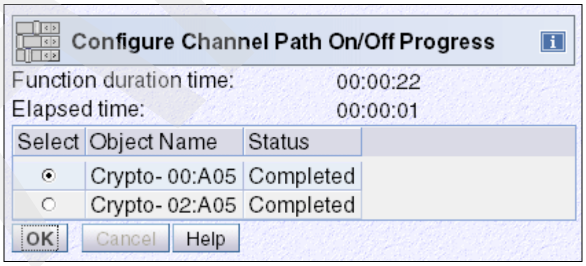


Toggle the Crypto to the desired state, then click "Apply".
If there is a "Not allowed" Message for a Crypto, select that Crypto, then click "Details" to get more information.
The operating system will not be notified when the Cryptos are configured off.
The next operation from the operating system to the Crypto will cause an error.

Select	Crypto Number:LPAR Name	Current State	Desired State	Message
☑	00:A05	Online	Standby	
☑	02:A05	Online	Standby	

Figure 9-23 SE: Config On/Off (Online to Standby)

4. The confirmation window opens (Figure 9-24. Click **OK**.



Function duration time: 00:00:22
Elapsed time: 00:00:01

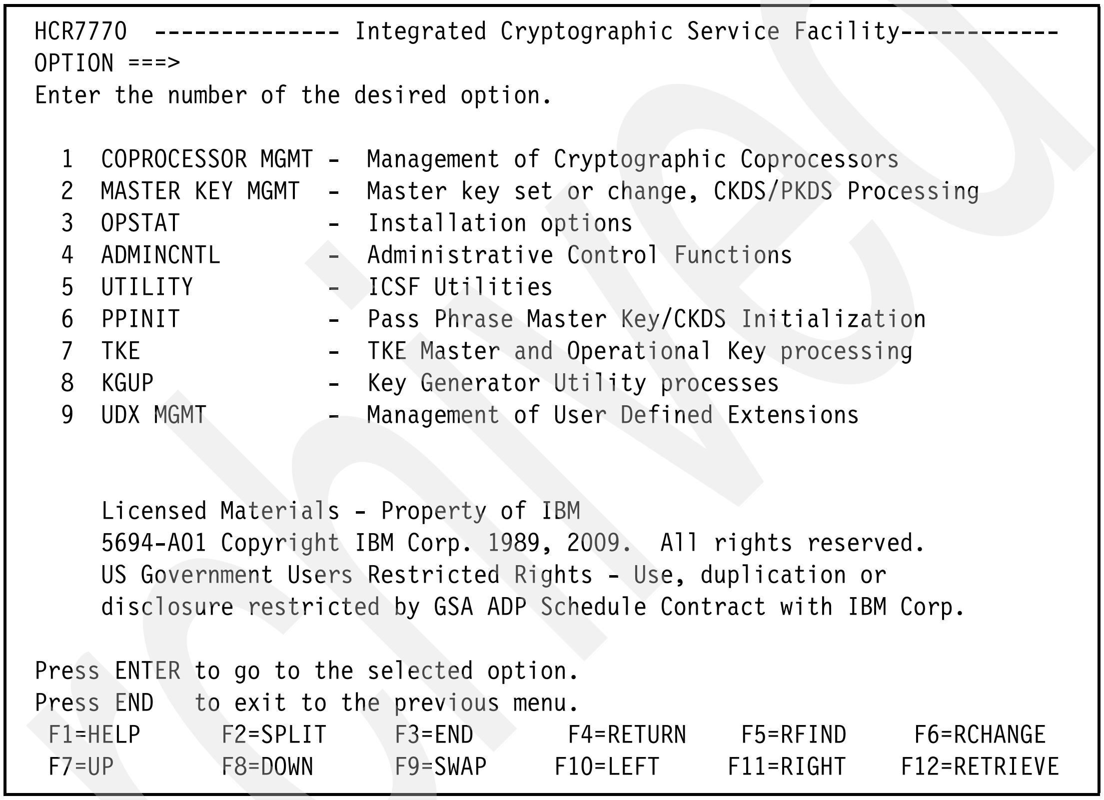
Select	Object Name	Status
●	Crypto- 00:A05	Completed
○	Crypto- 02:A05	Completed

Figure 9-24 SE: Config On/Off (Standby Completed)

9.3 Activating and deactivating cryptographic coprocessors using the Integrated Cryptographic Service Facility

Integrated Cryptographic Service Facility (ICSF) provides an ISPF Coprocessor Management panel where you can display or change the status, Active or Deactivate, of cryptographic coprocessors. This action only affects the coprocessor status of ICSF and has no effect on the Online/Standby hardware status displayed on the System z10 EC Support Element.

From the ICSF main menu, select Option 1 to open the ICSF Coprocessor Management panel (Figure 9-25).



```
HCR7770  ------------- Integrated Cryptographic Service Facility-----------
OPTION ===>
Enter the number of the desired option.

  1  COPROCESSOR MGMT -  Management of Cryptographic Coprocessors
  2  MASTER KEY MGMT  -  Master key set or change, CKDS/PKDS Processing
  3  OPSTAT           -  Installation options
  4  ADMINCNTL        -  Administrative Control Functions
  5  UTILITY          -  ICSF Utilities
  6  PPINIT           -  Pass Phrase Master Key/CKDS Initialization
  7  TKE              -  TKE Master and Operational Key processing
  8  KGUP             -  Key Generator Utility processes
  9  UDX MGMT         -  Management of User Defined Extensions


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     US Government Users Restricted Rights - Use, duplication or
     disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Press ENTER to go to the selected option.
Press END   to exit to the previous menu.
 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
```
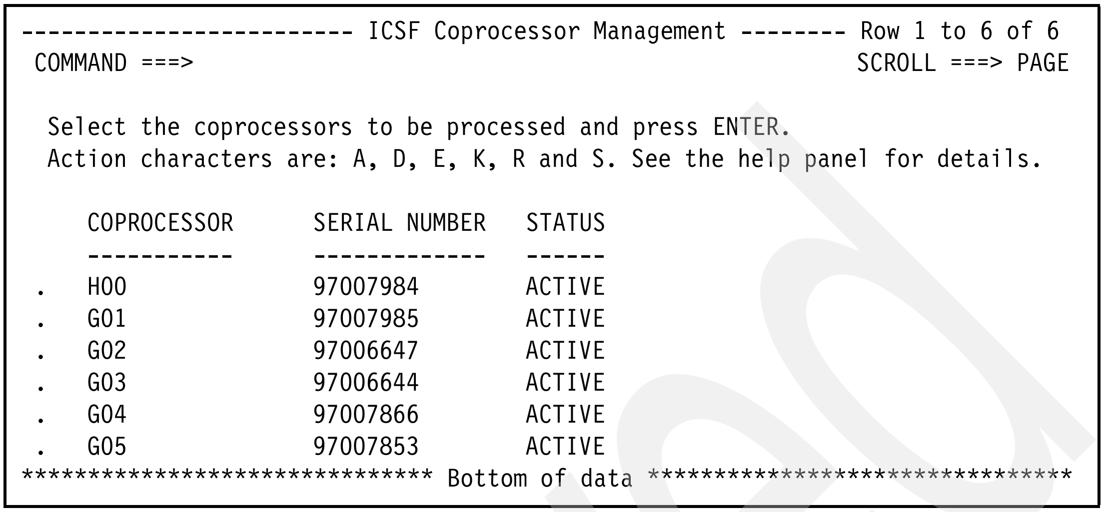

Figure 9-25 Integrated Cryptographic Service Facility main panel

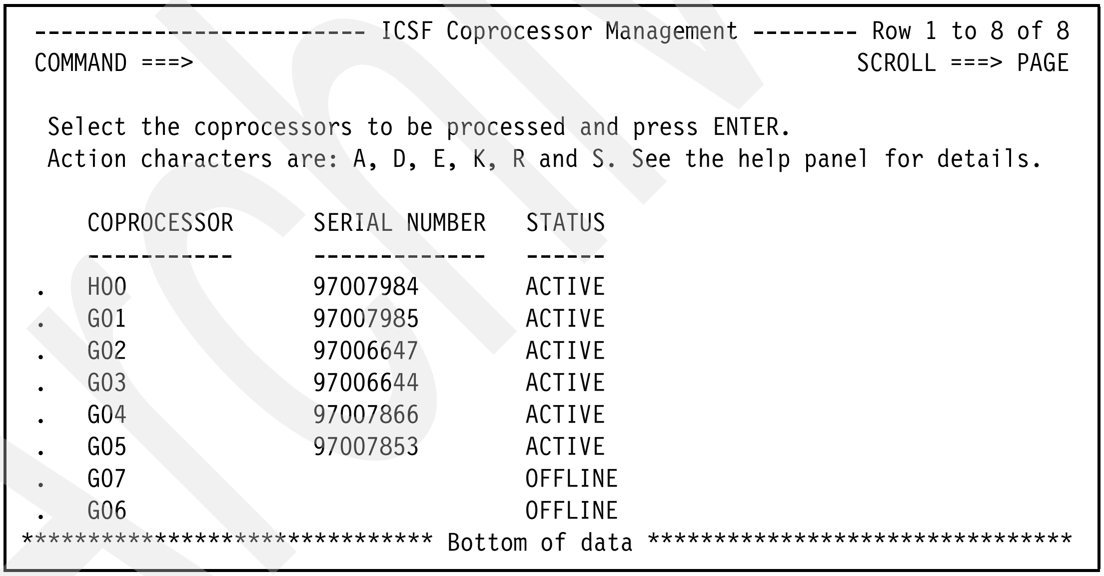
Cryptographic coprocessors that are currently configured on the partition are shown on the ICSF Coprocessor Management window (Figure 9-26).



```
------------------------- ICSF Coprocessor Management -------- Row 1 to 6 of 6
 COMMAND ===>                                                     SCROLL ===> PAGE

  Select the coprocessors to be processed and press ENTER.
  Action characters are: A, D, E, K, R and S. See the help panel for details.

     COPROCESSOR      SERIAL NUMBER   STATUS
     -----------      -------------   ------
 .   H00              97007984        ACTIVE
 .   G01              97007985        ACTIVE
 .   G02              97006647        ACTIVE
 .   G03              97006644        ACTIVE
 .   G04              97007866        ACTIVE
 .   G05              97007853        ACTIVE
******************************* Bottom of data ********************************
```

Figure 9-26 ICSF Coprocessor Management

When a coprocessor is configured off to the partition from the SE (Standby status), it is viewed Offline on the ICSF Coprocessor Management panel (Figure 9-27).



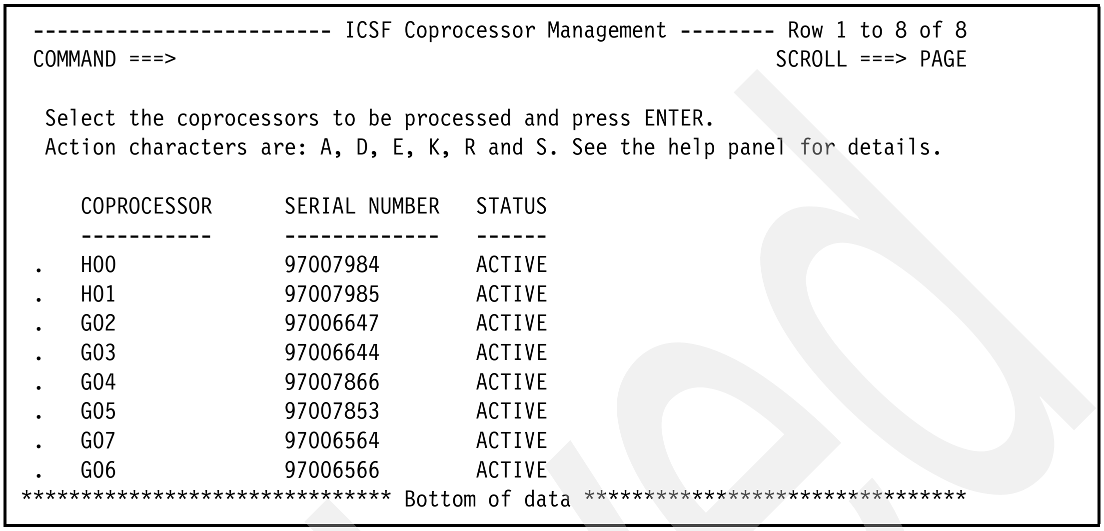
```
 ------------------------- ICSF Coprocessor Management -------- Row 1 to 8 of 8
 COMMAND ===>                                                     SCROLL ===> PAGE

  Select the coprocessors to be processed and press ENTER.
  Action characters are: A, D, E, K, R and S. See the help panel for details.

     COPROCESSOR      SERIAL NUMBER   STATUS
     -----------      -------------   ------
 .   H00              97007984        ACTIVE
 .   G01              97007985        ACTIVE
 .   G02              97006647        ACTIVE
 .   G03              97006644        ACTIVE
 .   G04              97007866        ACTIVE
 .   G05              97007853        ACTIVE
 .   G07                              OFFLINE
 .   G06                              OFFLINE
******************************* Bottom of data ********************************
```

Figure 9-27 ICSF Coprocessor Management (Candidate only - Standby)

A cryptographic coprocessor becomes visible to ICSF Coprocessor Management when the coprocessor number is part of the partition candidate list *and* the coprocessor is first brought online to the partition in either of these ways:

- At the time the partition is activated, if the coprocessor is installed and the coprocessor number is part of the partition Online list.
- When the coprocessor is first configured online to the partition using the Config On/Off task from the SE Workplace.

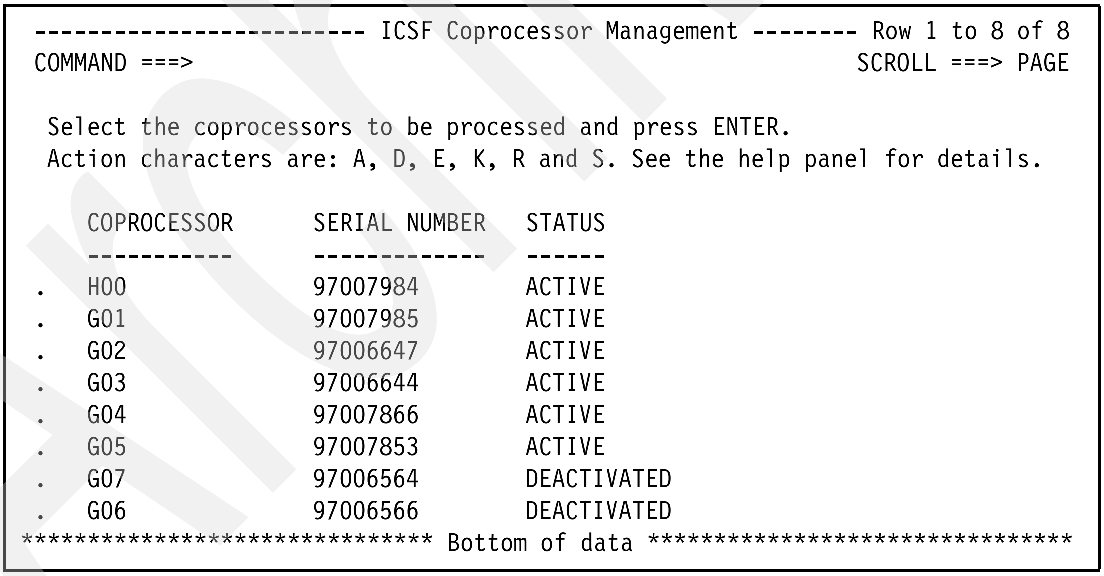
In the list shown in Figure 9-28, enter `A` or `D` to switch a coprocessor status to Active or Deactivated. When a coprocessor is deactivated through ICSF, shown in Figure 9-29, it cannot be used by applications running in that system image.



```
------------------------ ICSF Coprocessor Management -------- Row 1 to 8 of 8
COMMAND ===>                                                 SCROLL ===> PAGE

 Select the coprocessors to be processed and press ENTER.
 Action characters are: A, D, E, K, R and S. See the help panel for details.

    COPROCESSOR      SERIAL NUMBER   STATUS
    -----------      -------------   ------
.   H00              97007984        ACTIVE
.   H01              97007985        ACTIVE
.   G02              97006647        ACTIVE
.   G03              97006644        ACTIVE
.   G04              97007866        ACTIVE
.   G05              97007853        ACTIVE
.   G07              97006564        ACTIVE
.   G06              97006566        ACTIVE
******************************* Bottom of data ********************************
```

Figure 9-28 ICSF Coprocessor Management (Online)

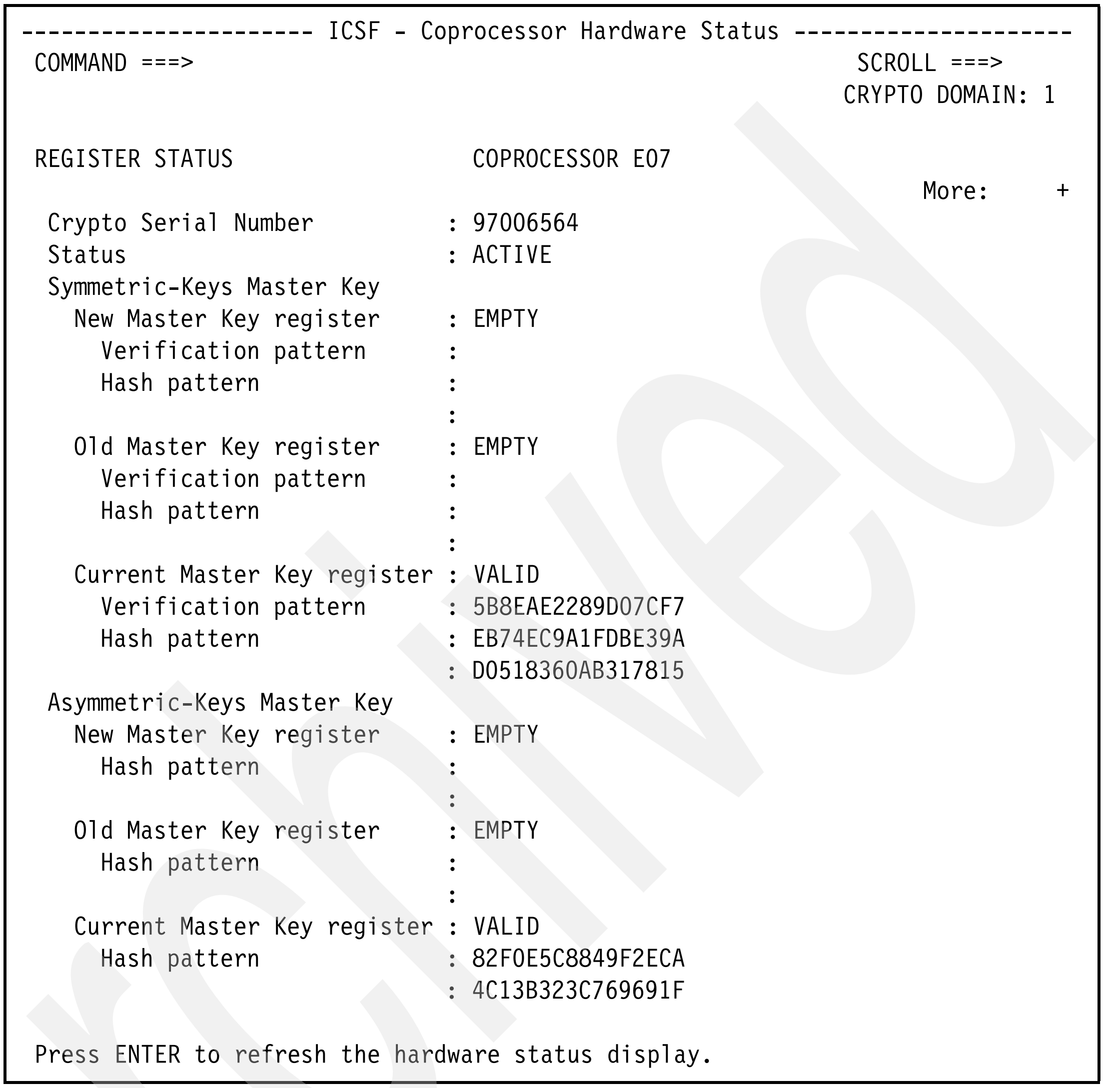
We recommend that you deactivate an *active* coprocessor from the ICSF Coprocessor Management panel before it is configured off from the Support Element. If you do not deactivate the coprocessor first, then some jobs may not be rerouted correctly.



```
------------------------ ICSF Coprocessor Management -------- Row 1 to 8 of 8
COMMAND ===>                                                 SCROLL ===> PAGE

 Select the coprocessors to be processed and press ENTER.
 Action characters are: A, D, E, K, R and S. See the help panel for details.

    COPROCESSOR      SERIAL NUMBER   STATUS
    -----------      -------------   ------
.   H00              97007984        ACTIVE
.   G01              97007985        ACTIVE
.   G02              97006647        ACTIVE
.   G03              97006644        ACTIVE
.   G04              97007866        ACTIVE
.   G05              97007853        ACTIVE
.   G07              97006564        DEACTIVATED
.   G06              97006566        DEACTIVATED
******************************* Bottom of data ********************************
```

Figure 9-29 ICSF Coprocessor Management (Deactivate)

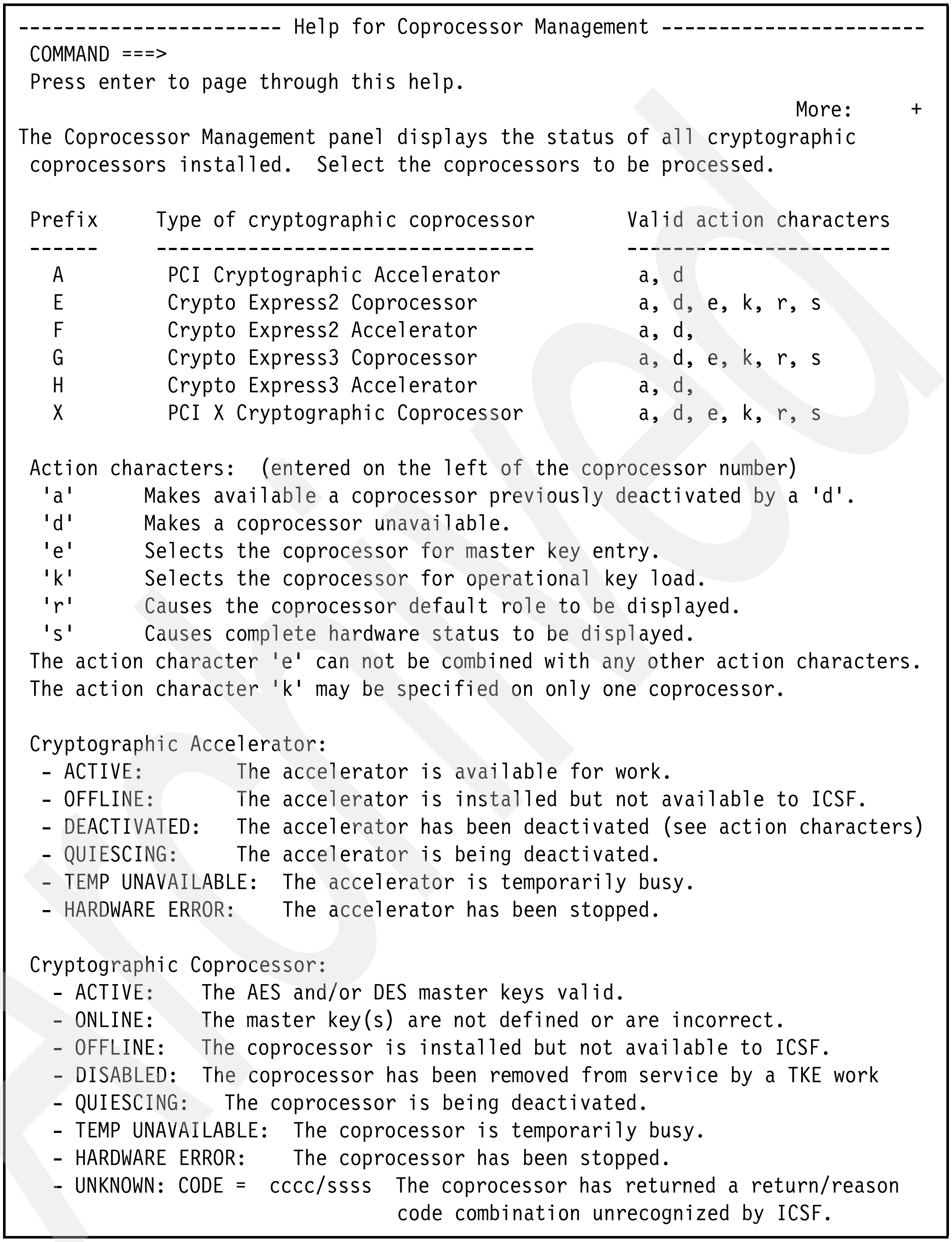
The Active/Deactivated status viewed from ICSF Coprocessor Management does not change the Online/Standby status set from the System z10 EC Support Element (Figure 9-30).



```
---------------------- ICSF - Coprocessor Hardware Status ---------------------
 COMMAND ===>                                                      SCROLL ===>
                                                                 CRYPTO DOMAIN: 1

 REGISTER STATUS                  COPROCESSOR E07
                                                                      More:     +
  Crypto Serial Number          : 97006564
  Status                        : ACTIVE
  Symmetric-Keys Master Key
    New Master Key register     : EMPTY
      Verification pattern      :
      Hash pattern              :
                                :
    Old Master Key register     : EMPTY
      Verification pattern      :
      Hash pattern              :
                                :
    Current Master Key register : VALID
      Verification pattern      : 5B8EAE2289D07CF7
      Hash pattern              : EB74EC9A1FDBE39A
                                : D0518360AB317815
  Asymmetric-Keys Master Key
    New Master Key register     : EMPTY
      Hash pattern              :
                                :
    Old Master Key register     : EMPTY
      Hash pattern              :
                                :
    Current Master Key register : VALID
      Hash pattern              : 82F0E5C8849F2ECA
                                : 4C13B323C769691F

 Press ENTER to refresh the hardware status display.
```

Figure 9-30 ICSF: Coprocessor Hardware Status

Help information from ICSF Coprocessor Management, shown in Figure 9-31, describes valid actions and status information for each type of cryptographic coprocessor.



```
----------------------- Help for Coprocessor Management -----------------------
 COMMAND ===>
 Press enter to page through this help.
                                                                  More:     +
The Coprocessor Management panel displays the status of all cryptographic
 coprocessors installed.  Select the coprocessors to be processed.

 Prefix     Type of cryptographic coprocessor       Valid action characters
 ------     ---------------------------------       -----------------------
   A         PCI Cryptographic Accelerator           a, d
   E         Crypto Express2 Coprocessor             a, d, e, k, r, s
   F         Crypto Express2 Accelerator             a, d,
   G         Crypto Express3 Coprocessor             a, d, e, k, r, s
   H         Crypto Express3 Accelerator             a, d,
   X         PCI X Cryptographic Coprocessor         a, d, e, k, r, s

 Action characters:  (entered on the left of the coprocessor number)
  'a'      Makes available a coprocessor previously deactivated by a 'd'.
  'd'      Makes a coprocessor unavailable.
  'e'      Selects the coprocessor for master key entry.
  'k'      Selects the coprocessor for operational key load.
  'r'      Causes the coprocessor default role to be displayed.
  's'      Causes complete hardware status to be displayed.
 The action character 'e' can not be combined with any other action characters.
 The action character 'k' may be specified on only one coprocessor.

 Cryptographic Accelerator:
  - ACTIVE:        The accelerator is available for work.
  - OFFLINE:       The accelerator is installed but not available to ICSF.
  - DEACTIVATED:   The accelerator has been deactivated (see action characters)
  - QUIESCING:     The accelerator is being deactivated.
  - TEMP UNAVAILABLE:  The accelerator is temporarily busy.
  - HARDWARE ERROR:    The accelerator has been stopped.

 Cryptographic Coprocessor:
   - ACTIVE:    The AES and/or DES master keys valid.
   - ONLINE:    The master key(s) are not defined or are incorrect.
   - OFFLINE:   The coprocessor is installed but not available to ICSF.
   - DISABLED:  The coprocessor has been removed from service by a TKE work
   - QUIESCING:   The coprocessor is being deactivated.
   - TEMP UNAVAILABLE:  The coprocessor is temporarily busy.
   - HARDWARE ERROR:    The coprocessor has been stopped.
   - UNKNOWN: CODE =  cccc/ssss  The coprocessor has returned a return/reason
                                 code combination unrecognized by ICSF.
```

Figure 9-31   ICSF Help for Coprocessor Management

10

Reserved logical partitions

In this chapter, we explain how to implement and use reserved logical partitions on the IBM zEnterprise 196.

We discuss the following topics:

- Introduction to reserved logical partitions
- Naming and activating a reserved logical partition
- Un-naming a logical partition
- Renaming a reserved logical partition

10.1 Introduction to reserved logical partitions

A logical partition can be named, given resources, and activated when needed. A logical partition can also be deactivated and unnamed, meaning it becomes a reserved logical partition. In addition, a logical partition can have its name changed. This can all be done without the need for a power-on reset (POR).

There are various reasons why a client may want to use reserved logical partitions. As the capacity of one server increases, there is an associated tendency for the number of logical partitions on the server to correspondingly increase. In this case, there might be a need, for example, to add a new z/OS image, to remove redundant z/OS images, or even consolidate logical partitions from multiple servers. All of these tasks can be performed without disrupting the operative logical partitions. The use of reserved logical partitions also includes logical partitions used as Coupling Facility images or Linux partitions.

The use of reserved logical partitions, in conjunction with concurrent book, memory, and channel upgrades, means that the need for a power-on reset of the z196 is kept to a minimum. This in turn means that the unnecessary downtime on active logical partitions is also reduced.

During the initial configuration setup of a processor, you have to plan for several hardware configuration definitions, including the logical partitions, channels, channel subsystems (CSSs), and Subchannel Sets (SSs). The reserved logical partitions also require extra space in the HSA. However, you are no longer required to plan for HSA growth due to additional definitions while planning for the z196.

> **Important:** On z196, a fixed amount (16 GB) is reserved for HSA storage size and is fenced off from customer purchased memory. When defining a z196 in HCD, the maximum numbers of logical partitions, channel subsystems, and subchannel sets are defined, and when the associated IOCDS is activated, HSA space is allocated for this configuration. This action relieves the user from planning considerations to reserve space for future partitions in the Input/Output Configuration Data Set (IOCDS) or to do a power-on-reset (POR) even if a new logical partition is needed.

The ability to use reserved logical partitions depends on certain prerequisite hardware and software requirements being in place before this function can be used. In addition, any Independent Software Vender (ISV) software that relies on the logical partition MIFID or partition ID might need to be updated.

10.2 Naming and activating a reserved logical partition

To activate a reserved logical partition, an HCD configuration change is required to assign a name to the logical partition. In addition, the Activation Profile for the new logical partition must be updated.

It is assumed that the z196 has sufficient resources for the new logical partition, which includes memory, channels, and CPs. The following steps are required to name and activate a reserved logical partition:

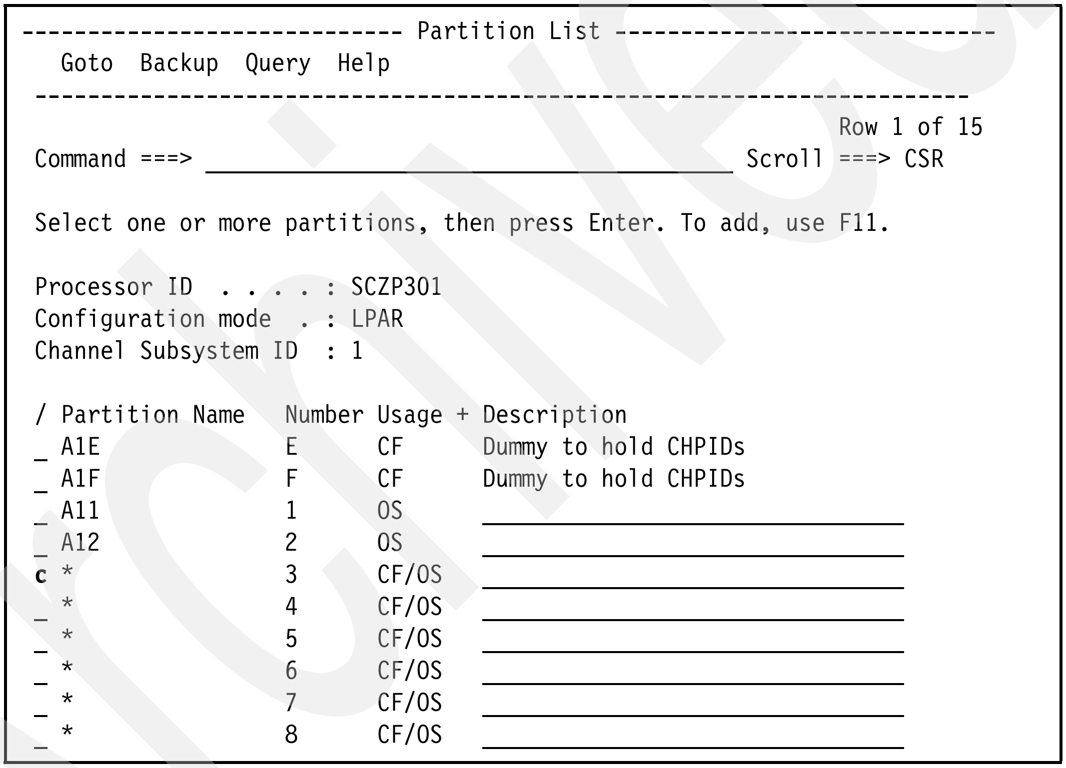
- Naming a reserved logical partition.
- Activating the configuration on the z196.
- Customizing the Activation Profile.

We discuss these tasks in more detail in the following sections.

10.2.1 Naming a reserved logical partition

To name the reserved logical partition, perform the following steps using HCD:

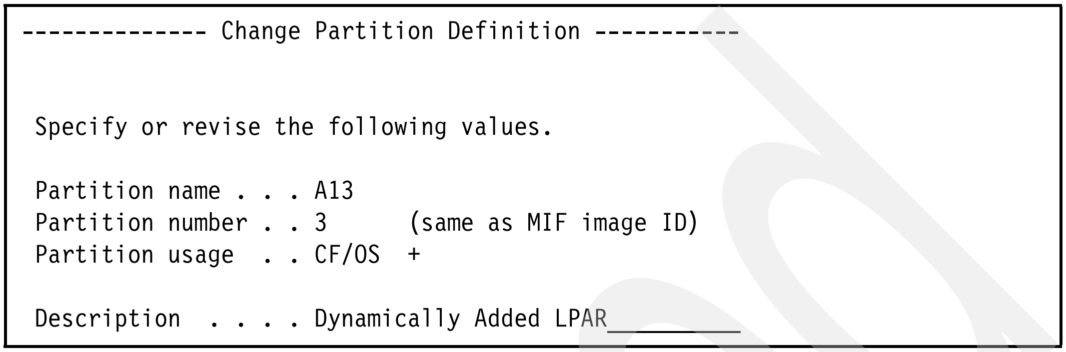
1. From the HCD primary menu, select Option 1. Define, modify, or view configuration data and then select Option 3. Processors to display the processor list. Select the processor that has the reserved logical partition you want to name and select the CSS from the channel subsystem list that contains the reserved logical partition that you want to name. This action displays the partition list for the selected CSS.
2. From the partition list, name the target reserved logical partition by using the Change (c) option. The example in Figure 10-1 shows that MIFID “3” in CSS ID 1 is reserved and that its name is displayed as “*”. HCD sometimes displays the MIFID as a partition number or just a number.



```
----------------------------- Partition List -----------------------------
   Goto  Backup  Query  Help
 ----------------------------------------------------------------------
                                                              Row 1 of 15
 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP301
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ A1E              E      CF      Dummy to hold CHPIDs
 _ A1F              F      CF      Dummy to hold CHPIDs
 _ A11              1      OS      ________________________________
 _ A12              2      OS      ________________________________
 c *                3      CF/OS   ________________________________
 _ *                4      CF/OS   ________________________________
 _ *                5      CF/OS   ________________________________
 _ *                6      CF/OS   ________________________________
 _ *                7      CF/OS   ________________________________
 _ *                8      CF/OS   ________________________________
```

Figure 10-1 HCD: Changing a reserved logical partition

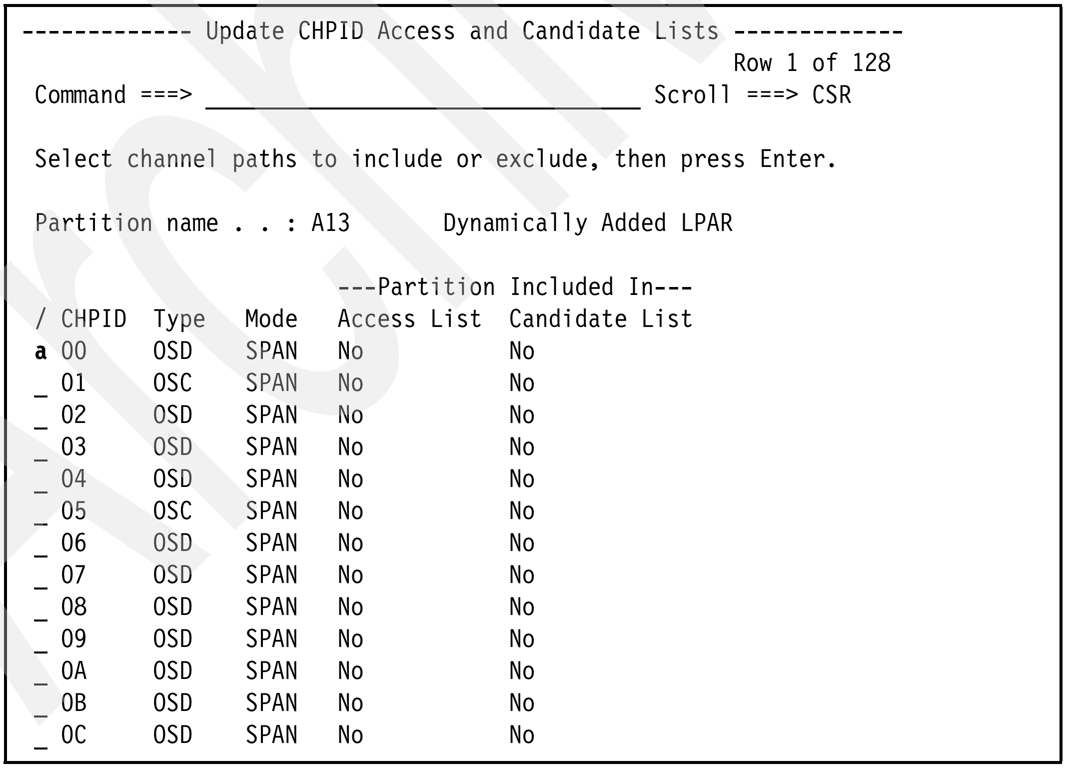
Figure 10-2 shows that the logical partition is given the new name A13. Remember that this name is in the IPL load member; we recommend using a name that conforms to your standard. Also remember that the partition number (MIF image ID) cannot change from what it was set to in the initial partition definition when this partition was created. This value already has been set during the power-on reset.



```
------------- Change Partition Definition -----------


 Specify or revise the following values.

 Partition name . . . A13
 Partition number . . 3      (same as MIF image ID)
 Partition usage  . . CF/OS  +

 Description  . . . . Dynamically Added LPAR__________
```

Figure 10-2 HCD: Naming to a reserved logical partition

3. Change Partition usage, if necessary.
4. Assign all channels required by the logical partition to access the devices it needs by using the Include in access list (a) option or by entering `YES` in the Access List column (Figure 10-3). All devices, except those with an explicit device candidate list, on the selected CHPIDs are available to the newly named logical partition.

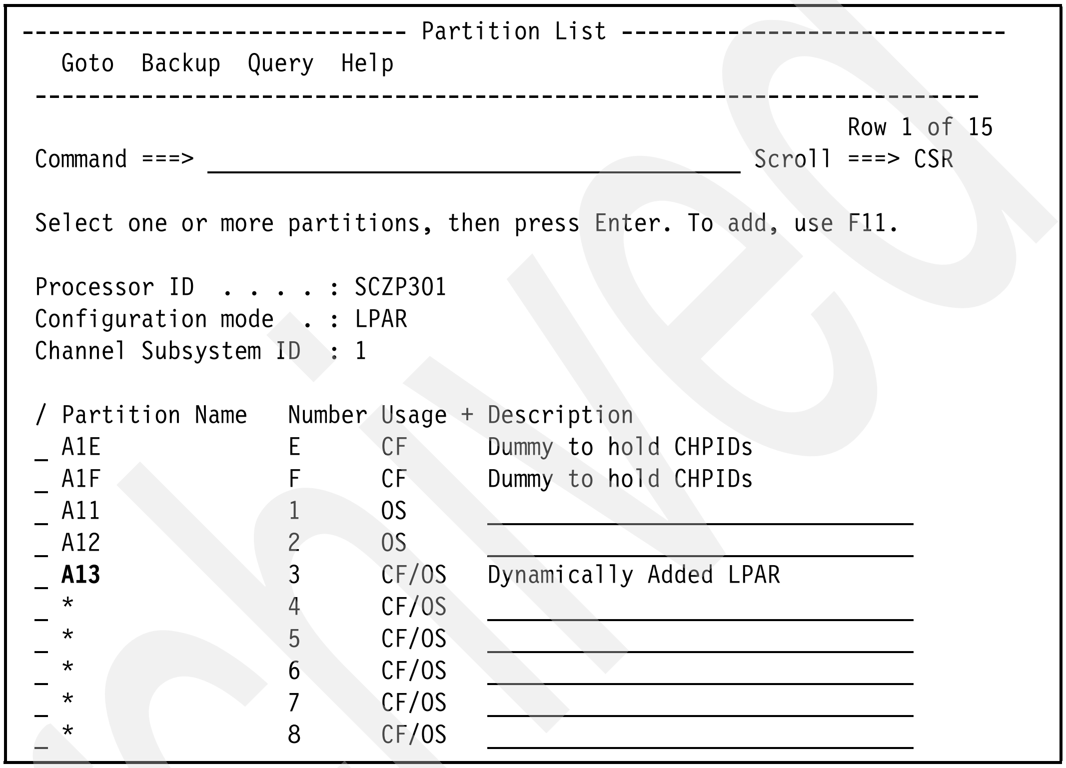


```
------------- Update CHPID Access and Candidate Lists -------------
                                                         Row 1 of 128
 Command ===> _________________________________ Scroll ===> CSR

 Select channel paths to include or exclude, then press Enter.

 Partition name . . : A13       Dynamically Added LPAR

                        ---Partition Included In---
 / CHPID  Type   Mode   Access List  Candidate List
 a 00     OSD    SPAN   No           No
 _ 01     OSC    SPAN   No           No
 _ 02     OSD    SPAN   No           No
 _ 03     OSD    SPAN   No           No
 _ 04     OSD    SPAN   No           No
 _ 05     OSC    SPAN   No           No
 _ 06     OSD    SPAN   No           No
 _ 07     OSD    SPAN   No           No
 _ 08     OSD    SPAN   No           No
 _ 09     OSD    SPAN   No           No
 _ 0A     OSD    SPAN   No           No
 _ 0B     OSD    SPAN   No           No
 _ 0C     OSD    SPAN   No           No
```

Figure 10-3 HCD: Update CHPID to new named logical partition

You might need to take additional steps to define devices such as CTC and Coupling links, including InfiniBand (CIB). An operating system configuration might have to be created if you using a different one from those already defined. Remember to ensure that devices like disk subsystems have sufficient logical channel connections to support the new logical partition I/O activity.

5. If you have channels that you do not want to connected to the newly named logical partition, those channels must have their candidate lists updated to exclude the newly named logical partition. If some devices already have candidate lists, the new logical partition is not included in that candidate list.
6. Your partition is now named and has all its necessary resources defined from an HCD perspective (Figure 10-4). At this point, a production IODF can be built.



```
----------------------------- Partition List -----------------------------
   Goto  Backup  Query  Help
 ------------------------------------------------------------------------
                                                              Row 1 of 15
 Command ===> ________________________________________ Scroll ===> CSR

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

 Processor ID  . . . . : SCZP301
 Configuration mode  . : LPAR
 Channel Subsystem ID  : 1

 / Partition Name   Number Usage + Description
 _ A1E              E      CF      Dummy to hold CHPIDs
 _ A1F              F      CF      Dummy to hold CHPIDs
 _ A11              1      OS      ________________________________
 _ A12              2      OS      ________________________________
 _ A13              3      CF/OS   Dynamically Added LPAR
 _ *                4      CF/OS   ________________________________
 _ *                5      CF/OS   ________________________________
 _ *                6      CF/OS   ________________________________
 _ *                7      CF/OS   ________________________________
 _ *                8      CF/OS   ________________________________
```

Figure 10-4 HCD: Partition List with new named logical partition

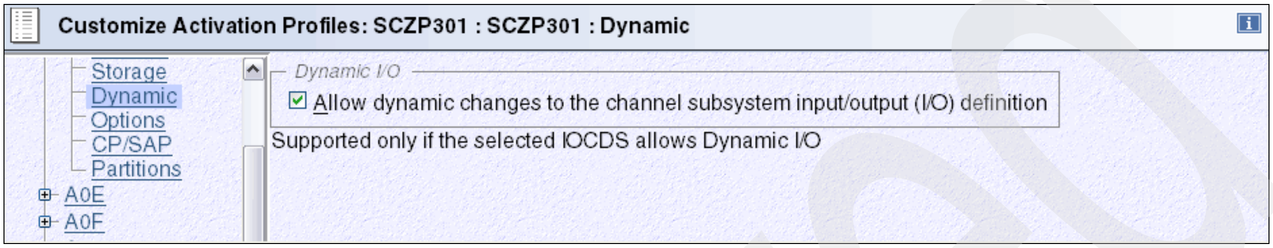
10.2.2 Activating the configuration on the z196

This section explains how to dynamically activate the production IODF to the processor and the systems running on it. For more information, see the *Hardware Configuration Definition User's Guide*, SC33-7988.

Checking the definition for IODF dynamic change

Perform the following steps:

1. Before dynamically activating the production IODF that contains the definition of the newly named logical partition, you have to verify that the processor is enabled for dynamic activation. From the Dynamic section in the activation profile of the CPC on the HMC application, verify that the **Allow dynamic I/O changes to the channel subsystem I/O definition** option is checked. This option *must* have already been enabled before the last power-on reset of the z196 (Figure 10-5). If this is not the case, a power-on reset is needed to change the reserved logical partition to a named logical partition.



Customize Activation Profiles: SCZP301 : SCZP301 : Dynamic

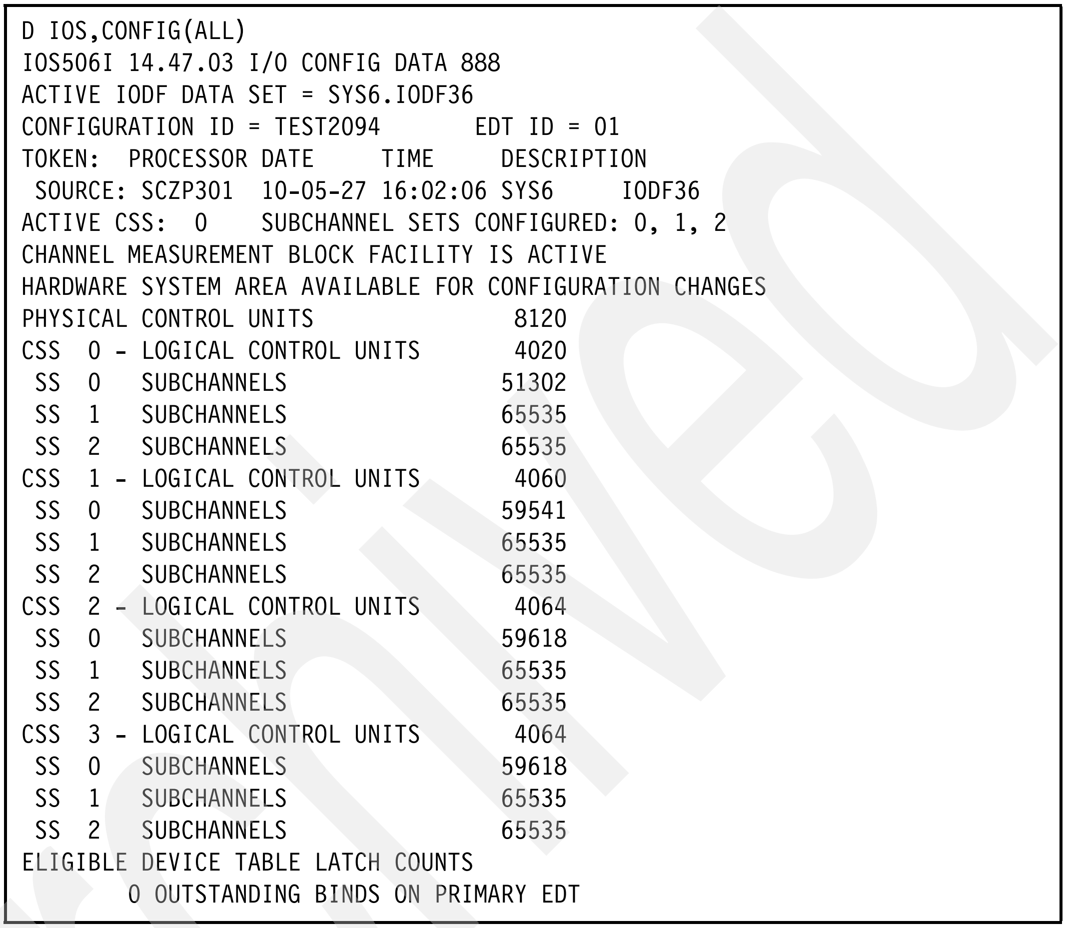
☑ Allow dynamic changes to the channel subsystem input/output (I/O) definition

Supported only if the selected IOCDS allows Dynamic I/O

Figure 10-5 HMC: Dynamic section in reset profile

2. Check that the z/OS system supports the command to activate the new configuration dynamically. This command is issued through HCD or as a z/OS `activate` command. This function is supported in z/OS V1.6, so when that command is issued in the system running on z196 for which z/OS V1.7 or above is required, the software requirement should be already satisfied.

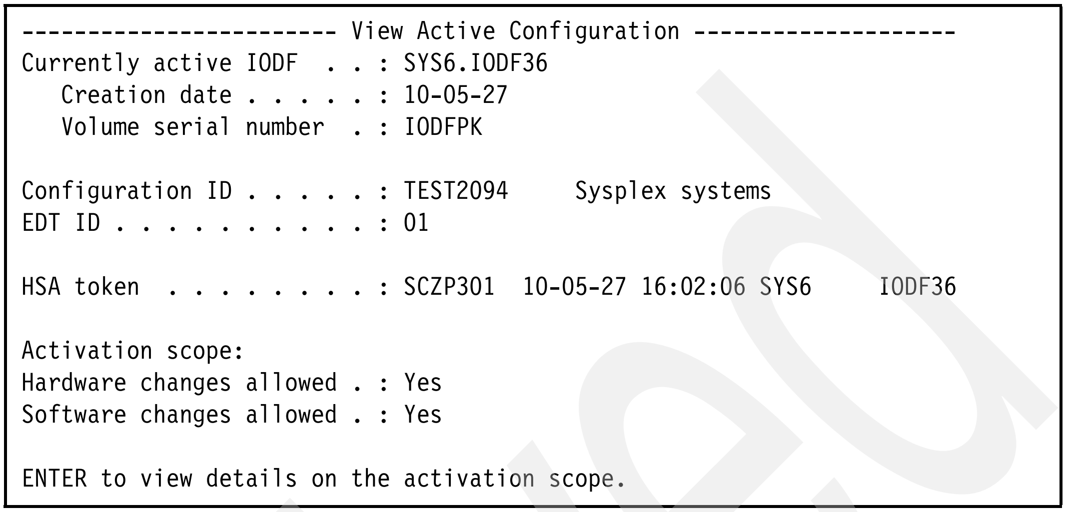
3. Before issuing the **`activate`** command, be sure to verify that full software and hardware activation can be done. From a system console, issue the **`d ios,config(all)`** z/OS command. You should see a panel similar to the one in Figure 10-6. This panel shows that the source IODF and the active IODF are the same (SYS6.IODF36); therefore, a full activation can be done.



```
D IOS,CONFIG(ALL)
IOS506I 14.47.03 I/O CONFIG DATA 888
ACTIVE IODF DATA SET = SYS6.IODF36
CONFIGURATION ID = TEST2094       EDT ID = 01
TOKEN:  PROCESSOR DATE     TIME     DESCRIPTION
 SOURCE: SCZP301  10-05-27 16:02:06 SYS6     IODF36
ACTIVE CSS:  0    SUBCHANNEL SETS CONFIGURED: 0, 1, 2
CHANNEL MEASUREMENT BLOCK FACILITY IS ACTIVE
HARDWARE SYSTEM AREA AVAILABLE FOR CONFIGURATION CHANGES
PHYSICAL CONTROL UNITS              8120
CSS  0 - LOGICAL CONTROL UNITS       4020
 SS  0   SUBCHANNELS                51302
 SS  1   SUBCHANNELS                65535
 SS  2   SUBCHANNELS                65535
CSS  1 - LOGICAL CONTROL UNITS       4060
 SS  0   SUBCHANNELS                59541
 SS  1   SUBCHANNELS                65535
 SS  2   SUBCHANNELS                65535
CSS  2 - LOGICAL CONTROL UNITS       4064
 SS  0   SUBCHANNELS                59618
 SS  1   SUBCHANNELS                65535
 SS  2   SUBCHANNELS                65535
CSS  3 - LOGICAL CONTROL UNITS       4064
 SS  0   SUBCHANNELS                59618
 SS  1   SUBCHANNELS                65535
 SS  2   SUBCHANNELS                65535
ELIGIBLE DEVICE TABLE LATCH COUNTS
        0 OUTSTANDING BINDS ON PRIMARY EDT
```

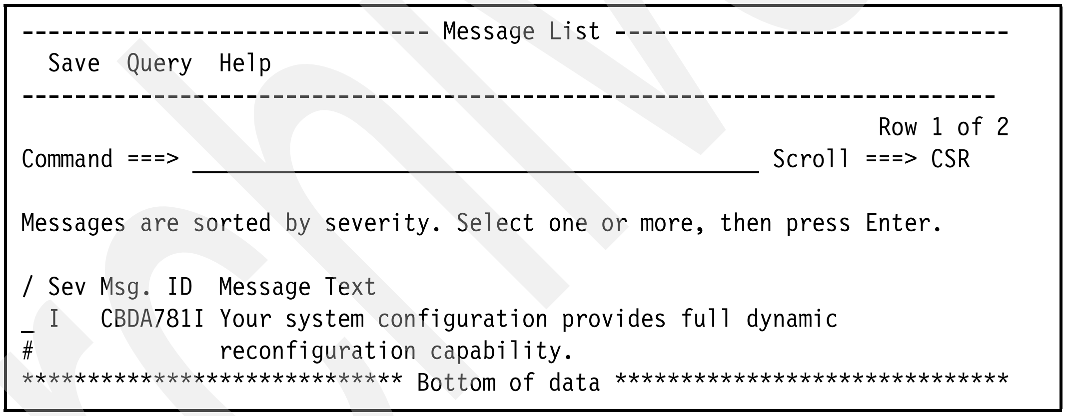
Figure 10-6 Display IOS,CONFIG output

4. You can also use the HCD Activate or process configuration data → View active configuration option to verify that a full activation can be performed (Figure 10-7). Using this option displays the CBDA781I message (Figure 10-8).



```
----------------------- View Active Configuration --------------------
Currently active IODF  . . : SYS6.IODF36
   Creation date . . . . . : 10-05-27
   Volume serial number  . : IODFPK

Configuration ID . . . . . : TEST2094     Sysplex systems
EDT ID . . . . . . . . . . : 01

HSA token  . . . . . . . . : SCZP301  10-05-27 16:02:06 SYS6     IODF36

Activation scope:
Hardware changes allowed . : Yes
Software changes allowed . : Yes

ENTER to view details on the activation scope.
```

Figure 10-7 HCD: View Active Configuration



```
------------------------------ Message List ------------------------------
  Save  Query  Help
--------------------------------------------------------------------------
                                                                 Row 1 of 2
Command ===> ___________________________________________ Scroll ===> CSR

Messages are sorted by severity. Select one or more, then press Enter.

/ Sev Msg. ID  Message Text
_ I   CBDA781I Your system configuration provides full dynamic
#              reconfiguration capability.
**************************** Bottom of data ******************************
```

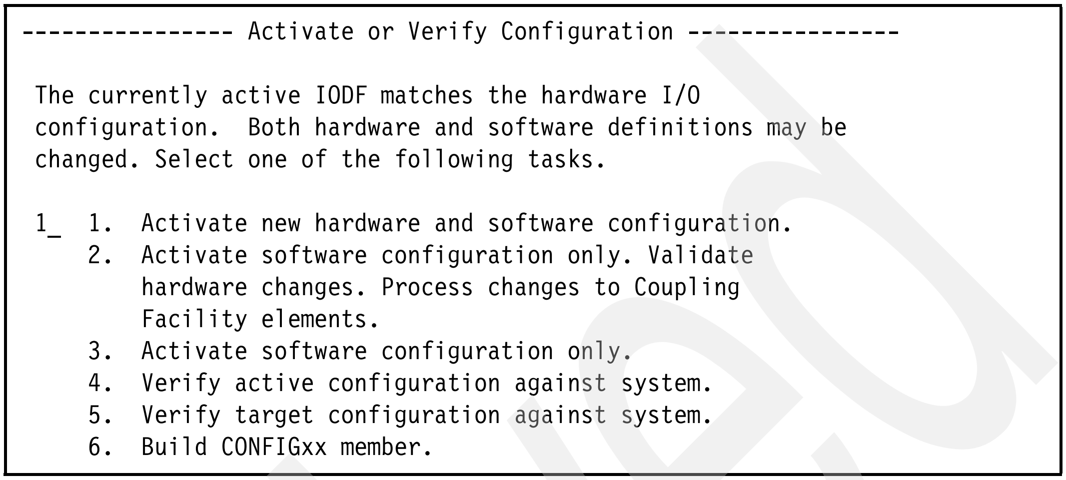
Figure 10-8 HCD: Display message for View Active Configuration

Activating a new IODF

After verification of the current definition, the new configuration can be activated dynamically. Watch for error messages and correct any errors that occur. The dynamic activation can be performed either by using the z/OS **`activate`** command or by HCD.

Perform the following steps:

1. In HCD, select Option 2. Activate or process configuration data, and then select Option 6. Activate or verify configuration dynamically. Next, select Option 1. Activate new hardware and software configuration, which allows you to do a full dynamic activation (Figure 10-9).

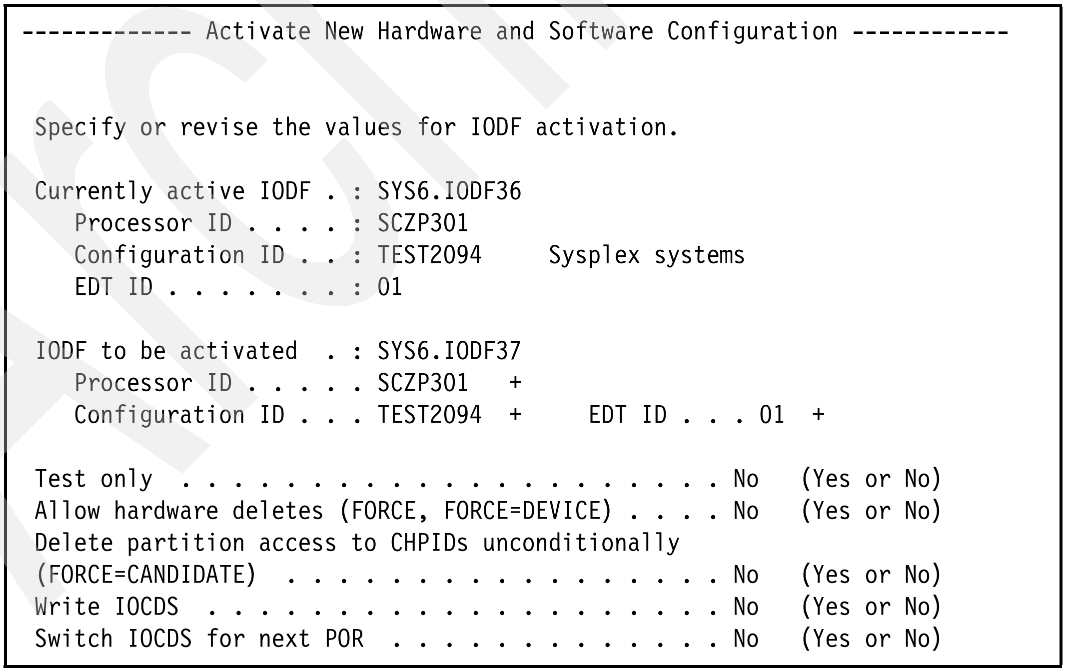


```
---------------- Activate or Verify Configuration ----------------

 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_  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.
```

Figure 10-9 HCD: Activate or Verify Configuration window

2. Verify that the new production IODF can be successfully activated. You can accomplish this task by setting the Test only option to `Yes` in HCD or by using the **`activate iodf=xx,test`** z/OS command.

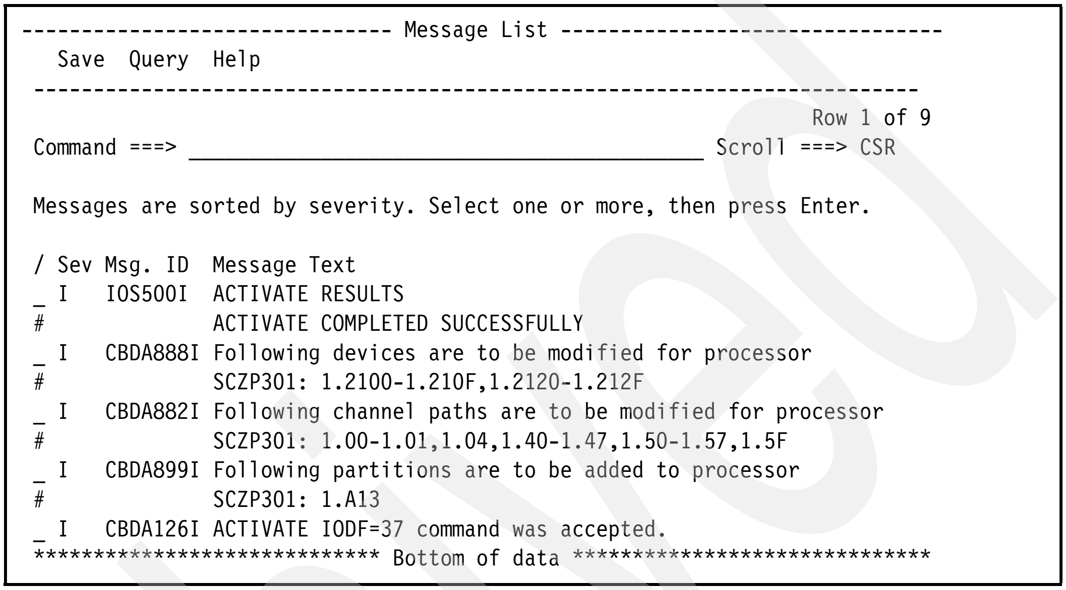
3. To activate the configuration, change the Test only option to `No`, so the new hardware and software configuration is activated at the same time (Figure 10-10).



```
------------- Activate New Hardware and Software Configuration ------------


 Specify or revise the values for IODF activation.

 Currently active IODF . : SYS6.IODF36
    Processor ID . . . . : SCZP301
    Configuration ID . . : TEST2094     Sysplex systems
    EDT ID . . . . . . . : 01

 IODF to be activated  . : SYS6.IODF37
    Processor ID . . . . . SCZP301   +
    Configuration ID . . . TEST2094  +     EDT ID . . . 01  +

 Test only  . . . . . . . . . . . . . . . . . . . . . . No   (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 10-10 HCD: Activate new IODF

4. Check all messages in the resulting panel (Figure 10-11), and verify that the dynamic activation completed successfully. Note that the action performed by this HCD panel is the same as issuing the **`activate iodf=xx`** z/OS command.
5. Confirm the current active IODF by using the View active configuration option in HCD or the **`d ios,config`** z/OS command. Now you can view the newly defined logical partition name in the contents of the CPC when you log into the HMC.



```
------------------------------- Message List --------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                  Row 1 of 9
 Command ===> ___________________________________________ Scroll ===> CSR

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 _ I   IOS500I  ACTIVATE RESULTS
 #              ACTIVATE COMPLETED SUCCESSFULLY
 _ I   CBDA888I Following devices are to be modified for processor
 #              SCZP301: 1.2100-1.210F,1.2120-1.212F
 _ I   CBDA882I Following channel paths are to be modified for processor
 #              SCZP301: 1.00-1.01,1.04,1.40-1.47,1.50-1.57,1.5F
 _ I   CBDA899I Following partitions are to be added to processor
 #              SCZP301: 1.A13
 _ I   CBDA126I ACTIVATE IODF=37 command was accepted.
 ***************************** Bottom of data ******************************
```

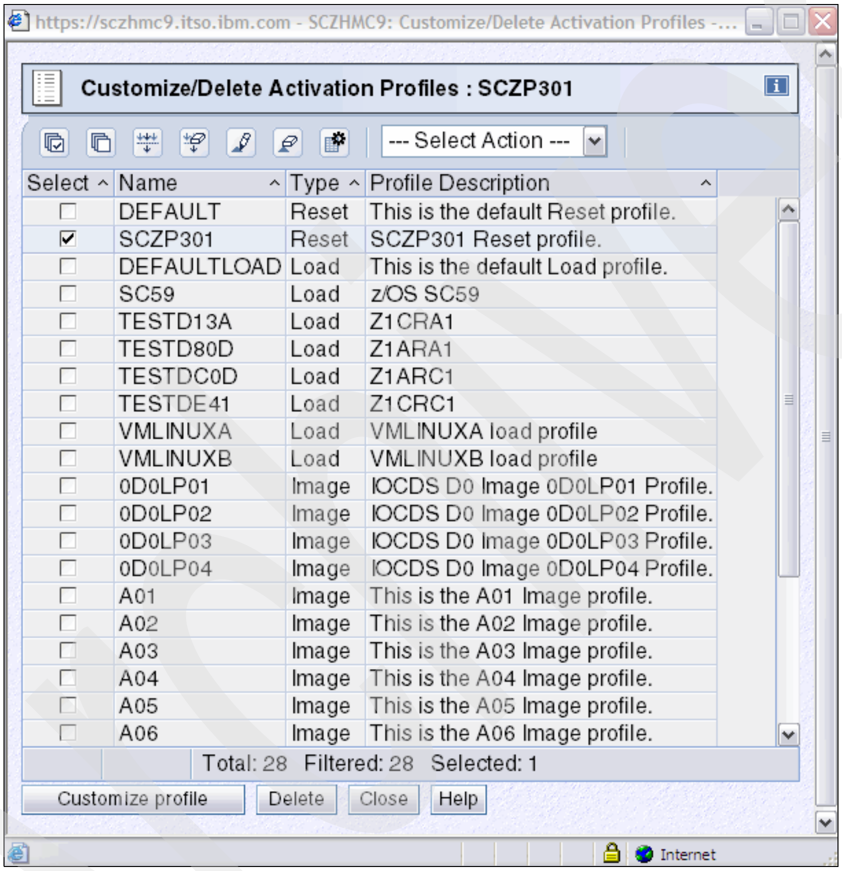
Figure 10-11   HCD: Activate new IODF message

6. Install a new IOCDS to the z196 and make it the active IOCDS on the server for the next POR. From HCD, select Option 2. Activate or process configuration data, and then select Option 11. Build and manage S/390 microprocessor IOCDSs and IPL attributes to update the new IOCDS into the HSA token slot and switch the active IOCDS. This operation enables you to use the new IOCDS, which contains the newly named logical partition, for the next POR.

10.2.3 Customizing the Activation Profile

To customize the Activation Profile for the new named logical partition, from the HMC, select the **Customize/Delete Activation Profile** for the server that contains the newly named logical partition. Select the desired reset profile and click **Customize** (Figure 10-12).

After you are in the reset profile, select the new IOCDS that was written to the server in the General page. A window opens, asking if you want to maintain the logical partition activation order in the Partitions page. Remember to verify the activation order of the Coupling Facility partitions on the server if you do update the activation order. Failure to do so may cause Coupling Facility partitions to activate after partitions running in other modes. This could lead to operating systems entering a disabled wait state.



Select	Name	Type	Profile Description
☐	DEFAULT	Reset	This is the default Reset profile.
☑	SCZP301	Reset	SCZP301 Reset profile.
☐	DEFAULTLOAD	Load	This is the default Load profile.
☐	SC59	Load	z/OS SC59
☐	TESTD13A	Load	Z1CRA1
☐	TESTD80D	Load	Z1ARA1
☐	TESTDC0D	Load	Z1ARC1
☐	TESTDE41	Load	Z1CRC1
☐	VMLINUXA	Load	VMLINUXA load profile
☐	VMLINUXB	Load	VMLINUXB load profile
☐	0D0LP01	Image	IOCDS D0 Image 0D0LP01 Profile.
☐	0D0LP02	Image	IOCDS D0 Image 0D0LP02 Profile.
☐	0D0LP03	Image	IOCDS D0 Image 0D0LP03 Profile.
☐	0D0LP04	Image	IOCDS D0 Image 0D0LP04 Profile.
☐	A01	Image	This is the A01 Image profile.
☐	A02	Image	This is the A02 Image profile.
☐	A03	Image	This is the A03 Image profile.
☐	A04	Image	This is the A04 Image profile.
☐	A05	Image	This is the A05 Image profile.
☐	A06	Image	This is the A06 Image profile.

Total: 28 Filtered: 28 Selected: 1

Figure 10-12 HMC: Customize/Delete Activation Profile

Defining the image profile to the new logical partition

You are now ready to define all the necessary resources to the new logical partition. After activating the production IODF that contained the newly named logical partition, you can view that logical partition from the HMC. You now have to build the image profile for that partition. For more information about the definitions in the image profile, see *Processor Resource/Systems Manager™ Planning Guide*, SB10-7153.

To create the image profile for a new logical partition, click the **Customize/Delete Activation Profiles** task in the Operational Customization menu in the HMC. Click **Customize selected profile** after selecting an existing image profile, or click the **Image profile wizard**. Define the values for the new logical partition.

Details about the definition values, organized by page, are in the following sections.

General page

Here are the details about the definition values for the General page:

- Partition identifier

  You can assign a partition identifier to the new logical partition. This is defined by a hex value representing a maximum 60 (decimal) logical partitions; valid identifiers for LPARs are X'00' through X'3F'. The LPAR identifier must be unique for each active LPAR. Remember to use an unassigned value that is not in use by any other partition. If the new logical partition is to be used as a Coupling Facility, the partition ID is important when defining or updating the CFRM policy. We recommend the partition ID be a concatenation of CSSID and MIFID. For this example, our LP is MIFID 3 in CSS 1, so the partition ID would be X'13'.

- Operation mode

  You can define how this partition is to be used. The mode of an LPAR, depending on the model, can be ESA/390, ESA/390 TPF, Linux-Only, z/VM, or Coupling Facility. The mode of an LPAR must support the mode of the control program loaded into it. ESA/390 LPARs support ESA/390 control programs, Coupling Facility LPARs support the coupling facility control code, z/VM LPARs support z/VM, and Linux-Only LPARs support Linux or z/VM.

  Note: zAAPs and zIIPs can be defined to ESA/390 or z/VM mode image. However, zAAPs and zIIPs are supported only by z/OS. Other operating systems cannot use zAAPs or zIIPs, even if they are defined to the logical partition. z/VM V5.3 can provide zAAPs or zIIPs to a guest z/OS.

- Clock type assignment

  The clock value allows you to use an External Time Reference (ETR) such as a Sysplex Timer and Server Time Protocol (STP), or an internal TOD clock if this is a stand-alone server. You can also set an offset value to the STP or ETR clock here if you want by selecting the **Logical partition time offset**.

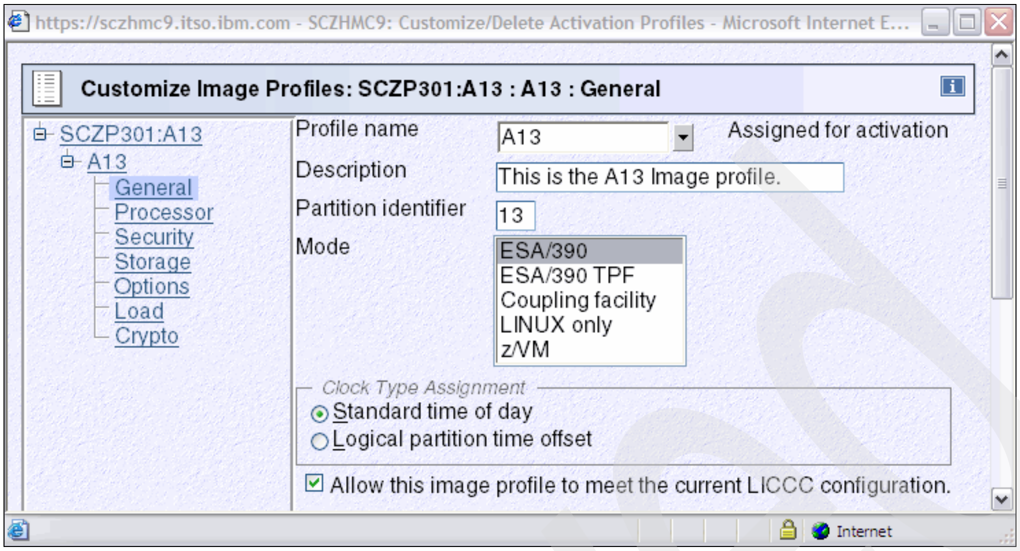
  When this option is selected, another option (Time Offset) is added to the logical partition activation profile. You can set the logical partition time either ahead of or behind your ETR time by selecting the appropriate option.

  Note: z196 does not support ETR.

  It is possible to have a z196 server as a Stratum 2 or Stratum 3 server in a Mixed CTN as long as there are at least two z10s or z9s attached to the Sysplex Timer operating as Stratum 1 servers.

  Two Stratum 1 servers are recommended, but not required to provide redundancy and avoid a single point of failure.

Figure 10-13 shows the General page.



Customize Image Profiles: SCZP301:A13 : A13 : General

Profile name: A13 ▾ Assigned for activation

Description: This is the A13 Image profile.

Partition identifier: 13

Mode: ESA/390 (selected); ESA/390 TPF; Coupling facility; LINUX only; z/VM

Clock Type Assignment

● Standard time of day

○ Logical partition time offset

☑ Allow this image profile to meet the current LICCC configuration.

Figure 10-13 HMC: General page in Image Profile

Processor page

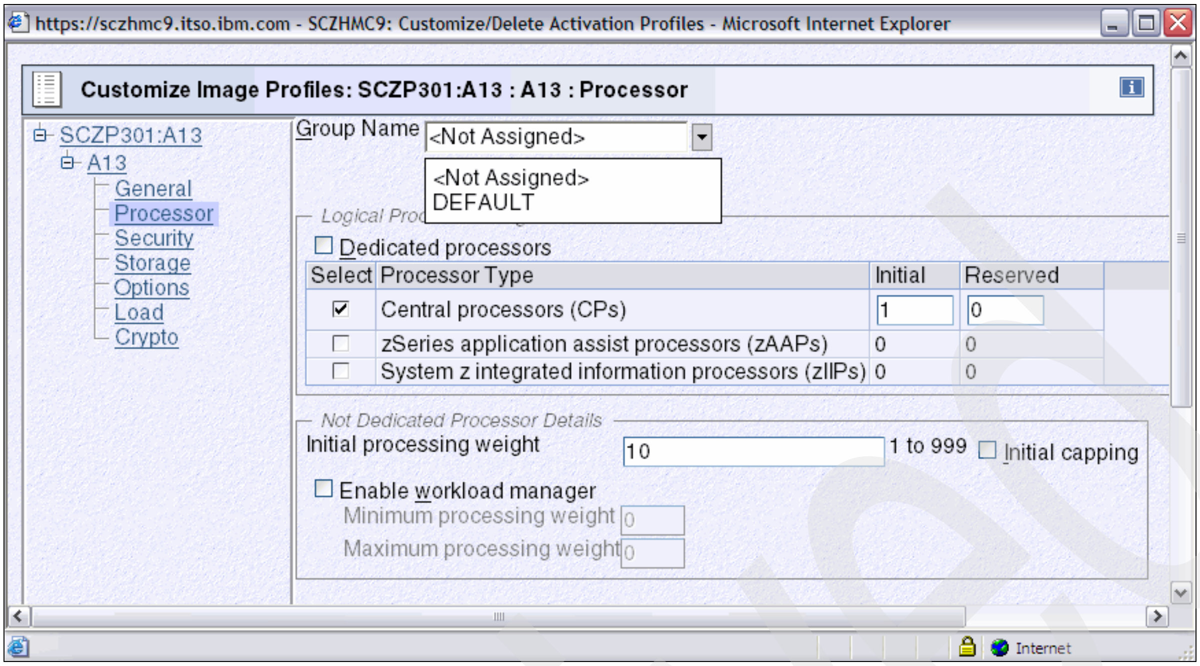
The Processor page in the image profile is where you specify the new logical partition CP assignment. The items that are selectable on this page change depending on the mode of the LPAR selected on the General page:

- Logical Processor Assignments

  Figure 10-14 on page 490 shows a sample page for an ESA/390 mode logical partition. You must set the initial and reserved number of CPs, zAAPs, and zIIPs. *Initial* refers to how many processors come online when an IPL is performed on a logical partition; *Reserved* refers to how many processors can be configured online while the system is running. This value also allows for future upgrades and can be set to more than what is physically available in the server. That way, when extra processors are enabled, they can be configured online and used immediately.

- Not Dedicated Processor Details

  If you operate this logical partition with *shared* processors (the box next to Dedicated processors in the Logical Processor Assignments section is *not* checked), then you need to set the processing weight and, if needed, the initial capping value and the Workload Manager values. Then, consider the impact on the systems working in other logical partitions on the same processor. The effective capacity for a processor might decrease because the cost to manage logical partitions becomes larger for PR/SM. We recommend that you estimate the capacity using the zPCR tool before defining processor resources, including the weight value. You can obtain this tool from IBM. For more details, refer to TechDocs *Getting Started with zPCR (IBM Processor Capacity Reference)*, Doc:PRS689.


https://sczhmc9.itso.ibm.com - SCZHMC9: Customize/Delete Activation Profiles - Microsoft Internet Explorer

Customize Image Profiles: SCZP301:A13 : A13 : Processor

- SCZP301:A13
  - A13
    - General
    - Processor
    - Security
    - Storage
    - Options
    - Load
    - Crypto

Group Name <Not Assigned>

<Not Assigned>
DEFAULT

Logical Proc

☐ Dedicated processors

Select	Processor Type	Initial	Reserved
☑	Central processors (CPs)	1	0
☐	zSeries application assist processors (zAAPs)	0	0
☐	System z integrated information processors (zIIPs)	0	0

Not Dedicated Processor Details

Initial processing weight 10 1 to 999 ☐ Initial capping

☐ Enable workload manager

Minimum processing weight 0

Maximum processing weight 0

Figure 10-14 HMC Processor page in image profile

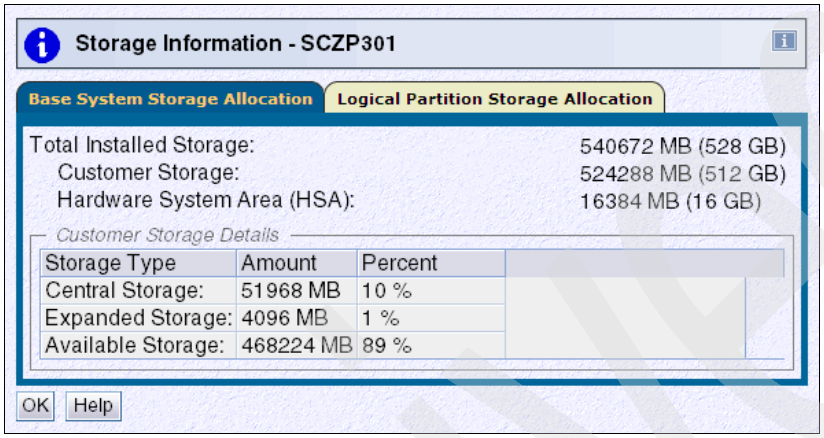
Security page

The Security settings determine the level of interlogical partition action that takes place. These values are unique to each client, but generally the first two options are always selected, namely **Global performance data control** and **Input/Output configuration control**.

For greater partition isolation, the other two options, **Cross partition authority** and **Logical partition isolation**, may be selected.

Storage page

Depending on the hardware model, the z196 can support a minimum of 32 GB to a maximum of 3 TB of memory for customer use. Before activating the new logical partition, you have to confirm the size of available storage to assign to the new logical partition. Use the **Storage Information** task in CPC Operational Customization from the Support Element (SE) to determine the available memory (Figure 10-15). This task also shows that the Hardware System Area (HSA) size is a fixed value (16384 MB/16 GB). The sum of main and expanded storage that you define in the image profile must be set to a value smaller than the amount of available storage, as shown in the Storage Information window.



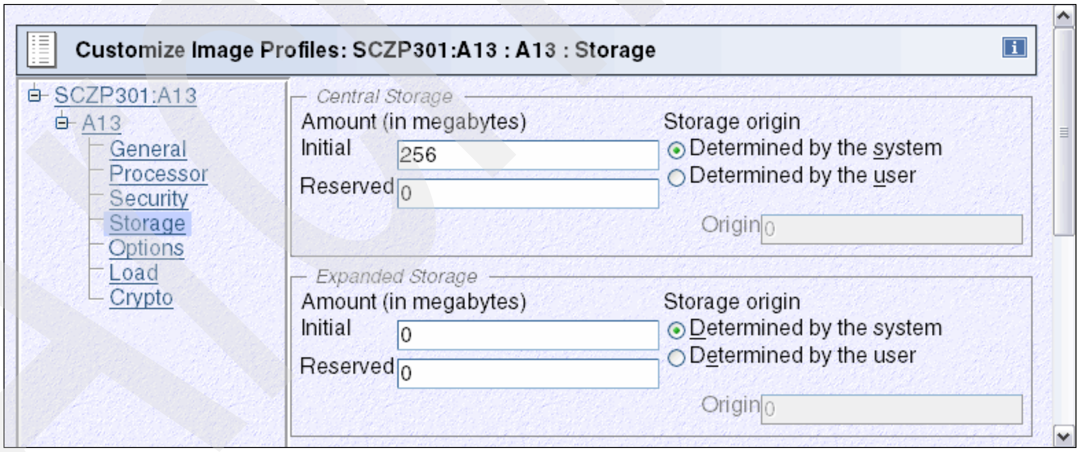
Total Installed Storage:	540672 MB (528 GB)
Customer Storage:	524288 MB (512 GB)
Hardware System Area (HSA):	16384 MB (16 GB)

Customer Storage Details

Storage Type	Amount	Percent
Central Storage:	51968 MB	10 %
Expanded Storage:	4096 MB	1 %
Available Storage:	468224 MB	89 %

Figure 10-15 SE: Storage Information

Storage options are set from the Storage page in the image profile (Figure 10-16). On the z196, memory can be assigned as a combination of main storage and expanded storage, supporting up to 60 logical partitions. Enter the value (in megabytes) of each storage type.



Central Storage
Amount (in megabytes)
Initial 256
Reserved 0
Storage origin
● Determined by the system
○ Determined by the user
Origin 0

Expanded Storage
Amount (in megabytes)
Initial 0
Reserved 0
Storage origin
● Determined by the system
○ Determined by the user
Origin 0

Figure 10-16 HMC: Storage page in image profile

Initial storage is the amount of storage to be allocated to the LPAR at activation; *reserved* storage is the amount of additional storage requested for the LPAR. Reserved storage is storage that can be dynamically brought online to the LPAR at some point after LPAR activation. Entering 0 for reserved storage limits storage to the initial amount for the duration of the LPAR activation.

Granularity of main storage for a logical partition is dependent on the largest main storage amount defined for either initial or reserved main storage, as shown in Table 10-1. The granularity applies across all main storage defined, both initial and reserved. For example, for an LPAR with an initial storage amount of 60 GB and a reserved storage amount of 160 GB, the main storage granularity of both initial and reserved main storage is 512 MB. Expanded storage granularity is fixed at 256 MB. Expanded storage granularity applies across the expanded storage input fields.

Table 10-1 Central Storage granularity

LPAR main storage amount	Logical partition storage granularity
Main storage amount <= 128 GB	256 MB
128 GB < main storage amount <= 256 GB	512 MB
256 GB < main storage amount <= 512 GB	1 GB
512 GB < main storage amount <= 1 TB	2 GB

Remember that either an IBM System zArchitecture (64-bit) mode or an ESA/390 (31-bit) architecture mode operating system can run in an ESA/390 image on a z196. Any ESA/390 image can be defined with more than 2 GB of main storage and can have expanded storage. These options allow you to configure more storage resources than the operating system is capable of addressing.

Cryptographic options

If the newly named logical partition is using cryptographic services, you must enable these options in the Crypto page of the image profile. Make sure that the control domain index and usage domain index are correct and do not conflict with any other logical partitions on the z196. If you duplicate definition values across logical partitions, you are not able to save the logical partition activation profiles until you correct the cryptographic definitions.

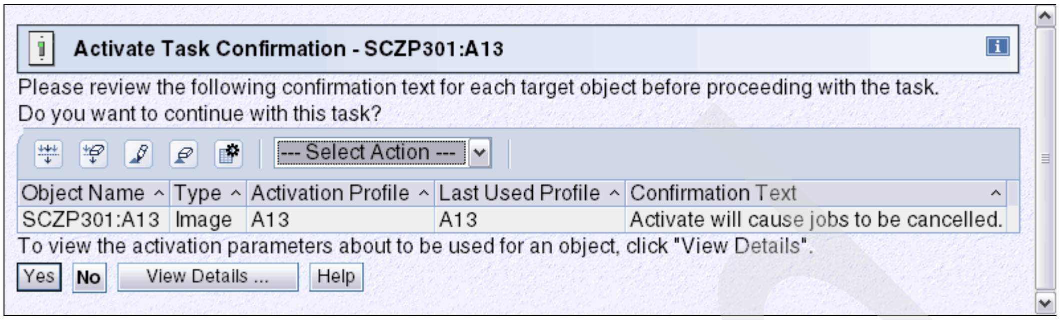
These values can also be defined using the Change LPAR Cryptographic Controls task from the Support Element after activating the logical partition using the new image profile. This topic is covered in 9.2.3, “Cryptographic configuration using the Support Element” on page 459.

Activating a defined logical partition

After all the values have been updated and saved, the logical partition can be activated and an IPL can be performed. This operation is done from the HMC by performing the following steps:

1. Select the logical partition from the HMC Contents of the CPC that you want to activate. Click the **Activate** task from the Daily group menu.

2. After confirming that the activation profile is correct, click **Yes** in the Activate Task Confirmation window (Figure 10-17).



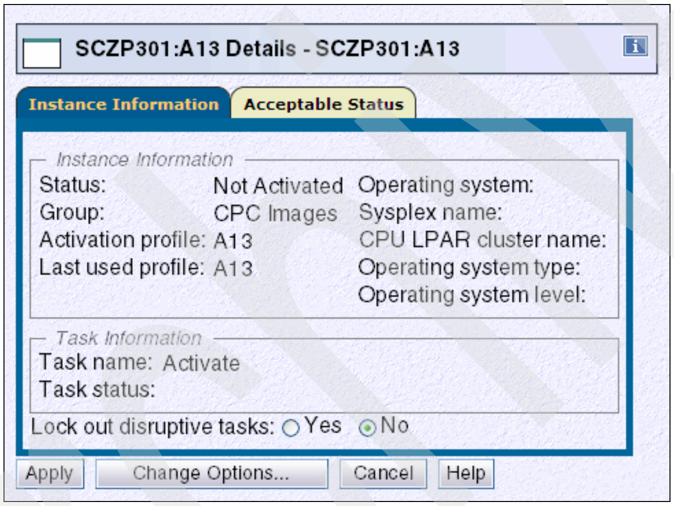
Please review the following confirmation text for each target object before proceeding with the task.
Do you want to continue with this task?

Object Name	Type	Activation Profile	Last Used Profile	Confirmation Text
SCZP301:A13	Image	A13	A13	Activate will cause jobs to be cancelled.

To view the activation parameters about to be used for an object, click "View Details".

Figure 10-17 HMC: Activate Task confirmation

3. Check that the activation task completed successfully. The status should have changed from Not Activating to Not Operating in the detail information of the target logical partition (Figure 10-18).



Status: Not Activated
Group: CPC Images
Activation profile: A13
Last used profile: A13
Operating system:
Sysplex name:
CPU LPAR cluster name:
Operating system type:
Operating system level:

Task name: Activate
Task status:

Lock out disruptive tasks: ○ Yes ● No

Figure 10-18 HMC: Details after activating a new logical partition

Finally, you can perform an IPL of the operating system in the newly named logical partition.

> **Note:** Any HMC users that are restricted to specific LPARs by Customized User Controls Managed Resources will not be able to access the newly added LPAR.

10.3 Un-naming a logical partition

This section explains the steps to change an active logical partition into a reserved partition whose name is removed (un-name). This section des not describe how to *delete* a logical partition; the deletion of a logical partition is not possible. All 60 LPs are either defined (named) or reserved (un-named).

Deactivating a logical partition

First, this action requires the deactivation of the target logical partition. Deactivating a logical partition is a straightforward process. After the image has been reset, the logical partition can be deactivated by using the Deactivate task in the HMC. This action frees up all the partition's resources, such as memory, CPs, and channels.

HCD definition changes

After deactivation is complete, make changes by HCD or HCM to revert the logical partition back to a reserved logical partition. In HCD, the process of changing a named logical partition to a reserved logical partition is the reverse process of naming a logical partition. Before making any changes in HCD for the logical partition that will be changed to reserved status, we recommend that you verify which channels and devices are defined to the Candidate Lists for this logical partition.

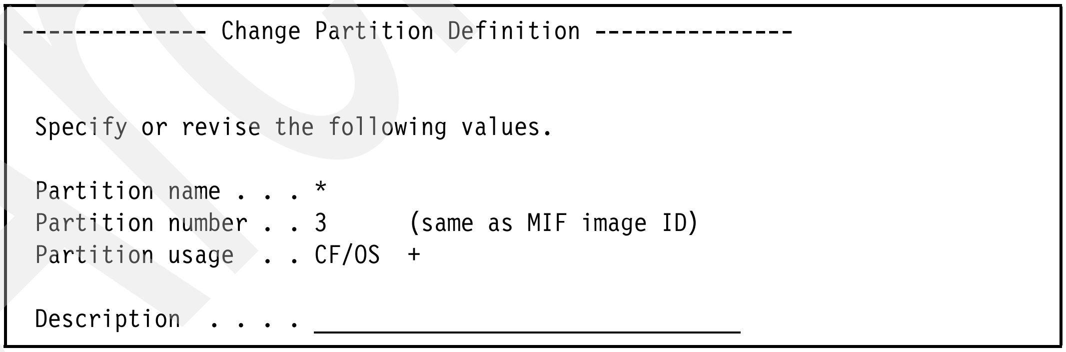
Some devices might generate errors if they have been included in the candidate lists for the logical partition that is changed to reserved status.

Perform the following steps:

1. In the HCD panel, select the CSS ID containing the partition you want to change to a reserved logical partition. A sample partition list is shown in Figure 10-1 on page 479.

   > **Note:** First, remove all the assigned CHPIDs for this logical partition. Failure to do this task before attempting to change the logical partition name to an asterisk (*) results in HCD generating errors.

2. Select the Change Partition Definition option and proceed to the Update CHPID Access and Candidate Lists panel, shown in Figure 10-3 on page 480. Change all the CHPID Access and Candidate Lists to `No`. This removes all channels from the logical partition.
3. From the Change Partition Definition panel, rename the logical partition to an *****, set the Partition Usage field back to CF/OS, and delete any data in the Description field, as shown in Figure 10-19. You are now ready to activate the new configuration.



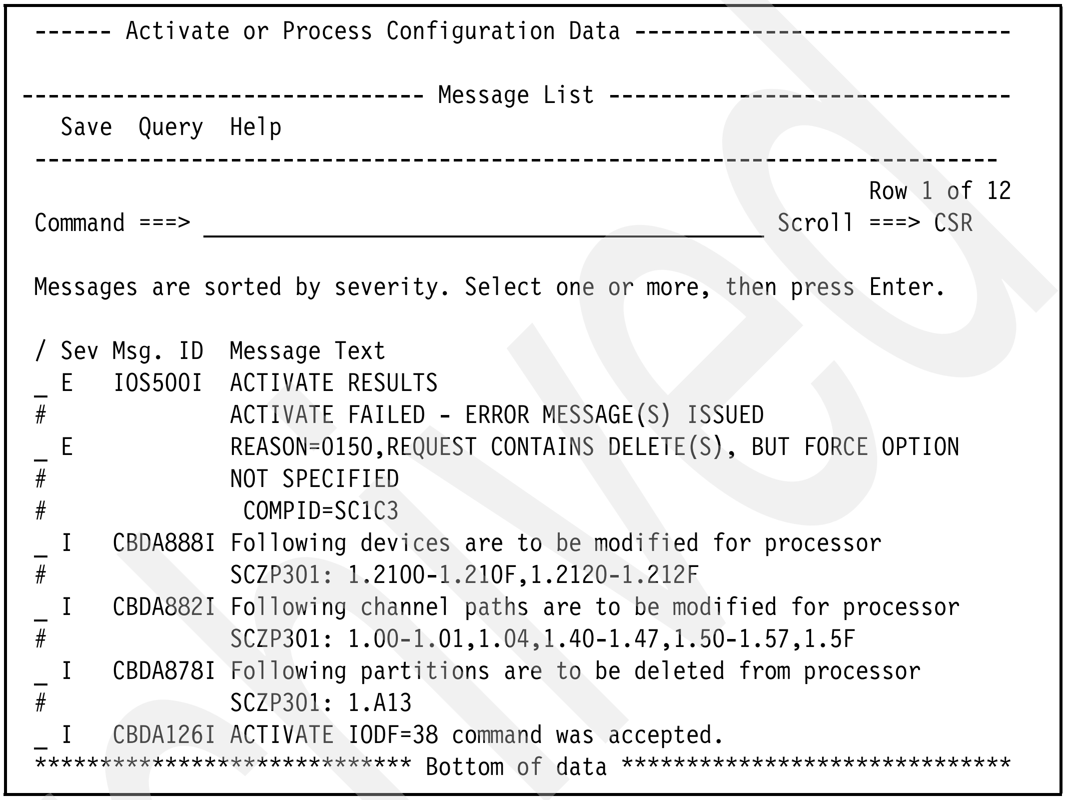
```
------------- Change Partition Definition ---------------


 Specify or revise the following values.

 Partition name . . . *
 Partition number . . 3      (same as MIF image ID)
 Partition usage  . . CF/OS  +

 Description  . . . . ________________________________
```

Figure 10-19 Changing a partition to reserved status

Dynamic activation of configuration

To dynamically activate the production IODF, perform the following steps:

1. Use Option 1, Activate new hardware and software configuration, as shown in Figure 10-9 on page 485. When a new configuration that has a reserved logical partition (un-named) is activated, you must add the force options. If the force options are not specified, the activation fails with an IOS500I message (Figure 10-20).



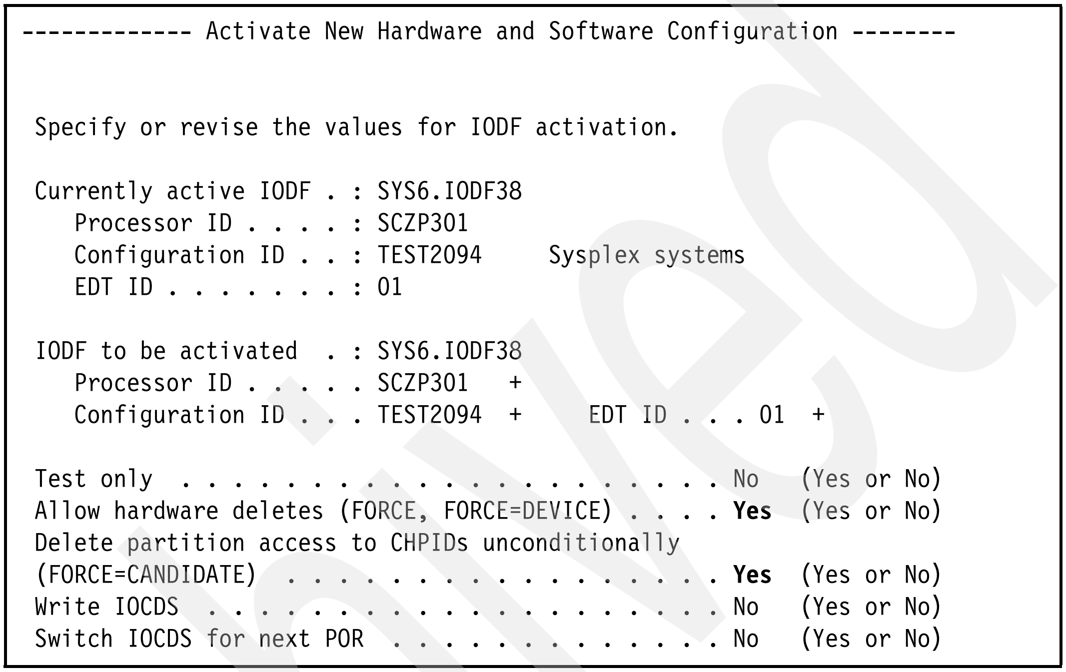
```
 ------ Activate or Process Configuration Data ----------------------------

------------------------------ Message List -------------------------------
   Save  Query  Help
 --------------------------------------------------------------------------
                                                                Row 1 of 12
 Command ===> ___________________________________________ Scroll ===> CSR

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 _ E   IOS500I  ACTIVATE RESULTS
 #              ACTIVATE FAILED - ERROR MESSAGE(S) ISSUED
 _ E            REASON=0150,REQUEST CONTAINS DELETE(S), BUT FORCE OPTION
 #              NOT SPECIFIED
 #               COMPID=SC1C3
 _ I   CBDA888I Following devices are to be modified for processor
 #              SCZP301: 1.2100-1.210F,1.2120-1.212F
 _ I   CBDA882I Following channel paths are to be modified for processor
 #              SCZP301: 1.00-1.01,1.04,1.40-1.47,1.50-1.57,1.5F
 _ I   CBDA878I Following partitions are to be deleted from processor
 #              SCZP301: 1.A13
 _ I   CBDA126I ACTIVATE IODF=38 command was accepted.
 ***************************** Bottom of data ******************************
```

Figure 10-20 HCD: Activate new IODF remove logical partition with message (bad case)

2. Set the Allow hardware deletes and the Delete partition access to CHPIDs unconditionally options to `Yes` (Figure 10-21).

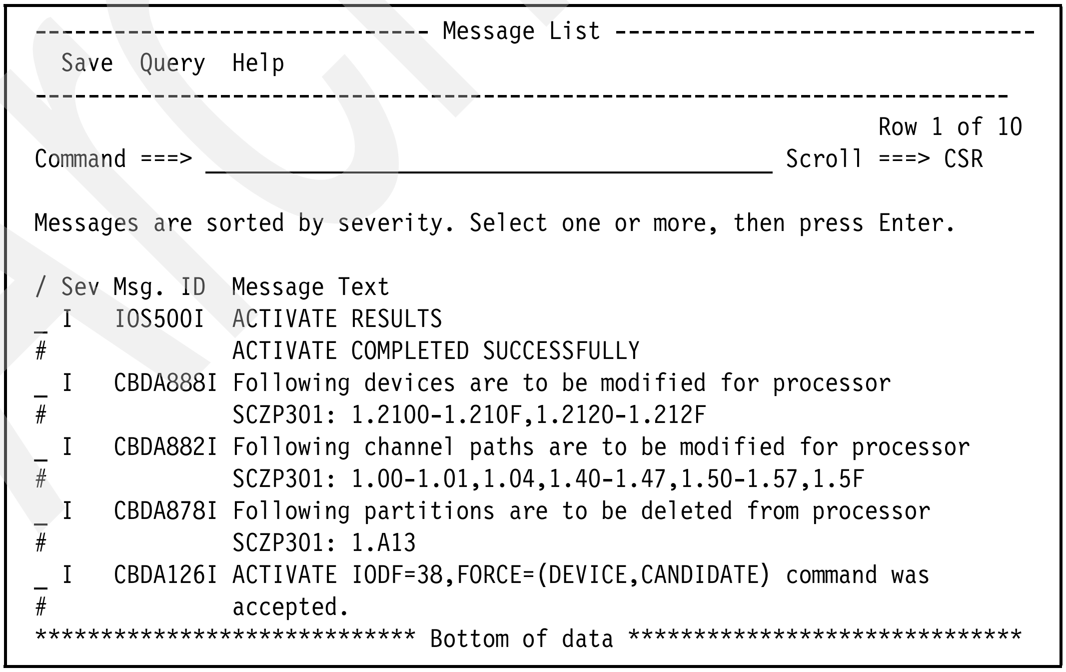
   Check all messages in the resulting panel (Figure 10-22), and verify that the dynamic activation completed successfully.

   The activation action performed by HCD can also be accomplished by issuing the **`activate iodf=xx,force=(candidate,device)`** z/OS command.



```
------------ Activate New Hardware and Software Configuration --------


 Specify or revise the values for IODF activation.

 Currently active IODF . : SYS6.IODF38
    Processor ID . . . . : SCZP301
    Configuration ID . . : TEST2094     Sysplex systems
    EDT ID . . . . . . . : 01

 IODF to be activated  . : SYS6.IODF38
    Processor ID . . . . . SCZP301   +
    Configuration ID . . . TEST2094  +     EDT ID . . . 01  +

 Test only  . . . . . . . . . . . . . . . . . . . . . No   (Yes or No)
 Allow hardware deletes (FORCE, FORCE=DEVICE) . . . . Yes  (Yes or No)
 Delete partition access to CHPIDs unconditionally
 (FORCE=CANDIDATE)  . . . . . . . . . . . . . . . . . Yes  (Yes or No)
 Write IOCDS  . . . . . . . . . . . . . . . . . . . . No   (Yes or No)
 Switch IOCDS for next POR  . . . . . . . . . . . . . No   (Yes or No)
```

Figure 10-21 Activate New Hardware and Software Configuration



```
 ------------------------------ Message List --------------------------------
   Save  Query  Help
 ----------------------------------------------------------------------------
                                                                 Row 1 of 10
 Command ===> ___________________________________________ Scroll ===> CSR

 Messages are sorted by severity. Select one or more, then press Enter.

 / Sev Msg. ID  Message Text
 _ I   IOS500I  ACTIVATE RESULTS
 #              ACTIVATE COMPLETED SUCCESSFULLY
 _ I   CBDA888I Following devices are to be modified for processor
 #              SCZP301: 1.2100-1.210F,1.2120-1.212F
 _ I   CBDA882I Following channel paths are to be modified for processor
 #              SCZP301: 1.00-1.01,1.04,1.40-1.47,1.50-1.57,1.5F
 _ I   CBDA878I Following partitions are to be deleted from processor
 #              SCZP301: 1.A13
 _ I   CBDA126I ACTIVATE IODF=38,FORCE=(DEVICE,CANDIDATE) command was
 #              accepted.
 **************************** Bottom of data *****************************
```

Figure 10-22 HCD: Activate new IODF remove logical partition with message

Removing resources from the activation profiles

When the new configuration has been activated and the logical partition removed, you can remove any profiles defined for the logical partition from the HMC.

After all the resources have been removed, write a new IOCDS to the Support Element (SE) on the server and make it active. Afterwards, update the Activation profiles to point to the new IOCDS. The partition that was changed to reserved status no longer exists in the partition list.

> **Note:** Remember to save the Reset activation profile in case a recovery action needs to be performed against the server.
>
> If the old IOCDS is still in the Reset profile and a recovery action is performed against the server, the old partition is defined to the server again and attempts to allocate all its resources.

10.4 Renaming a reserved logical partition

Changing a reserved logical partition name from one name to another name cannot be done directly. It is a two-step process that combines the following tasks:

- Deactivating and un-naming a named logical partition, making it reserved.
- Naming, assigning resources, and activating the reserved logical partition.

There are special considerations when using this approach. You must remember that it is a two-phased approach:

1. The configuration has to be changed to remove all assigned channels and devices, and then the new configuration has to be activated.
2. The configuration has to be changed again and the reserved logical partition has to be given a new name (and, if need be, a new operating mode); all the channels and devices it requires must be assigned.

   The configuration is then activated and the newly named logical partition is ready for use.

We discuss how to un-name and deactivate a logical partition in 10.3, “Un-naming a logical partition” on page 493, and how to name a reserved logical partition in 10.2.1, “Naming a reserved logical partition” on page 479. Here, we concentrate on changing the name and operating mode of a logical partition. We use the example of changing a z/OS partition to a Linux partition.

Any of the following combinations is possible:

- z/OS partition to CF partition, or to a Linux partition, or to a different z/OS partition
- CF partition to z/OS partition, or to a Linux partition, or to a different CF partition
- Linux partition to a z/OS partition, or to a CF partition, or to a different Linux partition

Renaming a z/OS logical partition to a Linux logical partition

Changing a named z/OS partition to a Linux partition consists of six steps. It is assumed that all the resources needed for the Linux partition are available (including storage, channels, and IFLs or CPs).

To accomplish this change, perform the following steps:

1. In the IODF, remove all assigned channels and, optionally, any devices that may be in the candidate list for the logical partition that will have its name and usage changed.

2. Change the partition name value to an asterisk (*); this action makes the logical partition a reserved logical partition. Build the new IODF. Make sure the logical partition that is renamed has been reset and deactivated on the HMC application.
3. Dynamically activate the new configuration, either by using the **`activate`** command from an active z/OS logical partition on the z196 where the logical partition is being renamed, or by using the HCD.
4. Using the work version of the IODF activated in step 3, name the reserved logical partition. Assign a partition name and usage. (In this example, the usage can be CF/OS, but OS is also allowed.) Keep in mind that the partition MIF ID *cannot* be changed.

> **Note:** If you are renaming a partition on a z196 or z10 EC that already has a Coupling Facility with peer mode Coupling links defined, you should change the Partition usage value to OS only because Coupling links in peer mode can only be connected to one Coupling Facility on a server.
>
> By using CF/OS, HCD does not allow you to connect any Coupling link that is already connected to another Coupling Facility to the reserved partition you are renaming, even if you are using this logical partition as an operating system.

5. Assign the channel paths and devices needed for the Linux logical partition. This can include channel types FC, FCP, OSD, OSE, OSM, OSN, OSC, OSX, IQD, and CNC/CTC.

> **Note:** OSC is the channel type for the OSA-Express Integrated Console Controller (OSA-ICC). This channel type can be used by Linux on System z systems.

6. You can now build a new production IODF for dynamic activation. The Dynamic Activate can be done once again by using the **`activate`** z/OS command or by using HCD.

   After the activation has completed successfully, you should write a new IOCDS to the SE. The current IOCDS in the Activation Profile for the z196 still reflects the old name of the logical partition. While this activation profile for the re-named logical partition could be updated and used, the name may not match the new name you have assigned. Change the activation profile to point to the new IOCDS and pay attention to the activation order of all the logical partitions.

11

Preparing the IBM zEnterprise 196 for the zEnterprise BladeCenter® Extension (zBX)Model 002

The zEnterprise BladeCenter® Extension (zBX)(zBX) is machine type 2458-002 and is designed exclusively for the z196 to integrate multi-platform systems and heterogeneous workloads. The advance virtualization management capabilities of the IBM zEnterprise System (offered through the Unified Resource Manager) allows the zBX to be managed as a single pool of resources.

More explanation of the role of zBX in the zEnterprise System environment and the Unified Resource Manager are covered in the additional references listed at the end of the chapter.

This chapter introduces the zBX environment and considerations when planning for the installation of a zBX. The necessary steps to configure the z196 to support a zBX are also discussed.

We discuss the following topics:

- zBX hardware summary
- Ensembles and zBX connectivity
- Installation considerations
- Configuration examples
- HMC/SE Ensemble requirements
- HCD definitions and z/OS display commands
- z/OS display commands
- Additional references

11.1 zBX hardware summary

The zBX Model 002 (2458-002) is an extension of the z196. It can be ordered with a new z196 or at a later time as an Miscellaneous Equipment Specification (MES) to an existing z196. Either way, the zBX is treated as an addition to a single z196. The zBX must have a controlling z196 and cannot be ordered separately.

The zBX is configured with the following key components:

- Up to four standard 19-inch 42U IBM Enterprise racks
- Redundant hardware infrastructure for availability
- Hardware and operational management support (provided with the z196 HMC/SE)
- One to eight IBM BladeCenter® chassis (two per rack)
- Up to 14 blades per BladeCenter
- Four VLAN capable switches in the first rack (Rack B) that are used for network connectivity between the z196 and the zBX

Figure 11-1 shows the rack naming scheme of a fully configured zBX configuration.

.

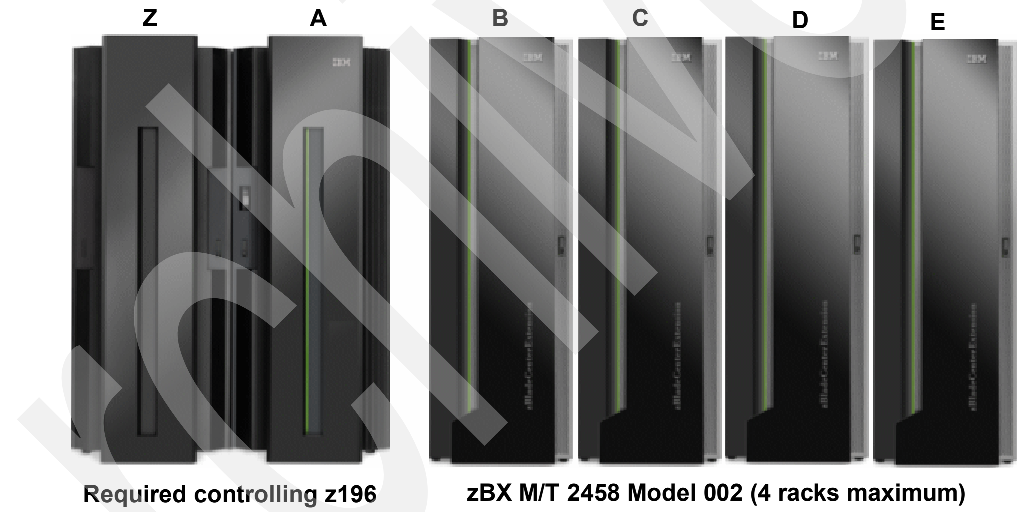


Figure 11-1 zBX racks

Rack B (FC 0601) is the primary rack. It contains the top of rack (TOR) switches installed to support the intranode management network (INMN) and the intraensemble data network (IEDN). These networks are used for the overall operation and support of the zEnterprise System and are explained in more detail in 11.2.2, “Intranode management network” on page 506 and 11.2.3, “Intraensemble Data Network” on page 512.

Racks C, D, and E are expansion racks (FC 0602). They can accommodate additional BladeCenter chassis that can each contain up to 14 blades each. Figure 11-2 shows the order of BladeCenter chassis as they are ordered and installed. Also notice from the front of the zBX the top of rack switches have a cover plate installed. All cabling is done from the rear of the machine.

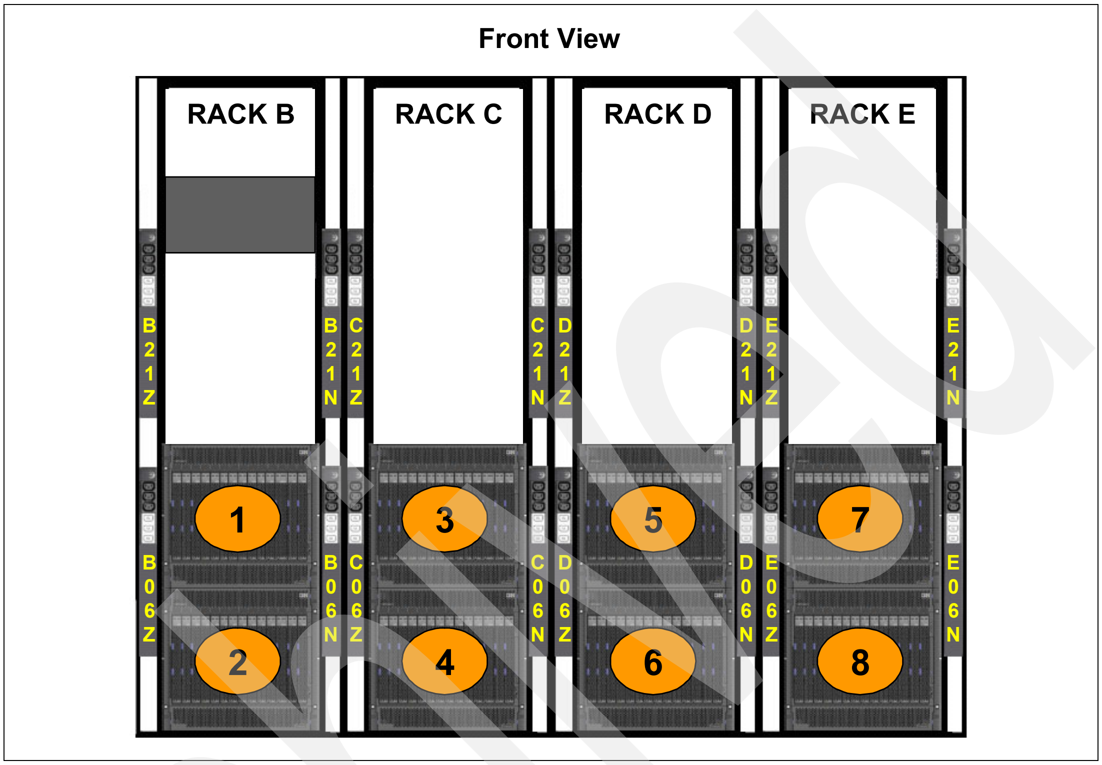


Figure 11-2 BladeCenters: Order in which the chassis are installed in the racks

Figure 11-3 shows the rear view of the four top of rack (TOR) switches installed in Rack B. From top to bottom are two 1000BASE-T switches for the intranode management network (INMN) and two 10 GbE switches for the intraensemble data network (IEDN). The INMN and IEDN TOR switches are cabled for redundancy. Power distribution units are installed in the rear of the racks to provide power for the internal components.

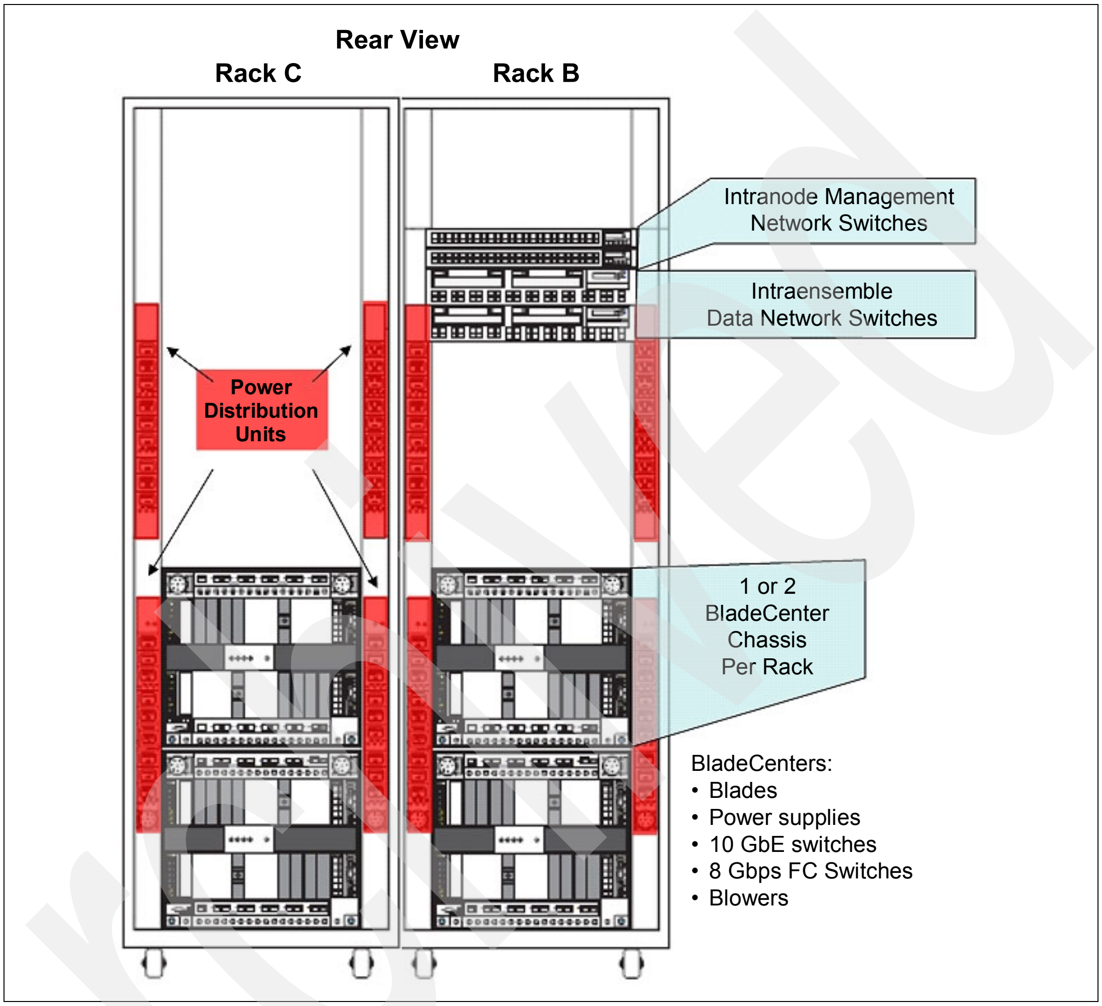


Figure 11-3 zBX racks: Rear view

Each rack requires from two to four independant redundant customer-supplied power feeds. For detailed power and environmental requirements, refer to *IBM System z196 Enterprise Class Technical Introduction,* SG24-7833 and *zEnterprise Installation Manual - Physical Planning,* GC28-6897.

A zBX can only be managed by one z196 using the INMN connections. IBM provides two 26 meter cables for the INMN connection between the controlling z196 and the zBX (see Figure 11-4).

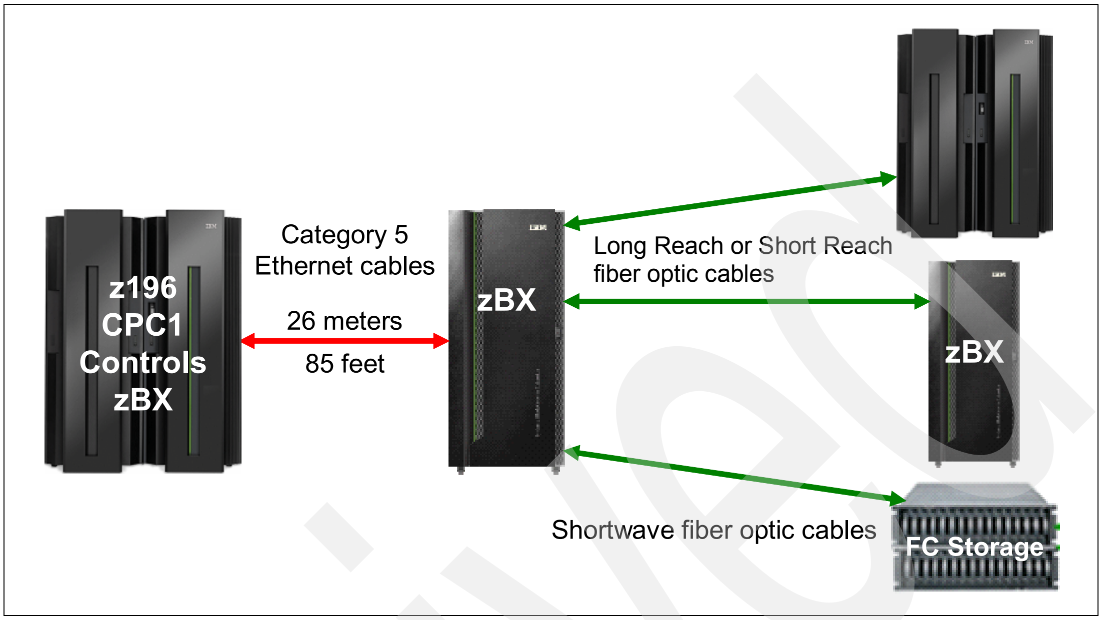


Figure 11-4 INMN and IEDN connections

When installed, the zBX should be positioned next to or as close as possible to the controlling z196. Length limitations are dictated by the fiber optic cable specifications and the connecting features:

- The zBX Model 002 uses either short reach (SR) or long reach (LR) transceivers to terminate the IEDN. The fiber optic type needs to be specified when ordering the zBX.
- Either OSA-Express3 10 GbE SR or OSA-Express3 10 GbE LR features can be used in the z196. All fiber connections between the z196 and zBX for the IEDN are point to point (no switches or routers allowed).

Cable length restrictions for the intraensemble data network (IEDN) - 10 Gigabit Ethernet are shown in Table 11-1.

Table 11-1 Intraensemble data network (IEDN): Maximum lengths

Fiber optic cable types	Maximum distance
Single mode 9 micron for LR transceivers	10 km (6.2 miles)
Multimode 50 micron (2000 MHz-km) for SR transceivers	300 meters (984 feet)
Multimode 50 micron (500 MHz-km) for SR transceivers	82 meters (269 feet)
Multimode 62.5 Micron (200 MHz-km) for SR transceivers	33 meters (108 feet)

11.2 Ensembles and zBX connectivity

Each z196, with its optional zBX, make up a node of a zEnterprise Ensemble. A zEnterprise Ensemble is a collection of highly virtualized diverse systems that can be managed as a single logical entity where diverse workloads can be deployed. A zEnterprise Ensemble is composed of up to eight nodes, each with:

- Up to eight z196s and up to eight zBXs.
- Two dedicated integrated networks.
  - Intranode Management Network
  - Intraensemble Data Network
- Optionally, a customer managed data network can be connected to the z196 and zBX.
- One Unified Resource Manager.

  Management of the Ensemble is via a primary HMC. An alternate HMC is used to back up the primary HMC.

With the Unified Resource Manager, the z196 provides advanced end-to-end management capabilities for the blades housed in the zBX. The zBX components are configured, managed, and serviced the same way as the other components of the z196.

Figure 11-5 shows the networks used to manage the Ensemble and to support data traffic.

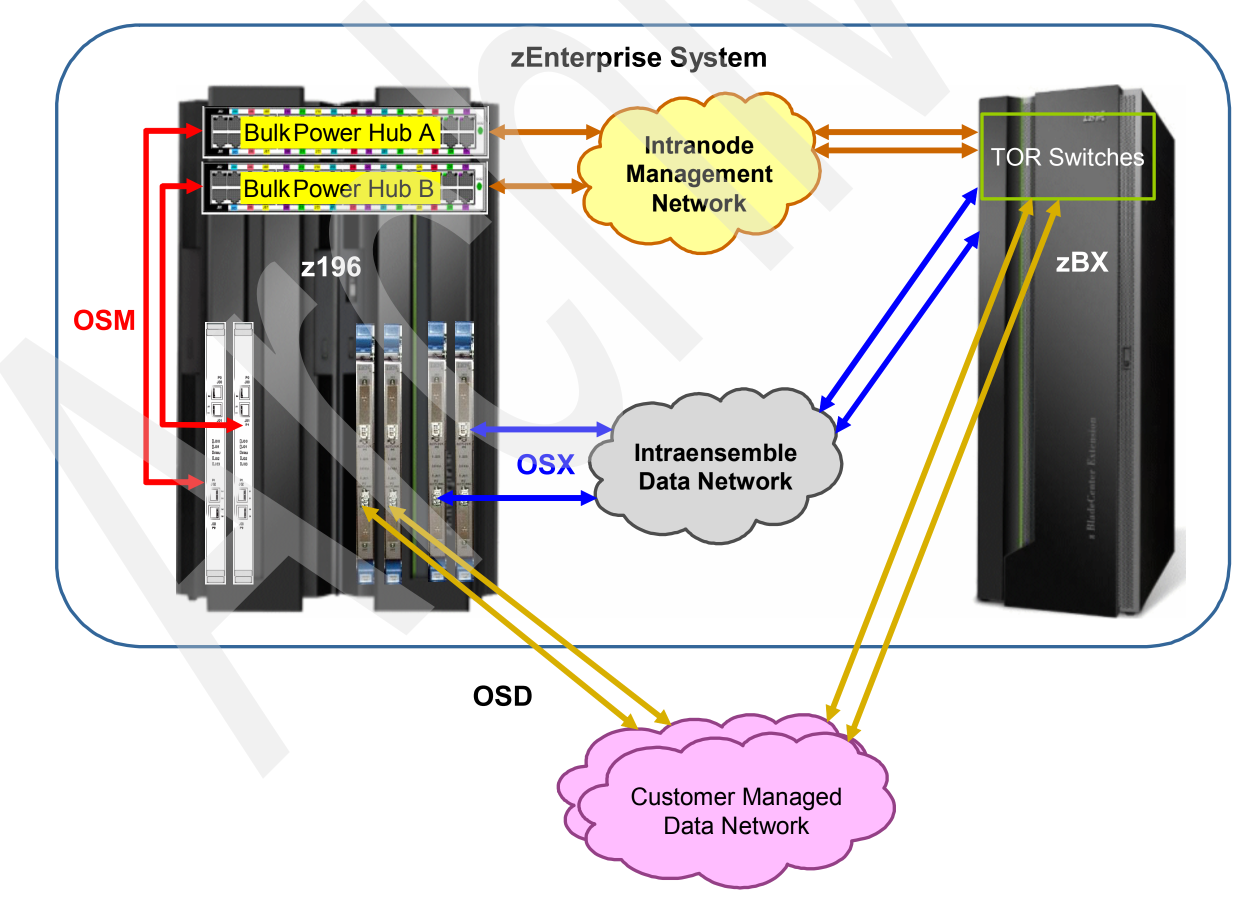


Figure 11-5 z196 and zBX components

The Fibre Channel (FC) connections are only required between the zBX and the attached Fibre Channel disk or storage area network (SAN).

11.2.1 HMCs in an Ensemble

The Ensemble starts with a pair of HMCs that are designated as the primary and alternate HMCs, and are assigned an Ensemble identity. The z196s and zBXs are then added to the Ensemble through an explicit action at the primary HMC.

The communication path from a HMC to a Support Element (SE) may consist of a complex network to resolve geographic or security issues. This HMC network is managed by the customer. For simplicity, we describe the necessary components and the communication path shown in Figure 11-6:

- FC 0091 provides a dual HMC configuration.
- The Bulk Power Hubs in the z196 provide two separate network interfaces to the Support Elements:
  - Customer Network 1 Port J02
  - Customer Network 2 Port J01

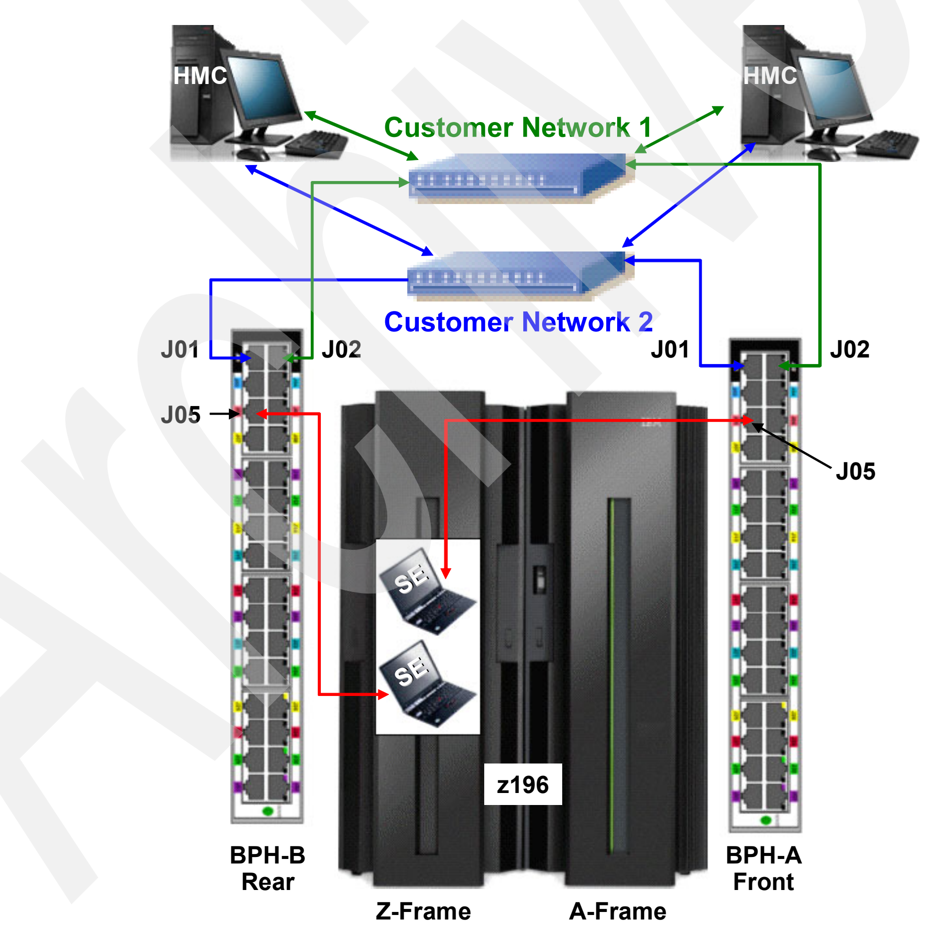


Figure 11-6 HMC network

The two internal Bulk Power Hubs (BPHs) are located at the upper right corner at both the front and rear of the Z frame of every z196.

Note: The top two ports (J01 and J02) on each BPH are reserved for external customer network connections only. Do not use any other ports in the BPH.

For each z196 installation, the top SE is plugged into port J05 on the front BPH and the bottom SE is plugged into J05 on the rear BPH. These cables come pre-installed and are only being shown so that you can understand the communication path in the network.

The z196 ship group provides Category 5 Ethernet cables (50 feet each) and FC #0070 Ethernet switches (if ordered) to connect the HMCs and BPHs.

The maximum distance for the zEnterprise Hardware Management Console (HMC) Network 1000BASE-T Ethernet is 100 meters (328 feet). The alternate HMC must be on the same subnet as the primary.

There are two reserved customer networks inside the z196. Although technically either customer network can be used to manage the Ensemble, you should configure an isolated network connected to BPH J02 ports of the CPCs and use BPH J01 ports of the CPCs to provide a communication path for remote HMCs within the customer intranet, and to provide the necessary broadband IBM Remote Support Facility, if possible.

11.2.2 Intranode management network

The intranode management network (INMN) is one of the Ensemble’s two private and secure internal networks. The INMN is used by the Unified Resource Manager. The INMN is a physically isolated 1000BASE-T Ethernet LAN, operating at 1 Gbps that connects all resources (CPC and zBX components) for management purposes. It is prewired, internally switched, configured, and managed with full redundancy for high availability.

- The INMN starts at the controlling z196 internal Bulk Power Hubs (BPH) and extends over the zBX internal INMN switches to the BladeCenter chassis.
- The INMN switch has 48 VLAN capable ports.
- The INMN provides connectivity to the AMM (Advanced Management Module) in the BladeCenter chassis.
- The INMN is used by the z196 SE to perform the following tasks:
  - zBX entitlement
  - zBX blade problem analysis
  - zBX service related activities
  - zBX overall management, including firmware management, heath status, resource utilization monitoring, configuration, resource discovery, and inventory management

Figure 11-7 shows the minimum components cabled into the INMN network.

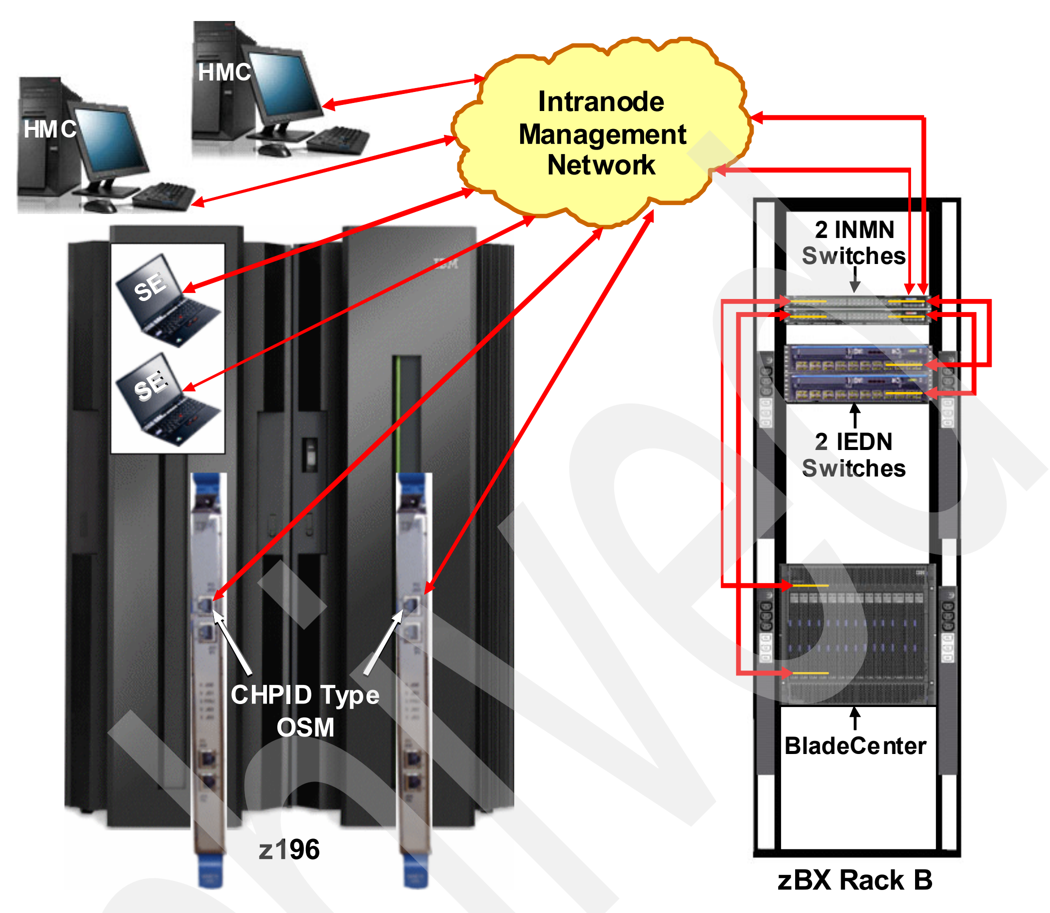


Figure 11-7 Intranode management network z196 to zBX

- Primary and alternate HMCs.
- Primary and alternate SEs of the controlling z196.
- Two redundant CHPIDs from two separate OSA-Express3 1000BASE-T features configured as CHPID type OSM.
- Two redundant INMN switches located in zBX Rack B.
- Two IEDN switches cabled into the INMN switches to allow management of these switches over the INMN network.
- BladeCenter connected to the INMN switches to allow management functions.
- All connections on this network are standard Category 6 Ethernet cables.

Bulk Power Hub

The Bulk Power Hubs are located inside the z196 Z frame and each provides 32 Ethernet port connections for overall system control and monitoring.

There is one installed at the front of the Z frame in the upper right corner (BPH-A) and one installed at the rear of the Z frame in the upper right corner (BPH-B) for high availability.

Figure 11-8 shows the Bulk Power Hub with the port designations.

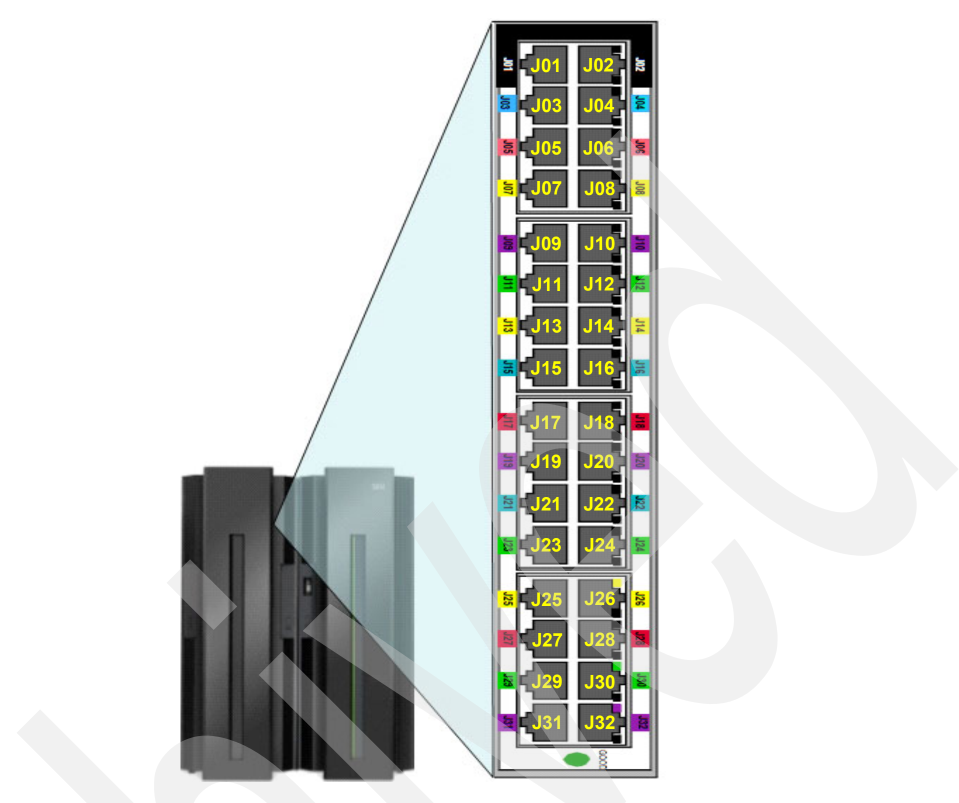


Figure 11-8 z196 Bulk Power Hub

Table 11-2 lists the port assignments for the bulk power hubs (BPHs).

Table 11-2 Port assignments for the BPHs

Ports	**Description**
J01	Customer Network 2 - HMC to SE Network
J02	Customer Network 1 - HMC to SE Network
J03	BPH-A to BPH-B
J04	BPH-A to BPH-B
J05	BPH-A Top SE / BPH-B Bottom SE
J06	zBX Top of Rack INMN-A / INMA-B port 47
J07	OSA-Express 3 1000BaseT CHPID type OSM
J08	Unused
J09-J32	Used for internal z196 components

The required connections are as follows:

- Ports J01-J08 operate at 1 Gbps and J09-J32 operate at 10/100 Mbps. All cables connected to the BPH are provided and supported by the z196 platform.
- The 26 m Category 5 plenum-rated Ethernet cable plugged into ports J06 on each BPH will connect to the zBX to extend the INMN network to the zBX Rack B.

Note: All ports on the z196 BPH are reserved for specific connections. Any deviations or misplugs will affect the operation of the z196 system.

OSA-Express3 1000BASE-T feature (FC #3367)

The OSA-Express3 1000BASE-T is a four port feature. There are two CHPIDs per feature and two ports per CHPID (Port 0 and Port 1). CHPID type OSM is used for Ensemble management and is a requirement for a zBX. When the CHPID is configured as type OSM, Port 1 is unusable. Figure 11-9 show the ports that can be used as type OSM.

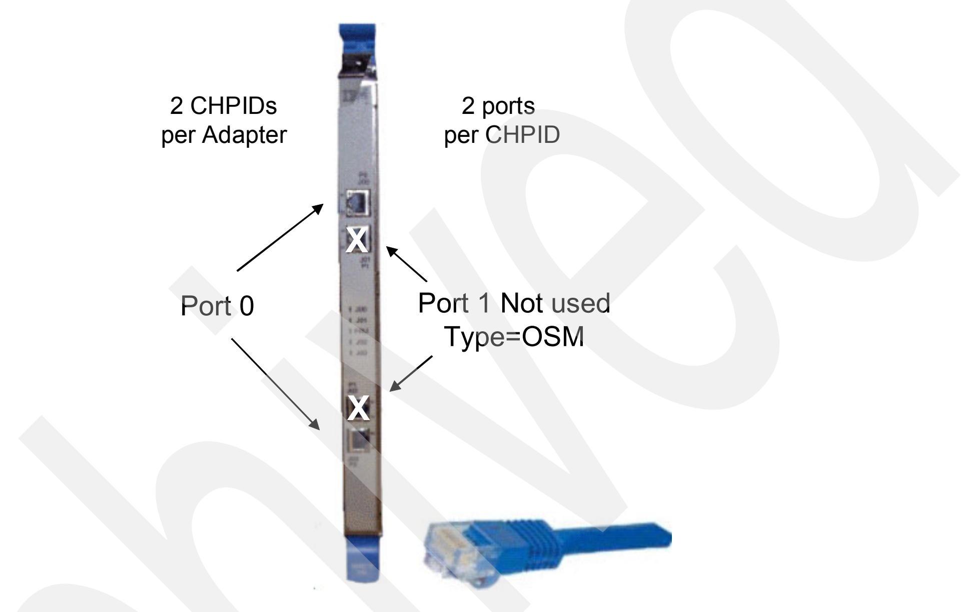


Figure 11-9 OSA-Express3 1000BASE-T Ethernet Adapters

When using high availability, you should use two separate OSA-Express3 1000BASE-T features:

- The other CHPID on the adapter can be used as type OSC, OSD, OSE, or OSN. If there is only ONE OSA, then both Port 0s are used, and Port 1s are not usable. If configured for redundancy, then the OSM would use Ports 0 (one on each OSA adapter), and the second CHPID on each OSA would be usable for types OSC, OSD, OSE, or OSN, and both Port 0 and 1 are usable. Also, *only* the four-port OSA card can be used.
- The two OSM CHPIDs (for redundancy) are connected to the z196 front and rear BPH hubs port J07 internally on the z196 using two 3.2 meter cables provided when FC #0025 Ensemble Membership is specified on the z196 initial order.
- You need to tell your IBM Service Representative which OSM CHPIDs will be used. The IBM SSR will connect the 3.2 meter cables from the BPHs to the OSM CHPIDs.
- If FC #0025 is added to an operational z196 footprint, the OSM defined CHPIDs should be offline prior to installing the 3.2 meter cables. The CHPIDs can then be brought online.

- FC #0025 is a z196 feature code. For Ensemble management without a zBX, FC #0025 is required. This configuration is shown in Figure 11-10.

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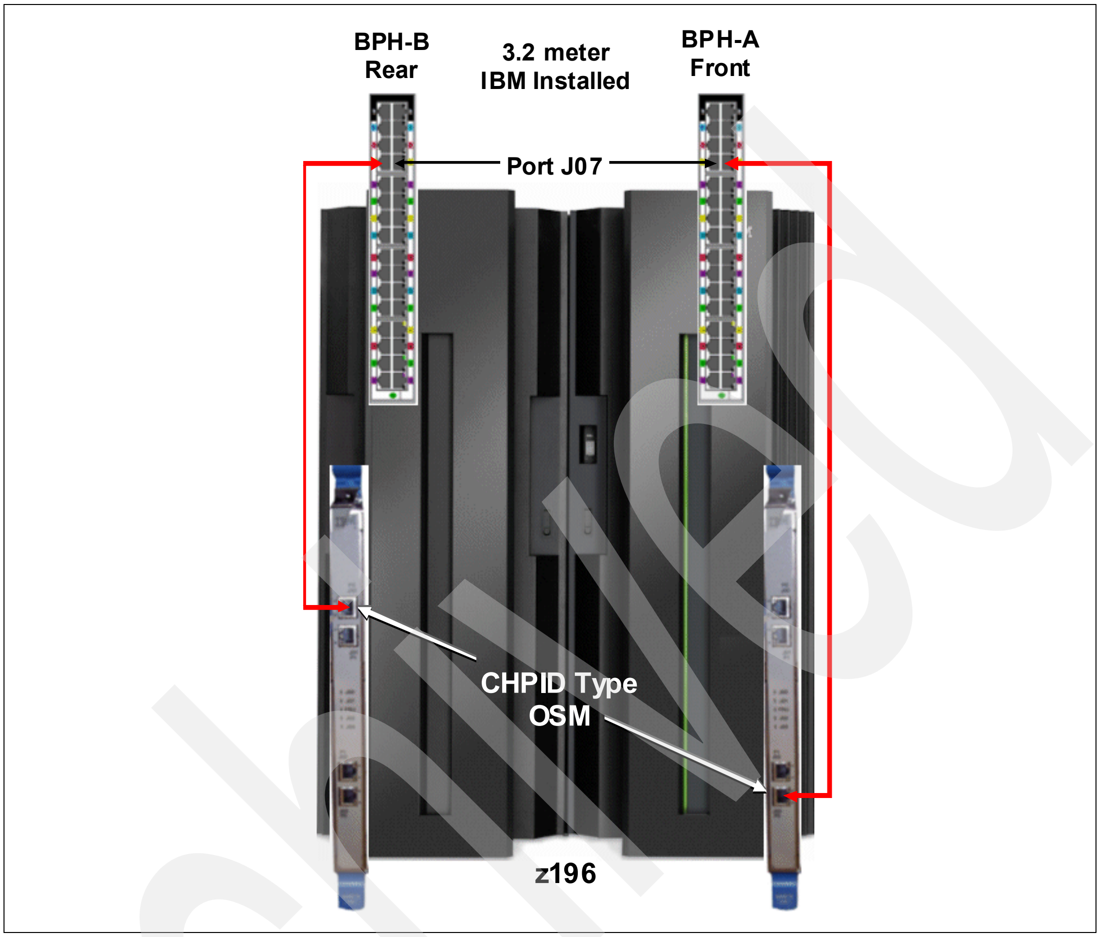

Figure 11-10 OSA-Express 1000BASE-T features connecting to the BPHs

Intranode management network switches

The intranode management network (INMN) TOR switches are 1U and are mounted from the rear of the zBX Rack B and located above the intraensemble data network (IEDN) TOR switches. The TOR switches are INMN-A (EIA B36P upper) and INMN-B (B35P lower). All connections to the switch are made at the rear of the rack:

- The two INMN TOR switches have 48 ports each.
- All ports operate at 1 Gbps. All cables are pre-wired and supported by the controlling z196 platform.
- All cables installed in the INMN TOR switches are internal to the zBX racks except for the two cables from INMN-A port J47 to the z196 BPH-A port J06 and INMN-B port J47 to the z196 BPH-B port J06. These connections use the 26 meter Category 5 Ethernet cables (chrome gray plenum rated), which are provided and connected during the installation of the zBX.
- As BladeCenters and racks are added to the zBX configuration, they are cabled accordingly to the INMN switches. All of the necessary cables are provided and installed during the installation of the zBX rack(s).

Each BladeCenter has two cable paths per TOR switch for redundancy. All INMN Ethernet cables to the BladeCenters and the IEDN switches are connected at installation time.

The port assignments for both INMN TOR switches are listed in Table 11-3.

Table 11-3 Port assignments for the INMN TOR switches

Ports	Description
J01-J03	Management for BladeCenters located in zBX Rack-B
J04-J07	Management for BladeCenters located in zBX Rack-C
J08-J11	Management for BladeCenters located in zBX Rack-D
J12-J15	Management for BladeCenters located in zBX Rack-E
J16-J43	Not used
J44-J45	INMN switch B36P (Top) to INMN switch B35P (Bottom)
J46	INMN-A to IEDN-A port J41 / INMN-B to IEDN-B port J41
J47	INMN-A to z196 BPH-A port J06 / INMN-B to z196 BPH-B port J06

Figure 11-11 show how the INMN cabling would look for a configuration of two zBX racks with four BladeCenters installed. Each BladeCenter has two cable paths per switch for redundancy cabled to the BladeCenter Switch Modules and the Advanced Management Modules.

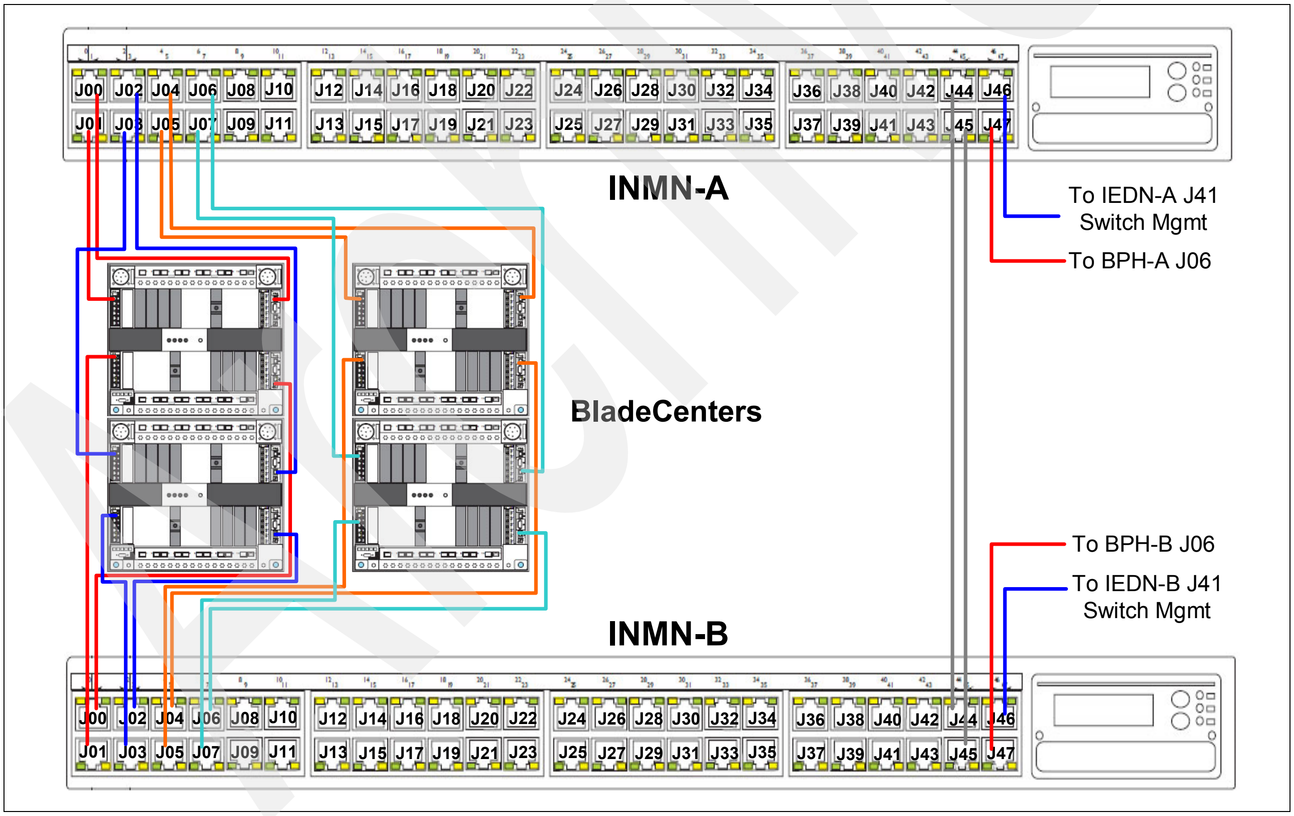

Figure 11-11 zBX INMN TOR switch wiring with two zBX BladeCenters (two rack configuration)

Note: The two INMN redundant switches are only present in zBX Rack B. Additional BladeCenter chassis are connected to the INMN switches as they are installed.

11.2.3 Intraensemble Data Network

The Intraensemble Data Network (IEDN) is a 10 Gigabit Ethernet (GbE) fiber optic connection between the z196(s) and the zBX. It consists of two independent data paths for redundancy. Any z196 connecting to the zBX through a IEDN requires a port on two separate OSA-Express3 10 GbE features. The zBX Model 002 can support up to eight separate IEDN connections to other zBXs and up to eight IEDN connections to other z196s' zBXs. All the fiber optic cables to connect the zBX to the z196 through the IEDN must be provided by the customer:

- The two ports provide a redundant configuration for failover purposes in case one link fails.
- For availability, the two ports should be spread across two different OSA-Express3 10 GbE features within the same CPC and in different I/O domains (in the i/O drawer or I/O cage), if possible.
- The IEDN is used exclusively for point-to-point data traffic between the z196 and the zBX. The zBX can have a maximum of 16 physical IEDN connections (eight pairs of OSA-Express3 10 GbE ports).
- The customer is responsible for all external fiber optic cables connecting from the z196 to the zBX IEDN switch.

Figure 11-12 displays the basic components within the intraensemble data network:

- Two redundant IEDN switches located in zBX Rack B.
- Two OSA-Express-3 10 GbE features, either FC #3370 Long Reach or FC #3371 Short Reach

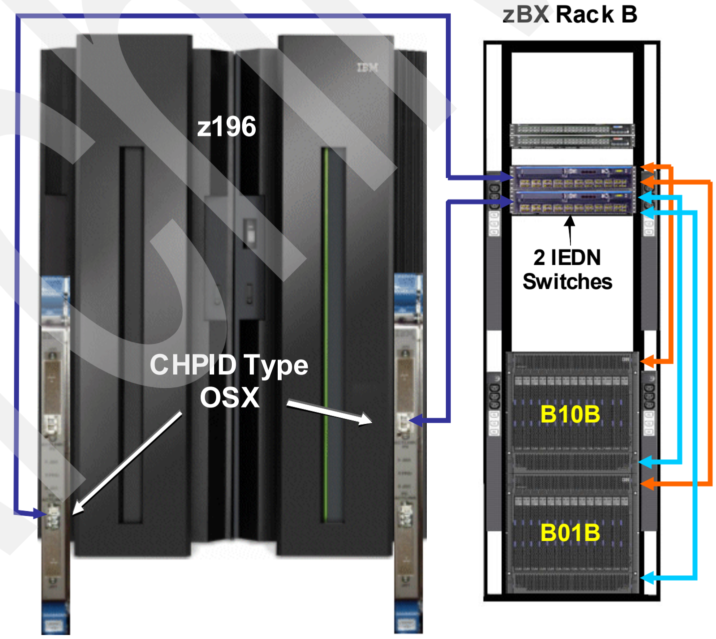

Figure 11-12 Intraensemble data network connections

IEDN TOR switches

The 2U IEDN TOR switches are mounted from the rear of the zBX Rack B and located below the intranode management TOR switches. The switches are IEDN-A (EIA 32P upper) and IEDN-B (EIA 30P lower). All fiber optic connections are at the rear of the zBX Rack-B.

Figure 11-13 show the IEDN switch port designations. All internal fiber optic connections from the BladeCenters to the IEDN switches in Rack-B will come pre-plugged. If there are additional racks, the fiber connections from the BladeCenters within those racks will be plugged at install time. These cables are included with the features ordered.

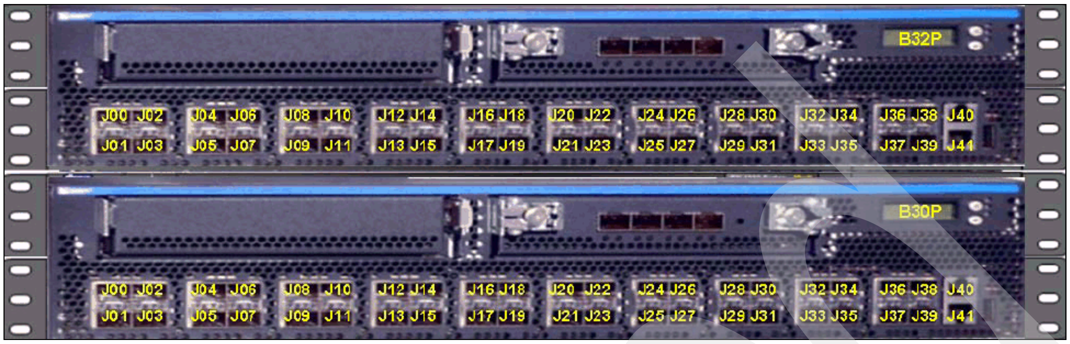

Figure 11-13 Intraensemble Data Network Switches

The port assignments for both IEDN TOR switches are listed in Table 11-4.

Table 11-4 Port assignments for the IEDN TOR switches

Ports	Description
J00 - J07	SFP and reserved for z196 (OSX) IEDN connections
J08 - J21[a]	DAC reserved for BladeCenter and SM07/SM09 IEDN connections
J22 / J23	DAC for IEDN switch-to-switch communication
J24 - J30	SFP reserved for zBX-to-zBX IEDN connections
J31 - J39	SFP reserved for customer managed network connections
J40	RJ-45 console port
J41	RJ-45 IEDN switch management port to INMN switch port 46

a. Only eight of the 14 ports are currently used.

The IEDN TOR switches use small form factor pluggable (SFP) optics for the external connections and direct attach cables (DAC) for connections, as shown in Figure 11-14.

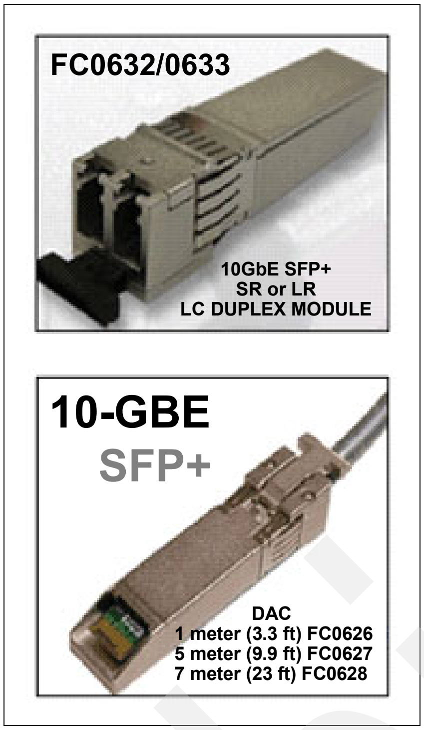

Figure 11-14 IEDN SFPs and DAC cables

- The IEDN is a 10 GbE flat data link (Layer 2) network.
- Communications Server for z/OS requires minimal configuration:
  - IPv4 or IPv6 addressing.
  - VLAN IDs must be configured to must match the zManager's configuration.
- The z/VM virtual switch types provide IEDN access:
  - The uplink can be a virtual machine Network Interface Connection (NIC).
  - Ensemble membership conveys a Ensemble Universal Unique Identifier (UUID) and MAC prefix.
- The IEDN network definition is performed from the Primary HMC, using the Manage Virtual Network task.

The IEDN TOR switch to BladeCenter, and IEDN-A to IEDN-B cables shown in Figure 11-15, are internal and are provided with the zBX Direct Attach Cables. Also shown are the Ethernet port designations for the switch management cables, which connect to the INMN switches.

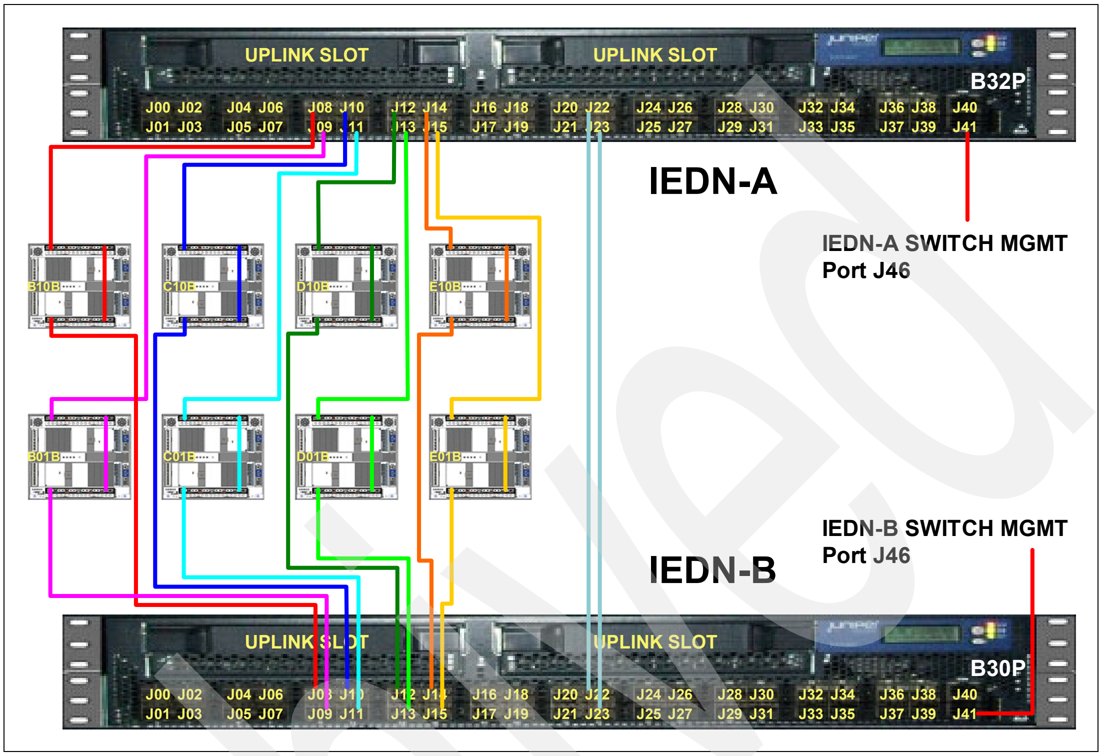

Figure 11-15 zBX IEDN internal switch wiring with eight zBX BladeCenters

OSA-Express3 10 GbE features

The z196 introduces the *OSX CHPID type*, which uses the OSA-Express3 10 GbE feature in the z196:

- The OSX connection is from the z196 to the IEDN Top of the Rack (TOR) switches on the zBX Rack B.
- The minimum requirement for each z196 is two OSA-Express3 10 GbE ports configured as CHPID type OSX.
- Two OSA-Express3 10 GbE features FC $3370 (LR) or FC #3371 (SR). Each feature code has two ports and should be on separate domains.

Figure 11-16 shows a picture of the adapter, a picture of the LC cable connector, and specifications.

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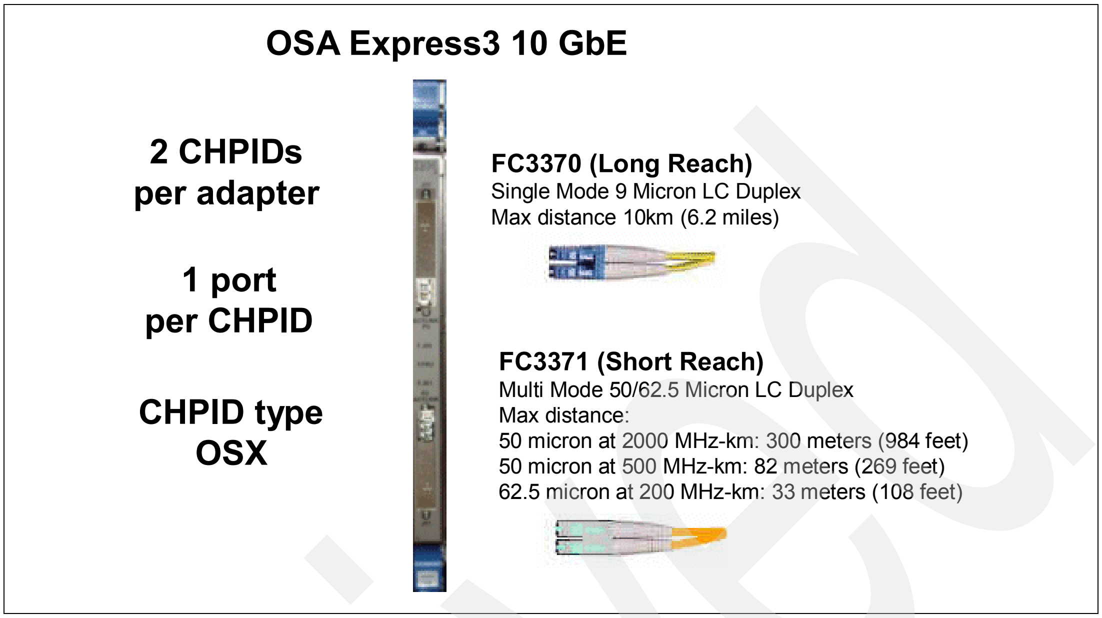


OSA Express3 10 GbE

2 CHPIDs per adapter

1 port per CHPID

CHPID type OSX

FC3370 (Long Reach)
Single Mode 9 Micron LC Duplex
Max distance 10km (6.2 miles)

FC3371 (Short Reach)
Multi Mode 50/62.5 Micron LC Duplex
Max distance:
50 micron at 2000 MHz-km: 300 meters (984 feet)
50 micron at 500 MHz-km: 82 meters (269 feet)
62.5 micron at 200 MHz-km: 33 meters (108 feet)

Figure 11-16 OSA-Express3 10 GbE

11.2.4 Fibre Channel attached storage

Although there are no setup tasks required on the z196 for the FC attached storage that connects to the zBX, it is the customer's responsibility to ensure fiber optic cables are ready to be plugged into the FC attached storage and the zBX FC switch modules.

There are many ways to configure the external FC storage attached to a zBX, and the configuration depends on the solution provided. The zBX attaches to external FC attached storage for two different solutions:

- IBM POWER7™ blades for use with the IBM AIX® operating system:
  - BladeCenter chassis with POWER7 blades uses Port 0 and Port 15 in each FC switch module (SM03 and SM04) to connect the FC disk.
  - You can use a SAN switch between the zBX and the FC disk. Cascade connections between BladeCenter chassis is not necessary.
  - The customer provides all cables, the FC disk, and the SAN switch.
  - It is a customer responsibility to configure and cable to the Fibre Channel storage.
  - You cannot share the same IBM System Storage DS5020 that is dedicated use for the IBM Smart Analytics Optimizer.
- IBM Smart Analytics Optimizer for DB2 for z/OS:
  - The maximum number of connections between the DS5020 and BladeCenter is eight.
  - A customer supplied IBM System Storage DS5020 with the appropriate configuration and fiber optic cables is required.

Each BladeCenter chassis in the zBX has two 20-port 8 Gbps FC switch modules (SM03 and SM04). Each FC switch module has 14 internal ports and 6 external ports. The internal ports are reserved for the blades in the chassis. Figure 11-17 shows the external ports.

- Ports J0 and J15 are used to connect to the customer provided external FC disk.
- Ports J16 to J19 are used to cascade between BladeCenter chassis.

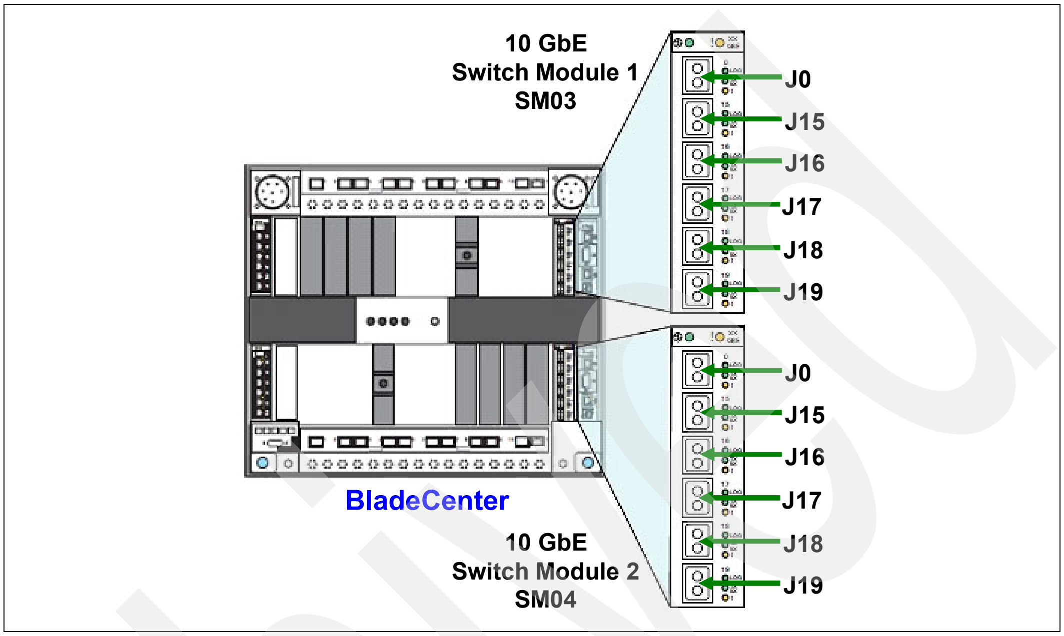


Figure 11-17 BladeCenter Switch Modules SM03 and SM04

Customer-provided shortwave LC duplex cables are used for FC disk connections. The BladeCenter switch modules support speeds of 8 Gbps, 4 Gbps, and 2 Gbps. A speed of 1 Gbps is not supported.

The maximum distance depends on the speed, fiber optic cable diameter, and signal frequency, as shown in Table 11-5.

Table 11-5 FC SAN fiber optic cable types: Maximum lengths

Fiber optic cable types	8 Gbps	4 Gbps	2 Gbps
50 micron (2000 MHz-km)	150 meters 492 feet	380 meters 1247 feet	500 meters 1640 feet
50 micron (500 MHz-km)	50 meters 164 feet	150 meters 492 feet	300 meters 984 feet
62.5 micron (200 MHz-km)	21 meters 69 feet	70 meters 230 feet	150 meters 492 feet

Figure 11-18 shows the FC disk storage attached to the zBX for use with the IBM Smart Analytics Optimizer with cascaded BladeCenters and a BladeCenter reserved for IBM POWER7 blades. These configurations could coexist in one zBX subsystem.

Note that BladeCenters for IBM Smart Analytic Optimizer cannot be mixed with IBM POWER7 blades.

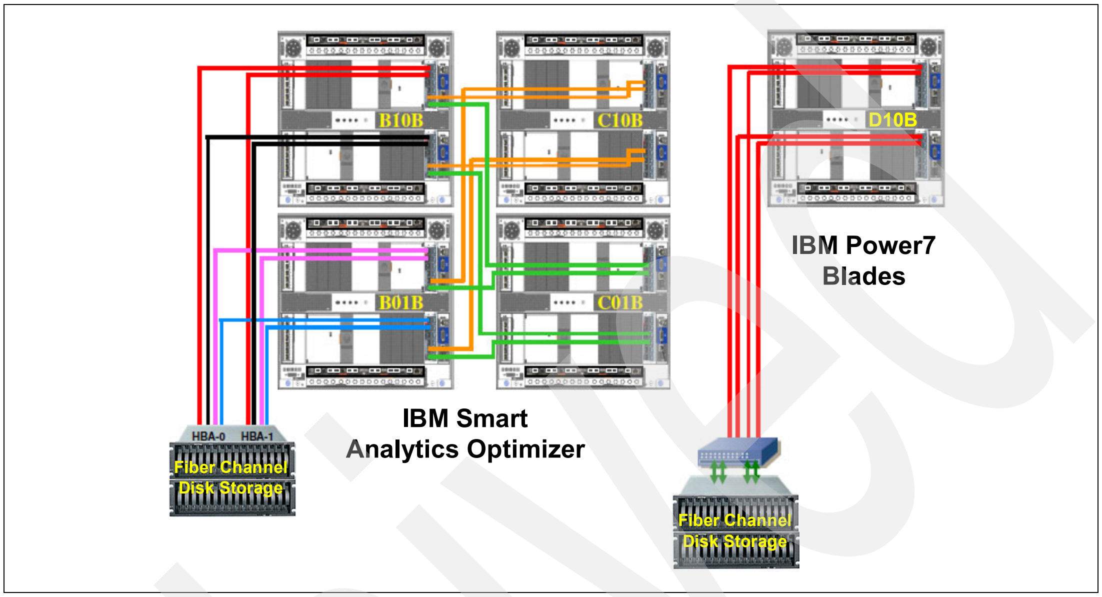


Figure 11-18 Connection example with IBM Smart Analytics Optimizer and POWER7 blades

11.3 Installation considerations

This section provides a list of hardware installation considerations when installing a zBX in an existing z196 environment. Because the configurations to implement and support a zBX can vary dramatically, various examples will be given in 11.4, “Configuration examples” on page 519.

- A Systems Assurance Technical Delivery Assessment (TDA) meeting has been scheduled to support the installation. This is the official planning vehicle for a smooth installation.
- Environmental requirements including floor cutouts, perforated tiles positioned at the front of the racks, customer supplied power for the racks, and installation positioning. If the zBX was ordered with a rear door heat exchanger, the proper water cooling arrangements have been planned.
- There are plans in place to locate the zBX adjacent to or as close as possible to the controlling z196. There is a 26 meter (86 foot) restriction.
- Two HMCs are required to manage a zBX. You need to plan the assignment of the Primary and Alternate HMCs and their locations. This plan also includes the necessary hardware and microcode to support the targeted HMCs.
- The controlling z196 has the necessary hardware installed:
  - Two OSA-Express3 1000BASE-T features (FC #3367), defined as CHPID type OSM
  - Two OSA-Express3 10 GbE features (FC #3370 Long Reach (LR) or FC #3371 Short Reach (SR)), defined as CHPID type OSX
  - FC #0025 (Ensemble Management)

- Ensure that you have the correct SFP feature codes for the IEDN switches for external attachment to the IEDN from a z196 or additional zBXs (up to eight in total):
  - FC #0632 for Long Reach (LR) SFP
  - FC #0633 for Short Reach (SR) SFP
- All z196s connecting to the zBX over the IEDN have the necessary OSA-Express3 features installed, that is, two OSA-Express3 10 GbE ports.
- All fiber optic cables that support external attachment to the zBX IEDN network are the customer's responsibility. These fiber optic cables can be from zBX to zBX or from z196 to zBX. All necessary Fibre Channel cables for the installation are ordered or planned for the following connections:
  - OSA-Express3 10 GbE ports to the zBX IEDN switches
  - zBX IEDN to zBX IEDN
- All fiber optic cables that support the FC disk storage (external attachment) to the zBX BladeCenters are the customer's responsibility.
- Feature codes for the IBM Smart Analytics Optimizer or IBM blades to support the zBX hardware requirements have been verified:
  - IBM Smart Analytics Optimizer for DB2 for z/OS V1.1 (5697-AQT)
  - IBM POWER7 blades with AIX, and x86 blades with Linux on IBM System x® applications. The customer is responsible for purchasing and installing POWER7 blades.
- Software Preventative Service Planning buckets for the zBX are reviewed. The PSP buckets are available on IBM Resource Link under the **Fixes** → **PSP** menu; search for 2458DEVICE.
- Review the System Storage Interoperation Center (SSIC) website for prerequisites in the Open Systems environment:

  `http://www-03.ibm.com/systems/support/storage/config/ssic/displayesssearchwithoutjs.wss?start_over=yes`

11.4 Configuration examples

This section presents configuration examples containing a zBX and the necessary connectivity requirements for operation. Follow-on configuration diagrams build on the first configuration and only additional requirements will be noted.

11.4.1 Basic Ensemble configuration with zBX

Figure 11-19 shows the initial necessary controlling z196 CPC1 installed, attached zBX, switches, and FC attached storage. Each of the necessary connections and the required cabling, and the necessary components within the Ensemble, are explained.

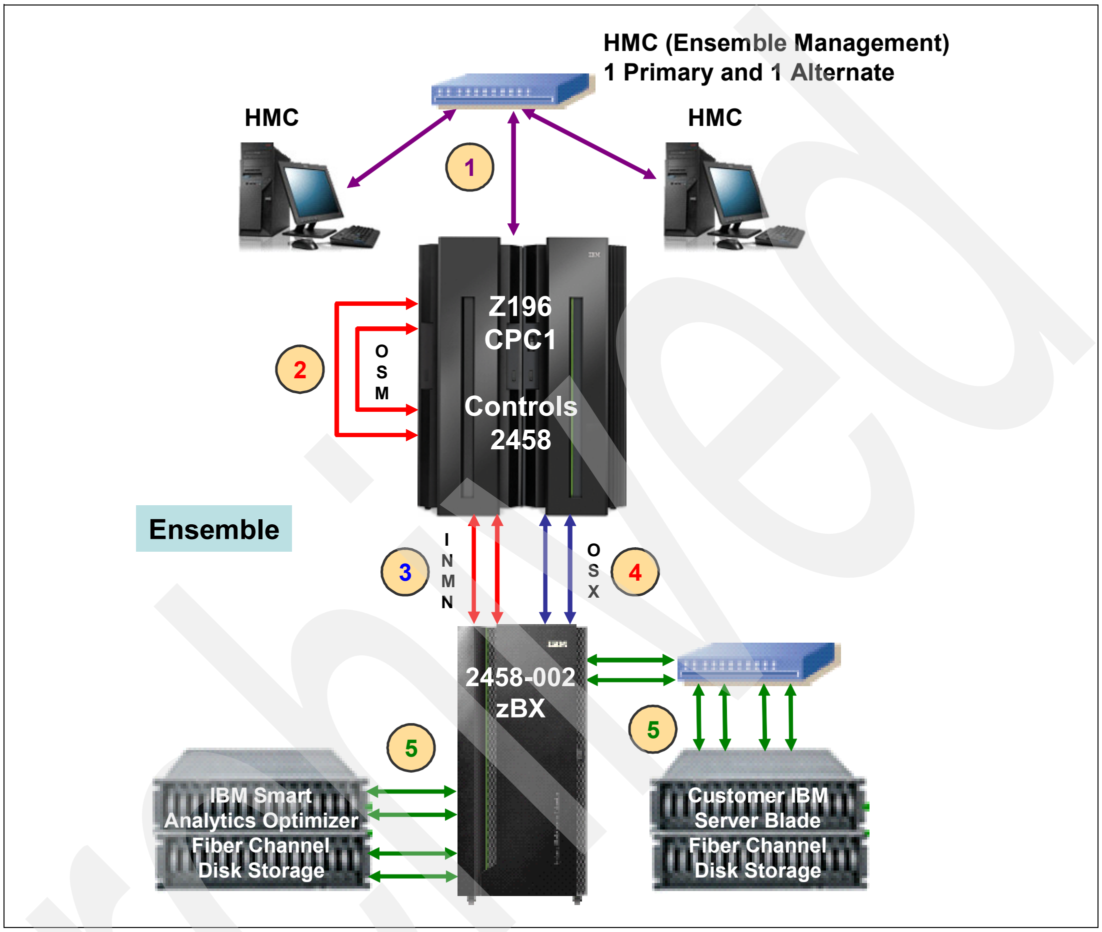


Figure 11-19 Single CPC with zBX

Where:

1. Customer-provided management network:
   - IBM supplies Ethernet RJ-45 cables (50 feet) and 1 Gbps capable switches FC #0070, if ordered.
   - The switch connects to the reserved customer network ports in the z196 Z29BPS11/PS31-J01 and Z29BPS11/PS31-J02.
2. Platform Support Manager (PSM) / intranode management network:
   - Two redundant CHPIDs from two different OSA-Express3 1000BASE-T features configured as CHPID type OSM.
   - IBM supplies two 3.2 meter Ethernet Category 6 cables (for redundancy) from the OSM CHPIDs to z196 Bulk Power Hub (BPH) Z29BPS11/PS31-J07 (this is a z196 internal connection supplied with Feature Code #0025).

3. Intranode management network - extension: IBM supplies two 26 meter Category 5 Ethernet cables (chrome gray plenum rated cables) from zBX Rack B INMN-A/B switches port J47 to z196 Bulk Power Hub (BPH) Z29BPS11/PS31-J06.
4. Intraensemble management network:
   - Two redundant ports from two different OSA-Express3 10 GbE (SR Short Reach or LR Long Reach) features are configured as CHPID type OSX.
   - The customer supplies the fiber optic cables (single mode or multimode).
5. FC attached disk storage:
   - The customer supplies all the fiber optic cables (single mode or multimode) from the zBX to the attached disk storage.
   - The customer supplies switches/routers if necessary and is responsible for the management of the FC attached disk storage.

11.4.2 Dual CPC Ensemble configuration with zBX

For a dual CPC Ensemble configuration with zBX, a second z196 CPC2 is introduced (Figure 11-20, which shows the necessary additional hardware). Additional z196 systems (up to eight) can be added in the same fashion.

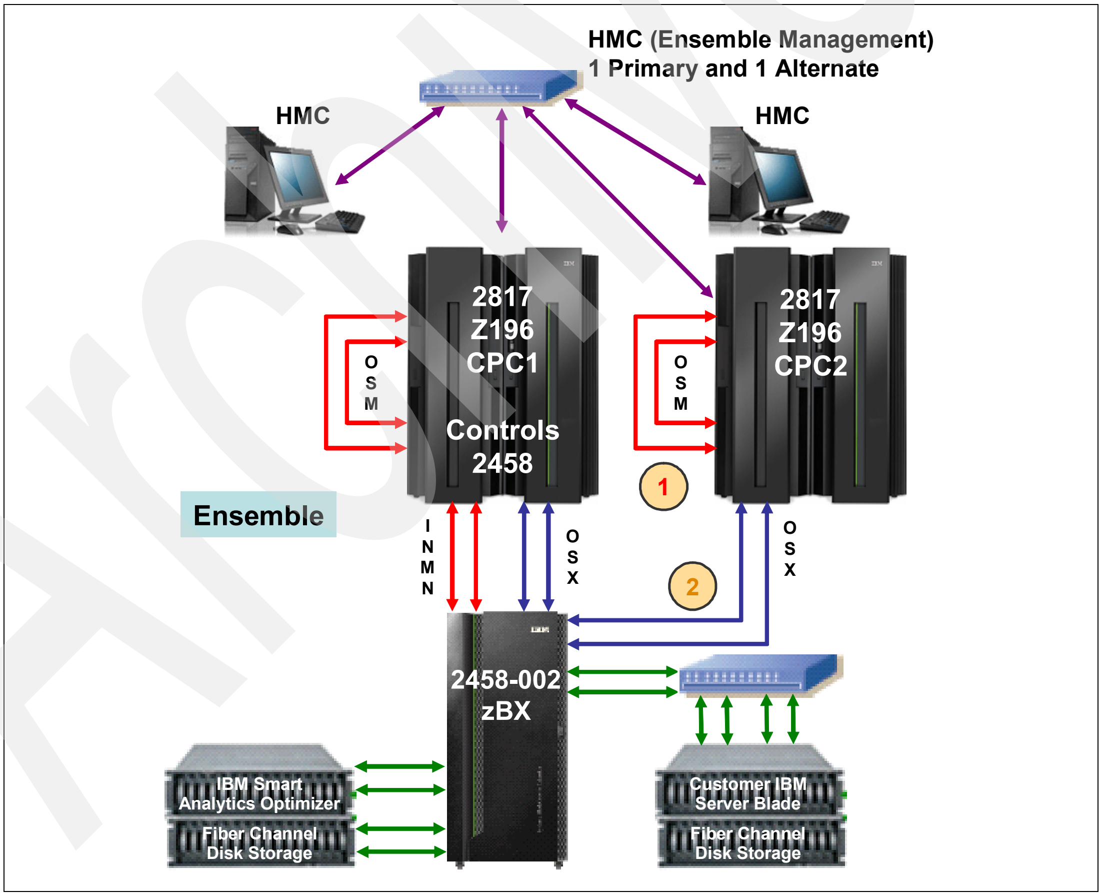


Figure 11-20 Dual CPC Ensemble with zBX

Where:

1. Platform Support Manager (PSM) / intranode management network:
   - Two redundant ports from two different OSA-Express3 1000BASE-T features are configured as CHPID type OSM.
   - IBM supplies two 3.2 meter Ethernet Category 6 cables from the OSM CHPIDs to z196 Bulk Power Hub (BPH) Z29BPS11/PS31-J07 (this is a z196 internal connection).
2. Intraensemble data network
   - Two redundant ports from two different OSA-Express3 10 GbE (SR Short Reach or LR Long Reach) features are configured as CHPID type OSX.
   - The customer supplies the fiber optic cables (single mode or multimode).

11.4.3 Dual CPC/zBX Ensemble configuration

Figure 11-21 shows a second z196 and zBX (added to the original configuration). The two zBXs are interconnected by fiber optic cables to SFPs in the IEDN TOR switches for this reserved communication (SR or LR) over the IEDN network.

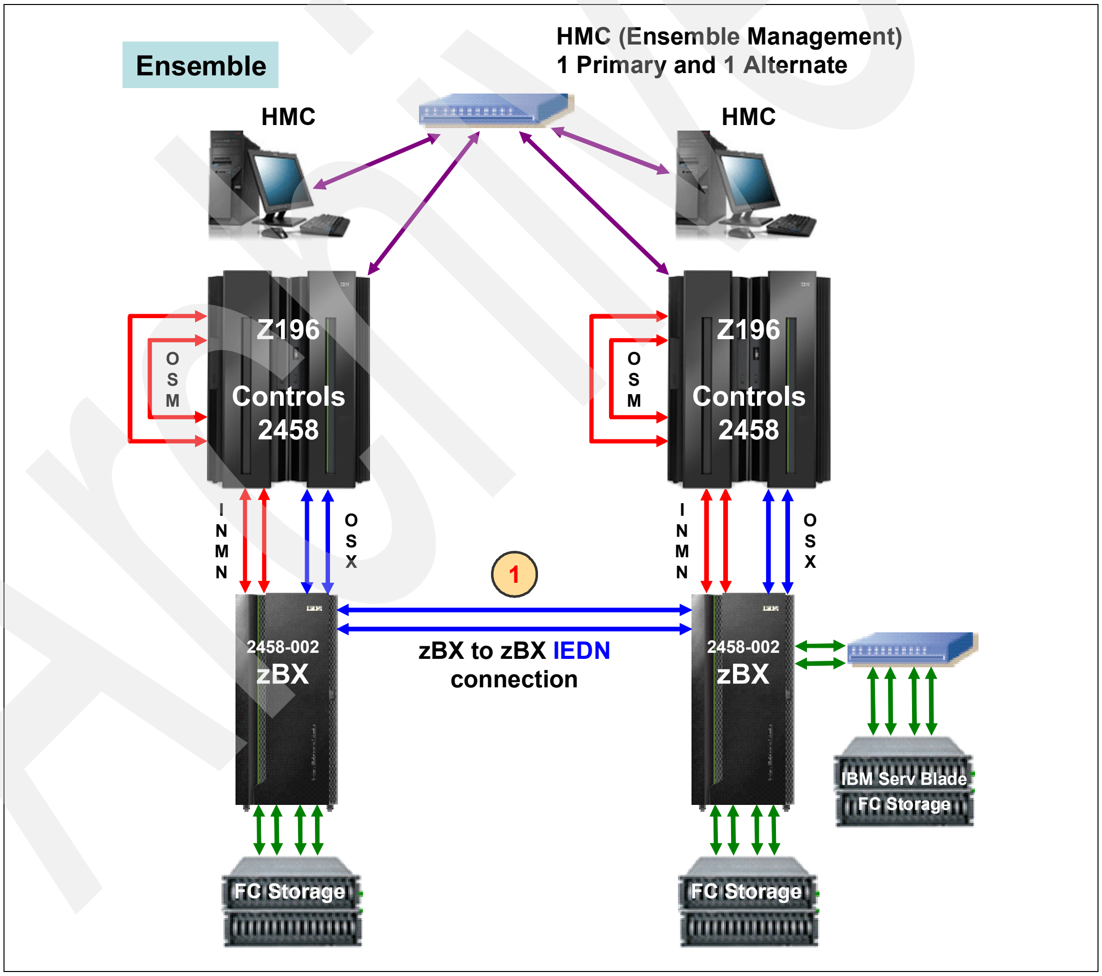


Figure 11-21 Dual CPC and zBX Ensemble configuration

Where:

1. Intraensemble data network: Two ports (for redundancy) in the IEDN TOR switches are used to connect the two zBXs (IEDN TOR switch to IEDN TOR switch).

11.4.4 Maximum mixed CPC/zBX Ensemble configuration

Figure 11-22 shows the maximum connected CPCs (eight) to a zBX using the IEDN. There are three z10 CPCs that are connected by OSA-Express3 or OSA-Express2 ports (CHPID type OSD), and they are either direct connected or through customer supplied switches.

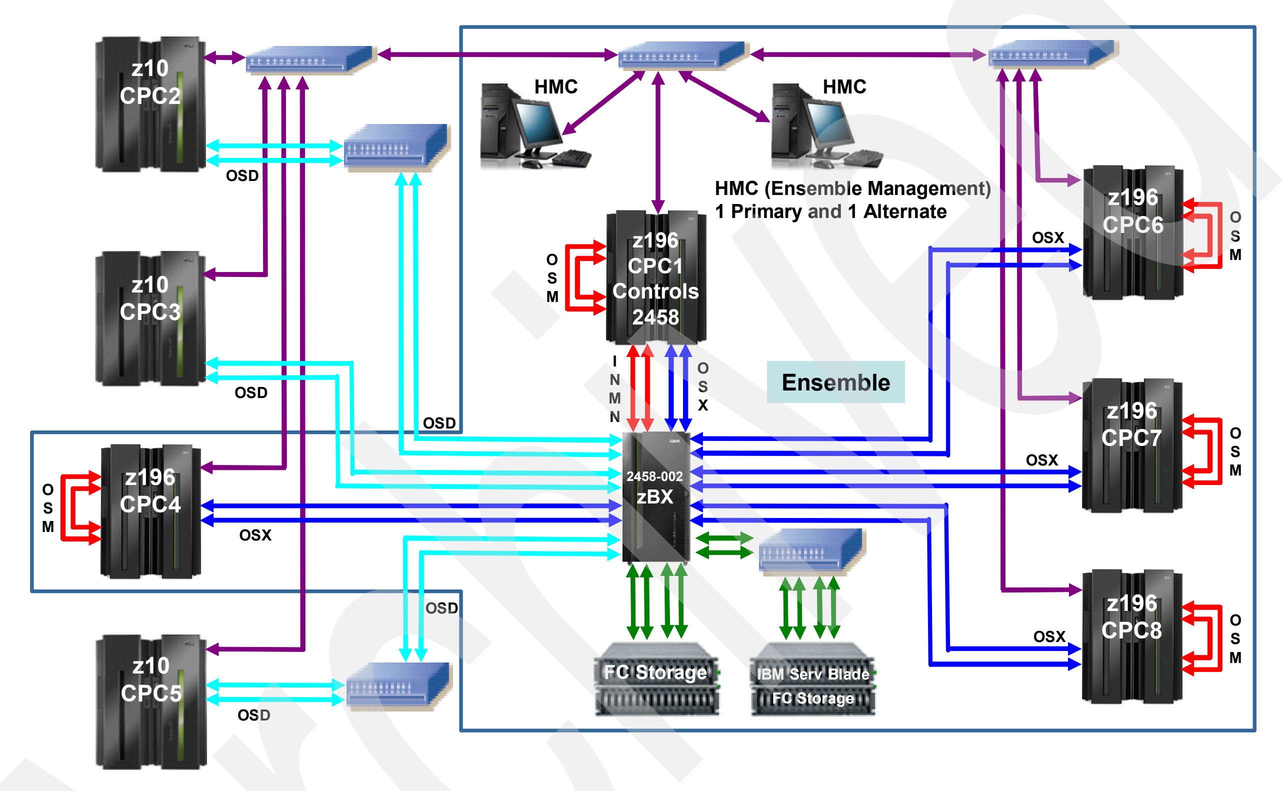


Figure 11-22 Maximum CPC / zBX configuration (eight CPCs connected over an IEDN)

Note that the z10s are not part of the Ensemble but are allowed to use the zBX applications. Additional z196 CPCs are added and connected to the zBX over the OSA-Express3 10 GbE (SR Short Reach or LR Long Reach) features configured as CHPID type OSX.

11.5 HMC/SE Ensemble requirements

The Ensemble starts with a pair of HMCs that are assigned an Ensemble identity. z196 CPCs are then added to the Ensemble through an explicit action at the HMC. To create a network across the CPCs within an Ensemble, one of three methods can be used:

- Over a zBX
- With a customer supplied switch
- Through paired OSA ports on the CPCs

Ensemble membership requires that the z196 have two OSA-Express3 1000BASE-T features (FC #3367) with a connection to Port 7 of the BPHs over two 3.2m cables. FC #0025 provides these cables and ensures that the necessary FC #3367 OSA cards are present. The connection for these cables is described in 11.2.1, “HMCs in an Ensemble” on page 505.

Feature Code #0025 (Ensemble Membership Flag) is associated with HMC enablement when a z196 is ordered. This feature code is required on the controlling z196 to attach a zBX.

A new task, Create Ensemble, allows the Access Administrator to create an Ensemble that contains CPCs, images, workloads, virtual networks, and storage pools, with or without a zBX.

The primary HMC provides the management functions for the Ensemble via Unified Resource Manager (Table 11-6).

Table 11-6 Unified Resource Manager functions

Functions	Description
Platform Performance Management	Manages Ensemble Image workloads, performance policies, and monitor goals
Virtual Network Management	Manages Ensemble server network connectivity on the IntraEnsemble Data Network
Virtual Server Management	Manages Ensemble Virtual server workloads, performance, and monitor goals
Hypervisor Management	Manages Ensemble Hypervisor workloads, performance, and monitor goals
z/VM Guest Management	HMC access to the services and APIs needed to manage Ensemble z/VM guests
Entitlement Management	Manages Ensemble Entitlement of different levels of Platform Performance Management
Energy Management	Manages Active Energy Manager to access the Ensemble power/thermal data

11.5.1 Unified Resource Manager

Unified Resource Manager is a set of functions for system management that can be grouped as follows:

- Defining and managing virtual environments, which includes automatic discovery and the definition of I/O and other hardware components across z196 and zBX, and the definition and management of LPARs, virtual machines, and virtualized LANs.
- Defining and managing workloads and workload policies.
- Receiving and applying corrections and upgrades to the Licensed Internal Code.
- Performing temporary and definitive z196 capacity upgrades.

These functions, which pertain to an Ensemble, are provided by the Hardware Management Console (HMC) and Support Elements (SE) and use the intraensemble management network.

An Ensemble is a platform systems management domain consisting of one or more z196 CPCs. Through the Ensemble, System z and non-System z resources are effectively integrated into a single platform. The Ensemble provides an integrated way to manage virtual server resources and the workloads that can be deployed on those resources.

Figure 11-10 shows an example of a z196 and zBX Ensemble.

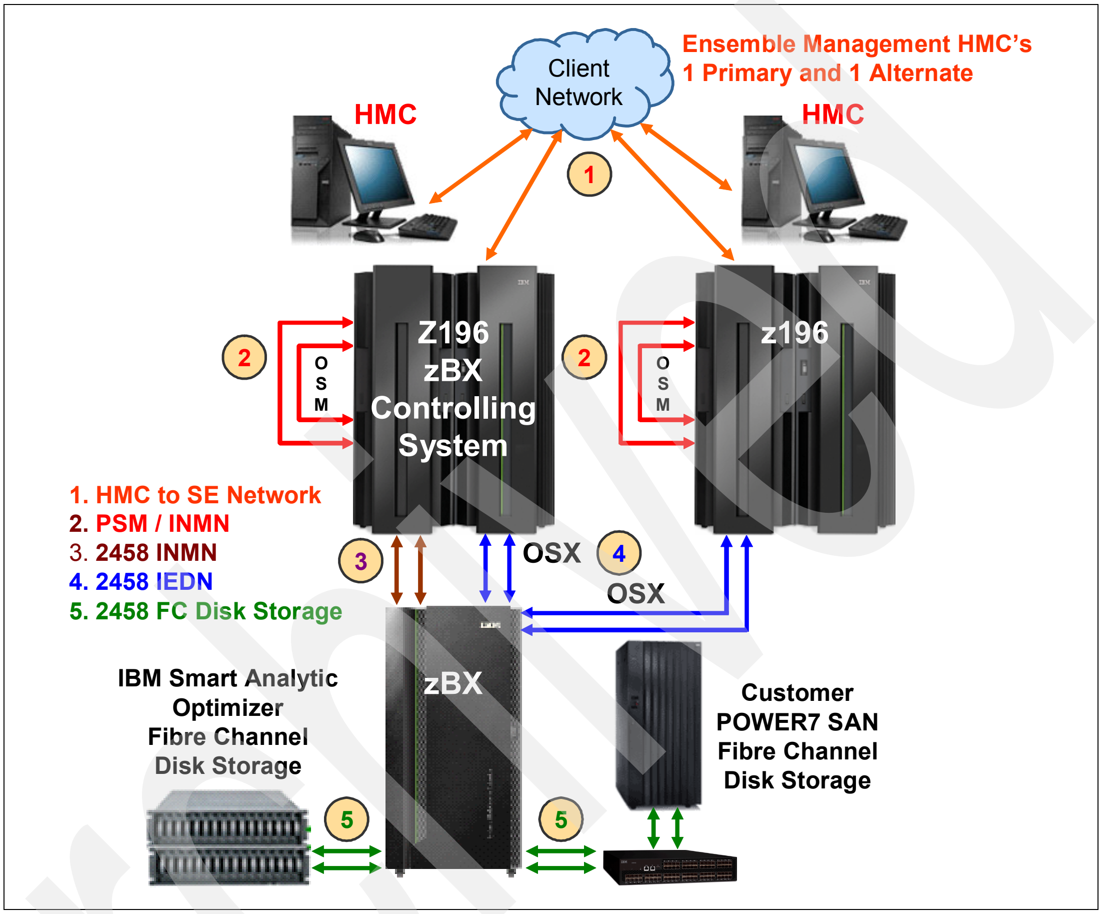


Figure 11-23 z196 / zBX Ensemble example

If a CPC has been entered into an Ensemble, then the CPC Details task on the SE and HMC reflect the Ensemble name. Two HMCs (primary and alternate) are required within the Ensemble for high availability Ensemble management.

All management actions for the Ensemble are conducted from the primary HMC. The primary HMC can also be used to perform basic system management tasks on both Ensemble and non-Ensemble CPCs, such as Load, Activate, and so on.

Figure 11-23 on page 525 shows a typical z196 with a zBX HMC/SE network.

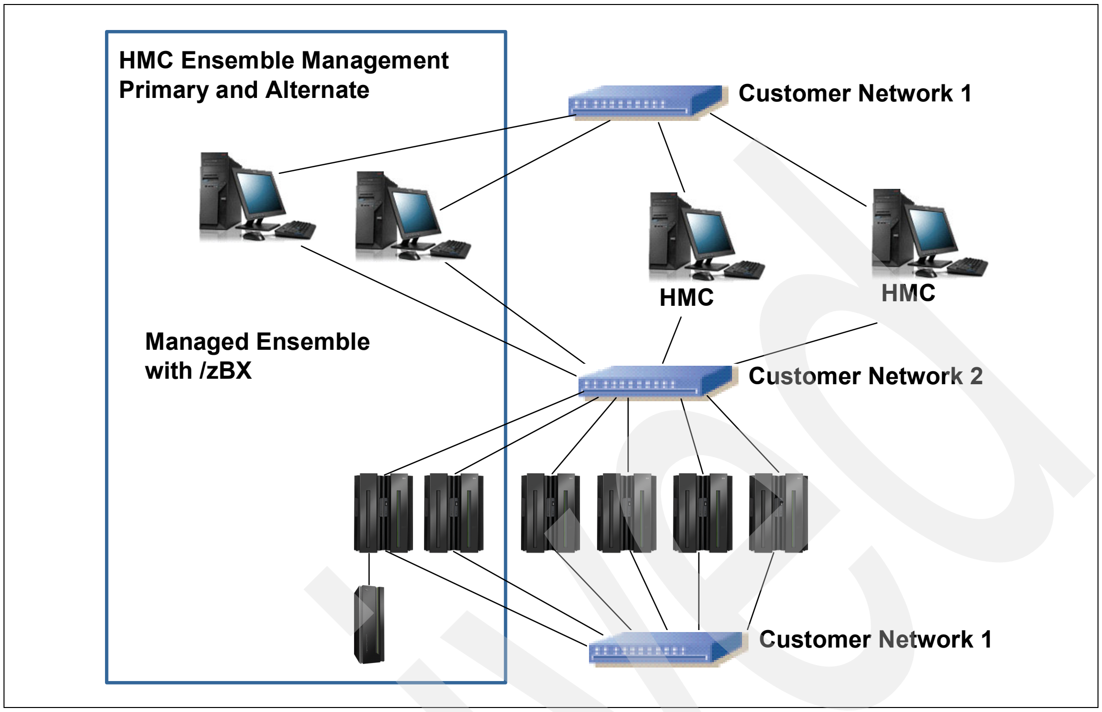


Figure 11-24 Ensemble consisting of two z196s and one zBX

The Ensemble HMC attributes are as follows:

- All HMCs at the supported code level are eligible to create an Ensemble. Only HMCs with FC #0090 and FC #0091 are capable of managing an Ensemble.
- There is an HMC pair managing the Ensemble: primary HMC and alternate HMC.
- The HMC that creates an Ensemble (the HMC that performed the “Create Ensemble” wizard) becomes the primary HMC. An alternate HMC is selected and paired with the primary.
- Primary Hardware Management Console (Version 2.11.0) and Alternate Hardware Management Console (Version 2.11.0) will appear on the HMC banner.
- Only one primary HMC manages an Ensemble, which consists of a maximum of eight CPCs and eight zBXs.
- A primary HMC is the only HMC that can perform Ensemble related management tasks (create virtual server, manage virtual networks, and create workload).
- Any HMC can manage up to 100 CPCs. The primary HMC can perform all non-Ensemble HMC functions on CPCs that are not members of the Ensemble.
- Only one pair of HMCs manage an Ensemble, that is, the primary and alternate HMCs.
- The primary and alternate HMCs *must be on the same LAN segment*.
- The alternate HMC’s role is to mirror Ensemble configuration and policy information from the primary HMC.
- When failover happens, the alternate HMC becomes the primary HMC. This behavior is the same as the primary and alternate SEs.
- The alternate HMC has a limited set of tasks. All Ensemble functions need to be performed from the primary.

11.6 HCD definitions and z/OS display commands

This section reviews the definitions in z/OS HCD to support a zBX installation.

To support the internal communication networks that connect a z196 to a zBX, two new channel paths are introduced:

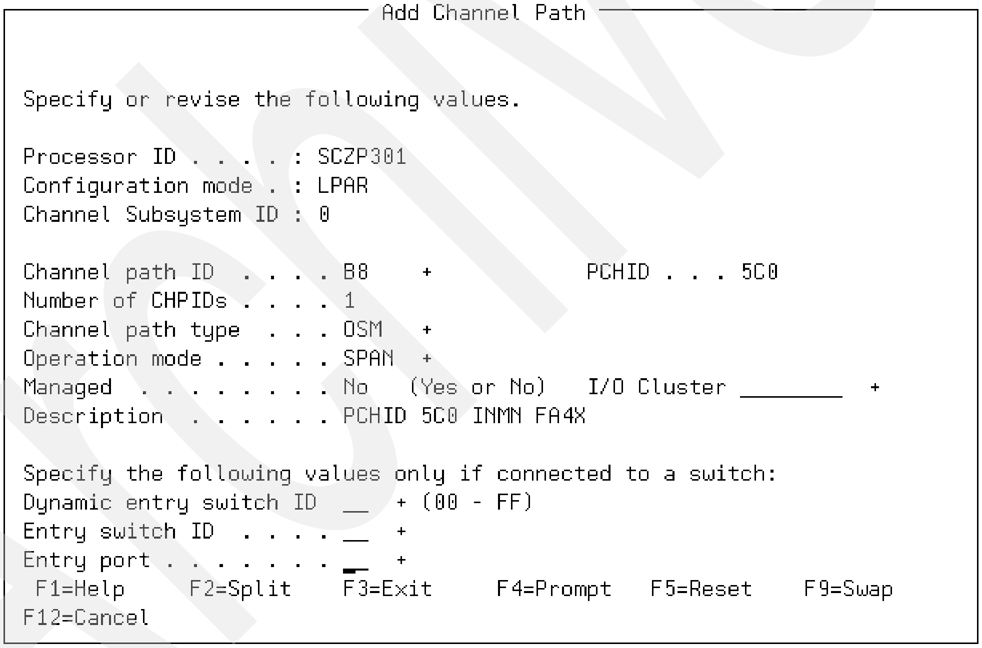
- OSX for the intraensemble data network (IEDN)
- OSM for the intranode management network (INMN)

The following HCD panel captures only define one of each of these CHPID types. It is necessary to define the second of each CHPID type (OSM and OSX) for redundancy. The second path includes a separate CHPID, CU, and device range.

11.6.1 Defining the OSM definitions

To define the OSM definitions, perform the following steps:

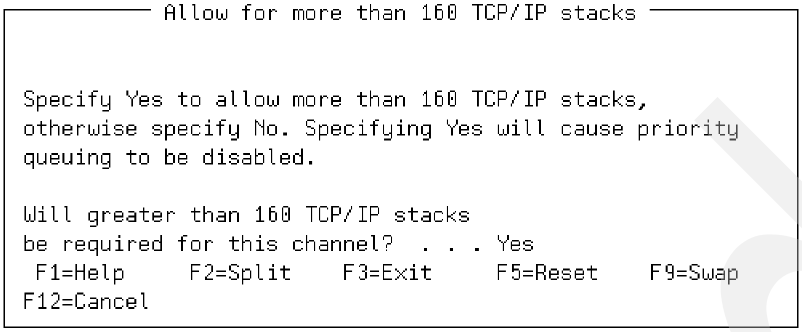
1. Make the necessary definitions to satisfy the INMN definitions that Ensemble management uses. In Figure 11-25, CHPID B8 is defined as type OSM. For this example, it is defined as spanned across multiple channel subsystems.



```
                          Add Channel Path


Specify or revise the following values.

Processor ID . . . . : SCZP301
Configuration mode . : LPAR
Channel Subsystem ID : 0

Channel path ID  . . . . B8    +           PCHID . . . 5C0
Number of CHPIDs . . . . 1
Channel path type  . . . OSM   +
Operation mode . . . . . SPAN  +
Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
Description  . . . . . . PCHID 5C0 INMN FA4X

Specify the following values only if connected to a switch:
Dynamic entry switch ID  __  + (00 - FF)
Entry switch ID  . . . . __  +
Entry port . . . . . . . __  +
 F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
F12=Cancel
```

Figure 11-25 OSM CHPID definition

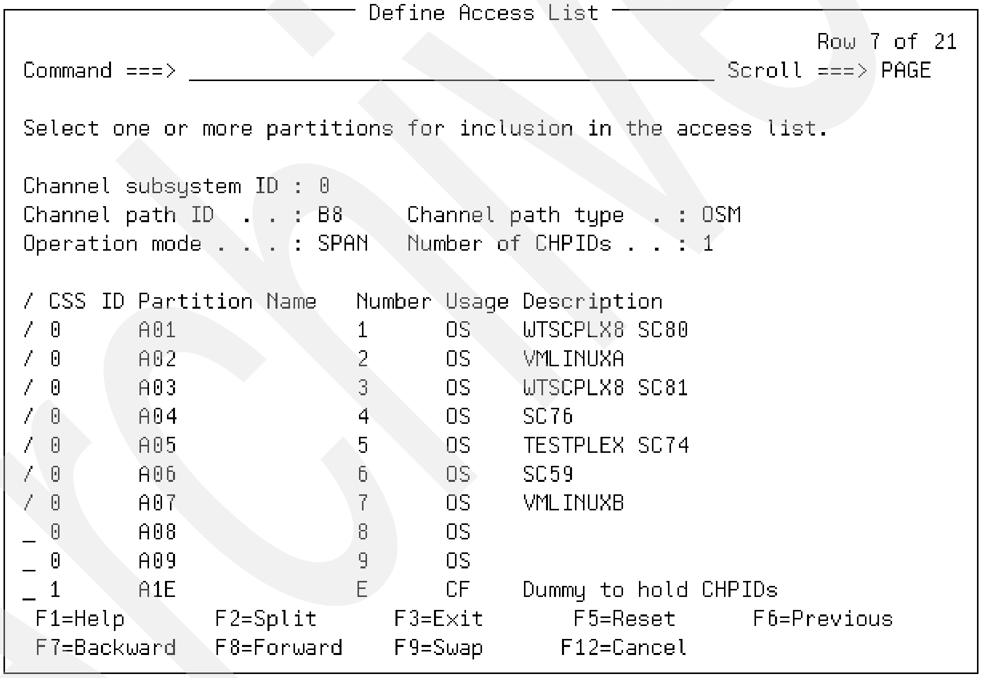
The HCD prompt shown in Figure 11-26 opens. OSM channels must be defined to allow for more than 160 TCP/IP stacks.



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

Figure 11-26   OSM CHPID allowing 160 TCP/IP stacks

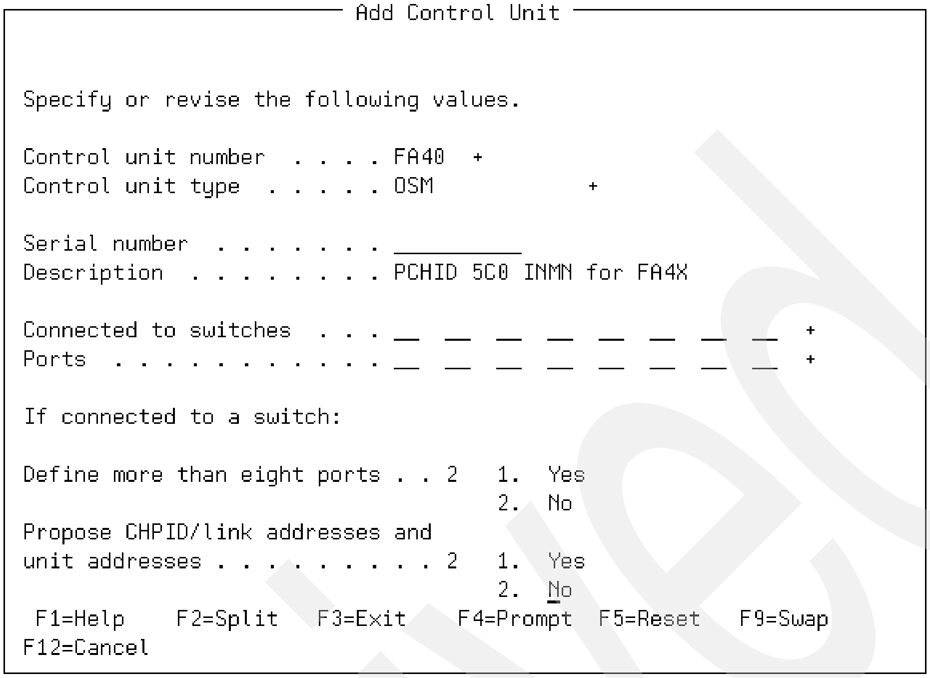
The HCD panel shown in Figure 11-27 defines the *access list* for the OSM CHPID. LPARS with a “/” will have access to CHPID B8. In this example, there are no LPARs in the *candidate list*.



```
                              Define Access List
                                                               Row 7 of 21
Command ===> _________________________________________ Scroll ===> PAGE

Select one or more partitions for inclusion in the access list.

Channel subsystem ID : 0
Channel path ID  . . : B8     Channel path type  . : OSM
Operation mode . . . : SPAN   Number of CHPIDs . . : 1

/ CSS ID Partition Name   Number Usage Description
/ 0      A01              1      OS    WTSCPLX8 SC80
/ 0      A02              2      OS    VMLINUXA
/ 0      A03              3      OS    WTSCPLX8 SC81
/ 0      A04              4      OS    SC76
/ 0      A05              5      OS    TESTPLEX SC74
/ 0      A06              6      OS    SC59
/ 0      A07              7      OS    VMLINUXB
_ 0      A08              8      OS
_ 0      A09              9      OS
_ 1      A1E              E      CF    Dummy to hold CHPIDs
 F1=Help       F2=Split      F3=Exit       F5=Reset      F6=Previous
 F7=Backward   F8=Forward    F9=Swap      F12=Cancel
```

Figure 11-27   OSM CHPID access list

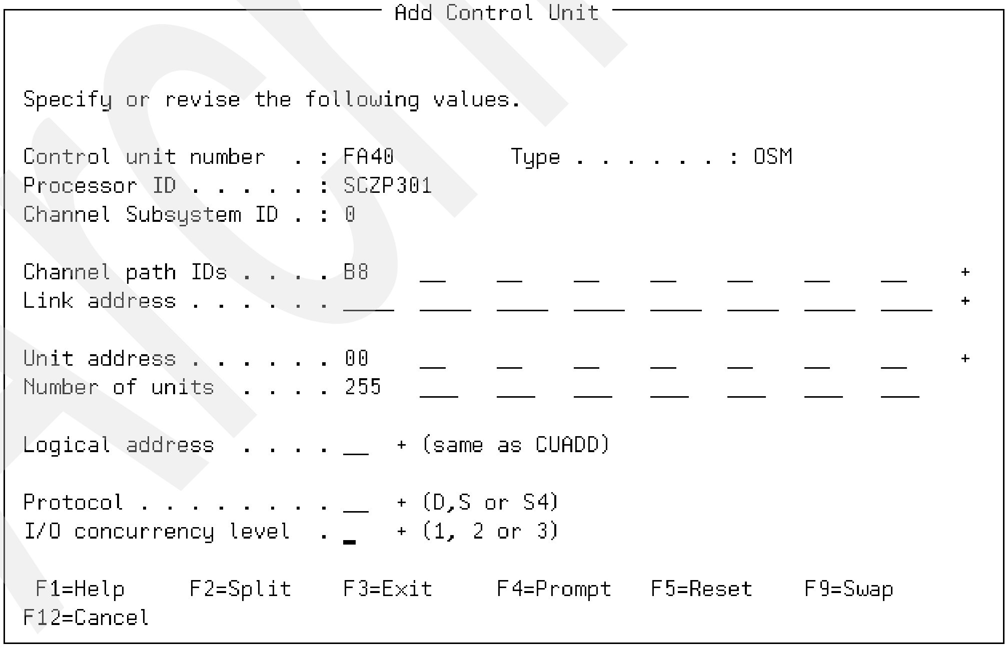
Now that the CHPID is defined, the Control Unit is defined as type OSM (Figure 11-28).



```
                           Add Control Unit

 Specify or revise the following values.

 Control unit number  . . . . FA40  +
 Control unit type  . . . . . OSM           +

 Serial number  . . . . . . . __________
 Description  . . . . . . . . PCHID 5C0 INMN for FA4X

 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
  F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
 F12=Cancel
```

Figure 11-28 OSM Control Unit definition

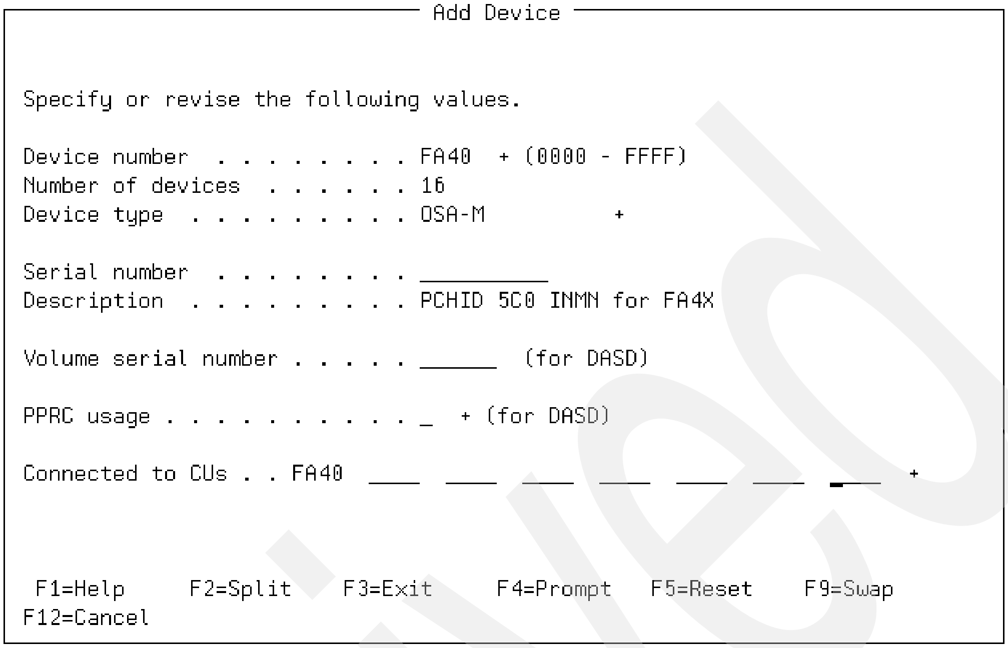
Figure 11-29 defines the control unit address range. By default, the range will be 255 addresses starting with 00.



```
                              Add Control Unit

 Specify or revise the following values.

 Control unit number  . : FA40         Type . . . . . . : OSM
 Processor ID . . . . . : SCZP301
 Channel Subsystem ID . : 0

 Channel path IDs . . . . B8    __    __    __    __    __    __    __    +
 Link address . . . . . . ____  ____  ____  ____  ____  ____  ____  ____  +

 Unit address . . . . . . 00    __    __    __    __    __    __    __    +
 Number of units  . . . . 255   ___   ___   ___   ___   ___   ___   ___

 Logical address  . . . . __  + (same as CUADD)

 Protocol . . . . . . . . __  + (D,S or S4)
 I/O concurrency level  . _   + (1, 2 or 3)

  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-29 OSM CU definition for the processor ID

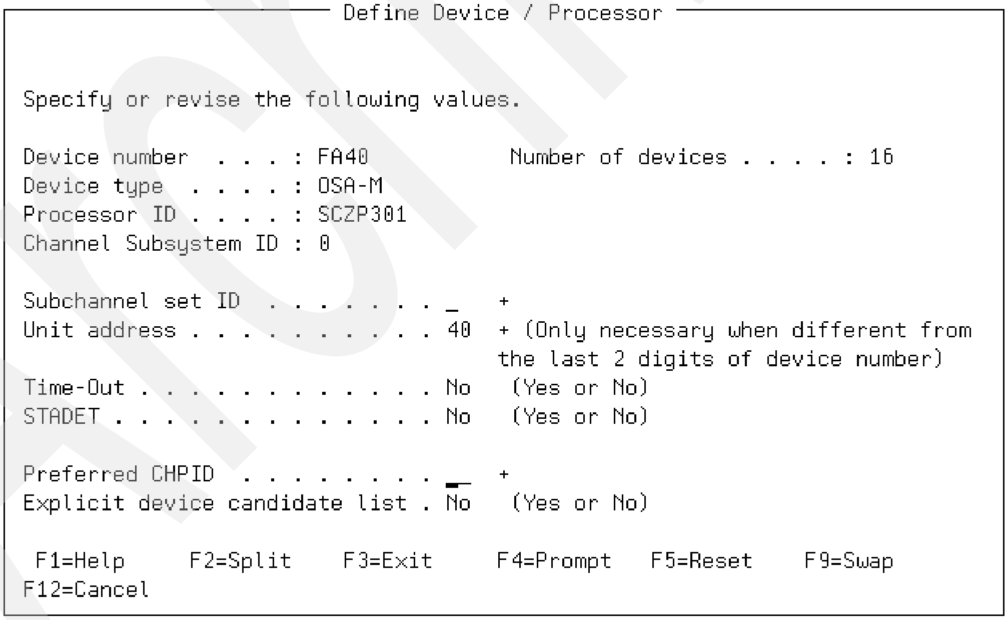
2. Define the OSM devices (type OSA-M) (Figure 11-30). In this example, we define 16 devices FA40-FA4F.



```
                                 Add Device


 Specify or revise the following values.

 Device number  . . . . . . . . FA40  + (0000 - FFFF)
 Number of devices  . . . . . . 16
 Device type  . . . . . . . . . OSA-M         +

 Serial number  . . . . . . . . __________
 Description  . . . . . . . . . PCHID 5C0 INMN for FA4X

 Volume serial number . . . . . ______  (for DASD)

 PPRC usage . . . . . . . . . . _  + (for DASD)

 Connected to CUs . . FA40  ____  ____  ____  ____  ____  ____  ____  +




  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-30   OSM device add

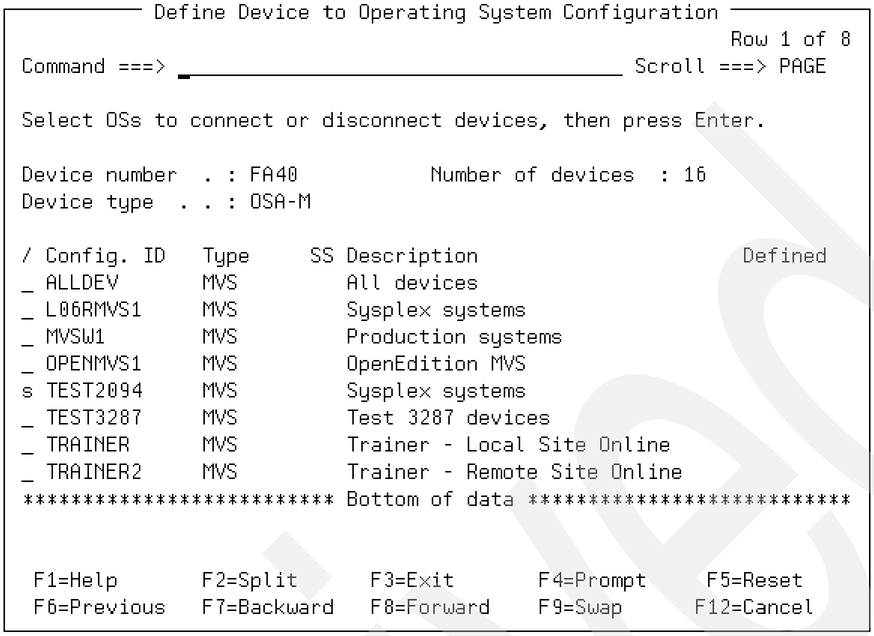
After selecting the processor ID, the window shown in Figure 11-31 opens.



```
                          Define Device / Processor


 Specify or revise the following values.

 Device number  . . . : FA40          Number of devices . . . . : 16
 Device type  . . . . : OSA-M
 Processor ID . . . . : SCZP301
 Channel Subsystem ID : 0

 Subchannel set ID  . . . . . . . _   +
 Unit address . . . . . . . . . . 40  + (Only necessary when different from
                                        the last 2 digits of device number)
 Time-Out . . . . . . . . . . . . No   (Yes or No)
 STADET . . . . . . . . . . . . . No   (Yes or No)

 Preferred CHPID  . . . . . . . . __  +
 Explicit device candidate list . No   (Yes or No)

  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-31   OSM device add processor definition

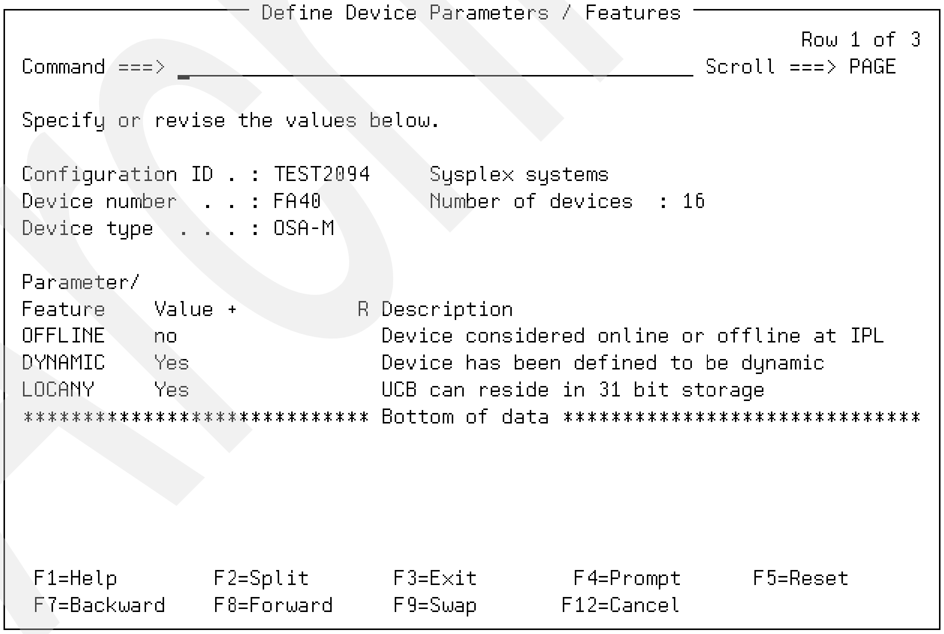
After the subchannel device has been added, the devices must be added to the appropriate Operating System Configurations, as shown in Figure 11-32.



```
            Define Device to Operating System Configuration
                                                             Row 1 of 8
Command ===> _                                     Scroll ===> PAGE

Select OSs to connect or disconnect devices, then press Enter.

Device number  . : FA40          Number of devices  : 16
Device type  . . : OSA-M

/ Config. ID   Type     SS Description                      Defined
_ ALLDEV       MVS         All devices
_ L06RMVS1     MVS         Sysplex systems
_ MVSW1        MVS         Production systems
_ OPENMVS1     MVS         OpenEdition MVS
s TEST2094     MVS         Sysplex systems
_ TEST3287     MVS         Test 3287 devices
_ TRAINER      MVS         Trainer - Local Site Online
_ TRAINER2     MVS         Trainer - Remote Site Online
************************** Bottom of data ***************************


 F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset
 F6=Previous   F7=Backward   F8=Forward    F9=Swap      F12=Cancel
```

Figure 11-32   OSM device add OS Config

The panel shown in Figure 11-33 determines the device parameters for the specific operating system configuration.

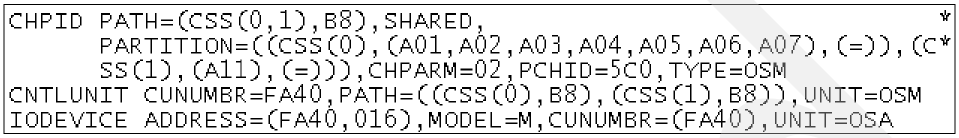


```
                     Define Device Parameters / Features
                                                                   Row 1 of 3
Command ===> _                                           Scroll ===> PAGE

Specify or revise the values below.

Configuration ID . : TEST2094     Sysplex systems
Device number  . . : FA40         Number of devices  : 16
Device type  . . . : OSA-M

Parameter/
Feature    Value +         R Description
OFFLINE    no                Device considered online or offline at IPL
DYNAMIC    Yes               Device has been defined to be dynamic
LOCANY     Yes               UCB can reside in 31 bit storage
***************************** Bottom of data ******************************




 F1=Help        F2=Split       F3=Exit        F4=Prompt      F5=Reset
 F7=Backward    F8=Forward     F9=Swap       F12=Cancel
```

Figure 11-33   Device OS parameters

The OSM definitions that were just completed generated the IOCDS statements shown in Figure 11-34.

For OSM channel paths, device priority queuing needs to be disabled. Therefore, for these CHPIDs, HCD converts a CHPARM=00 (default with priority queuing enabled) to CHPARM=02. Note that the statements generated depict the CHPID Type = `OSM`, the Control Unit Type (`UNIT=OSM`), and the IODEVICE type (`UNIT=OSA`) with `MODEL-M` parameter.



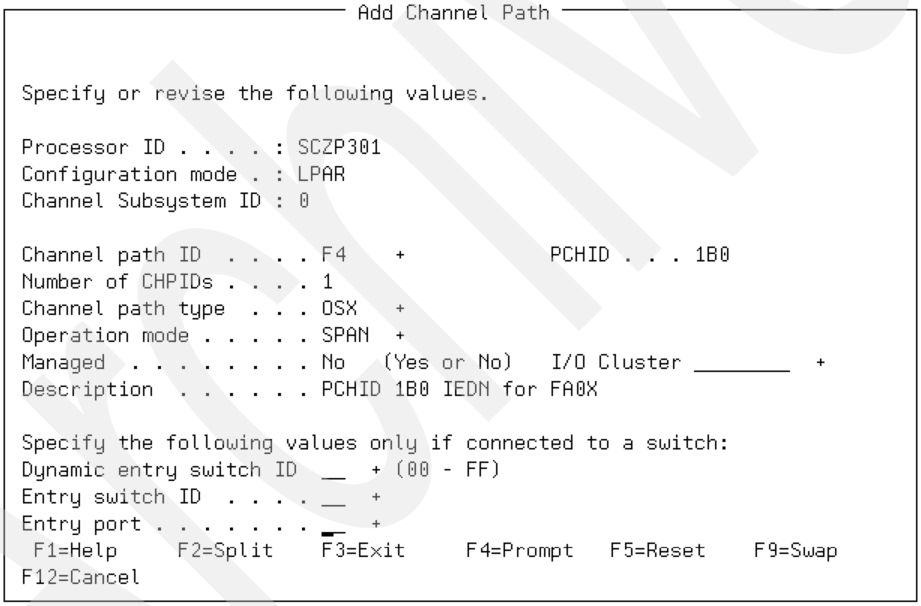
```
CHPID PATH=(CSS(0,1),B8),SHARED,                                  *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),CHPARM=02,PCHID=5C0,TYPE=OSM
CNTLUNIT CUNUMBR=FA40,PATH=((CSS(0),B8),(CSS(1),B8)),UNIT=OSM
IODEVICE ADDRESS=(FA40,016),MODEL=M,CUNUMBR=(FA40),UNIT=OSA
```

Figure 11-34 OSM IOCDS statements

11.6.2 Defining the OSX definitions

Now we discuss the definitions that are necessary to satisfy the intraensemble data network requirements.

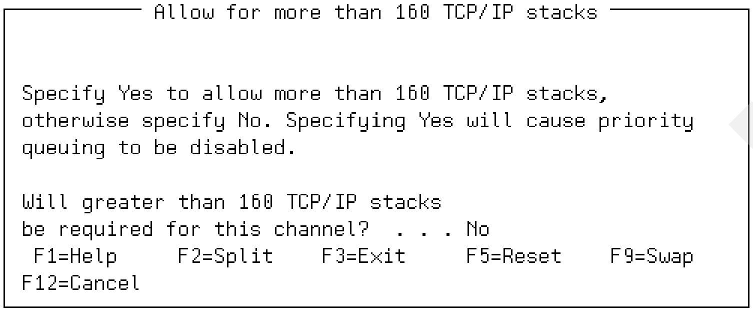
In Figure 11-35, the CHPID F4 is defined as type OSX. In this example, the CHPID is defined as SPANNED.



```
                             Add Channel Path


 Specify or revise the following values.

 Processor ID . . . . : SCZP301
 Configuration mode . : LPAR
 Channel Subsystem ID : 0

 Channel path ID  . . . . F4    +            PCHID . . . 1B0
 Number of CHPIDs . . . . 1
 Channel path type  . . . OSX   +
 Operation mode . . . . . SPAN  +
 Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________   +
 Description  . . . . . . PCHID 1B0 IEDN for FA0X

 Specify the following values only if connected to a switch:
 Dynamic entry switch ID  __  + (00 - FF)
 Entry switch ID  . . . . __  +
 Entry port . . . . . . . __  +
  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-35 OSX CHPID definition

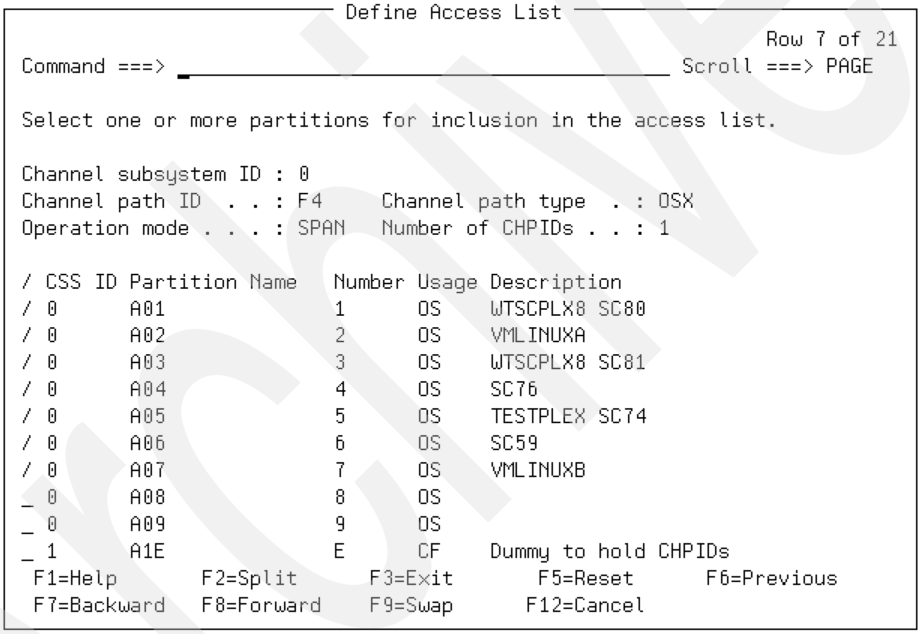
In Figure 11-36, we do not require more than 160 TCP/IP stacks. How many stacks we have depends on the proposed configuration.



```
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
```

Figure 11-36 OSX CHPID not allowing more than 160 TCP/IP stacks

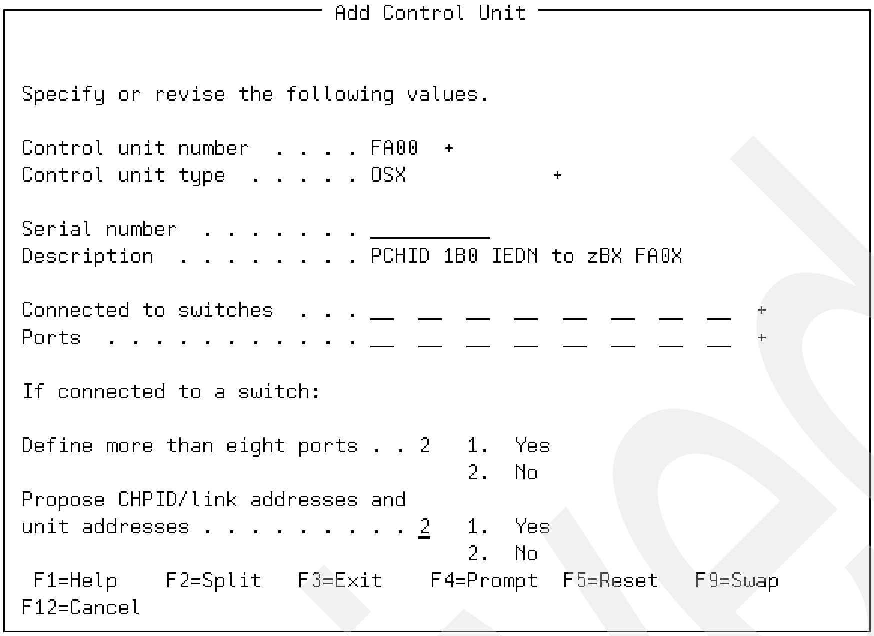
The CHPID access list is defined in Figure 11-37 for the OSX CHPID. The LPARs selected with a "/" has access to the CHPID. In this example, there are no LPARs in the candidate list, so that panel is skipped.



```
                         Define Access List
                                                            Row 7 of 21
Command ===> _________________________________________ Scroll ===> PAGE

Select one or more partitions for inclusion in the access list.

Channel subsystem ID : 0
Channel path ID  . . : F4     Channel path type  . : OSX
Operation mode . . . : SPAN   Number of CHPIDs . . : 1

/ CSS ID Partition Name   Number Usage Description
/ 0      A01              1      OS    WTSCPLX8 SC80
/ 0      A02              2      OS    VMLINUXA
/ 0      A03              3      OS    WTSCPLX8 SC81
/ 0      A04              4      OS    SC76
/ 0      A05              5      OS    TESTPLEX SC74
/ 0      A06              6      OS    SC59
/ 0      A07              7      OS    VMLINUXB
_ 0      A08              8      OS
_ 0      A09              9      OS
_ 1      A1E              E      CF    Dummy to hold CHPIDs
 F1=Help       F2=Split      F3=Exit       F5=Reset      F6=Previous
 F7=Backward   F8=Forward    F9=Swap      F12=Cancel
```

Figure 11-37 OSX CHPID access list

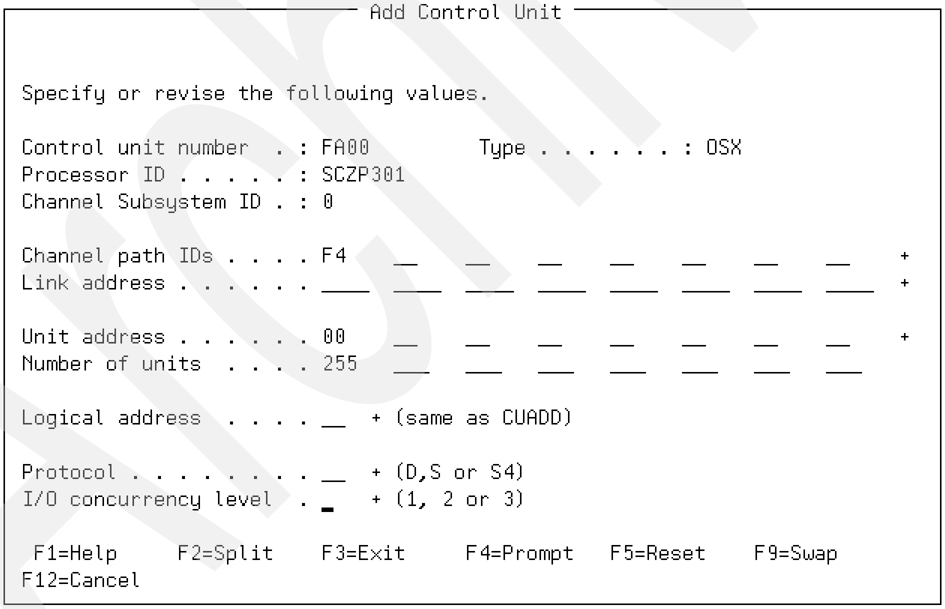
In Figure 11-38, the OSX Control Unit is defined as type OSX.



```
                         Add Control Unit


Specify or revise the following values.

Control unit number  . . . . FA00  +
Control unit type  . . . . . OSX            +

Serial number  . . . . . . . __________
Description  . . . . . . . . PCHID 1B0 IEDN to zBX FA0X

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
 F1=Help    F2=Split   F3=Exit    F4=Prompt  F5=Reset   F9=Swap
F12=Cancel
```

Figure 11-38 OSX add Control Unit

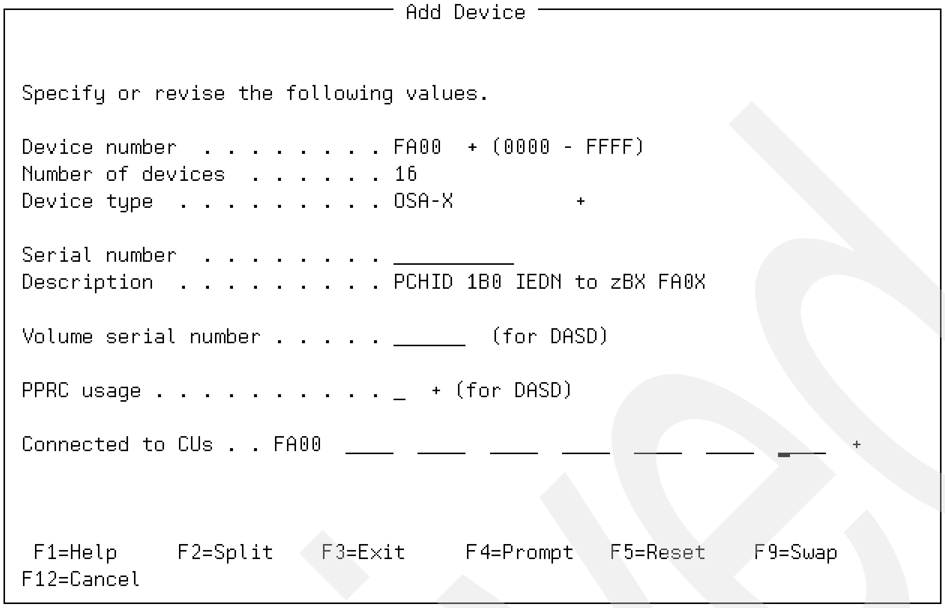
Figure 11-39 defines the Control Unit address range starting at 00 for 255 devices.



```
                              Add Control Unit


Specify or revise the following values.

Control unit number  . : FA00        Type . . . . . . : OSX
Processor ID . . . . . : SCZP301
Channel Subsystem ID . : 0

Channel path IDs . . . . F4    __    __    __    __    __    __    __    +
Link address . . . . . . ____  ____  ____  ____  ____  ____  ____  ____  +

Unit address . . . . . . 00    __    __    __    __    __    __    __    +
Number of units  . . . . 255   ___   ___   ___   ___   ___   ___   ___

Logical address  . . . . __  + (same as CUADD)

Protocol . . . . . . . . __  + (D,S or S4)
I/O concurrency level  . _   + (1, 2 or 3)

 F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
F12=Cancel
```

Figure 11-39 OSX add Control Unit for Processor

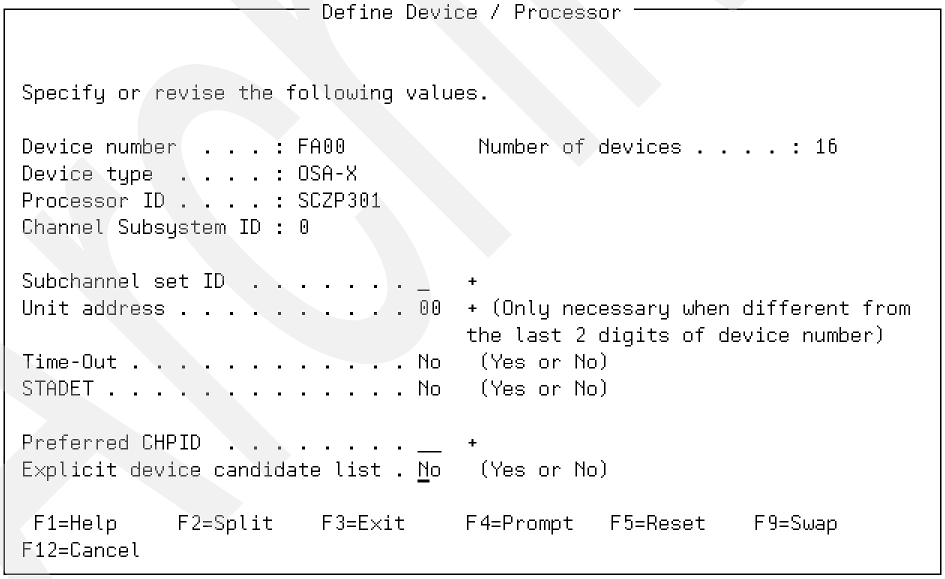
The OSX devices are defined in Figure 11-40. The OSX devices are defined as type OSA-X with a device address range FA00-FA0F.



```
                             Add Device

 Specify or revise the following values.

 Device number  . . . . . . . . FA00  + (0000 - FFFF)
 Number of devices  . . . . . . 16
 Device type  . . . . . . . . . OSA-X          +

 Serial number  . . . . . . . . __________
 Description  . . . . . . . . . PCHID 1B0 IEDN to zBX FA0X

 Volume serial number . . . . . ______  (for DASD)

 PPRC usage . . . . . . . . . . _  + (for DASD)

 Connected to CUs . . FA00  ____  ____  ____  ____  ____  ____  ____  +



  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-40   OSX Device definition

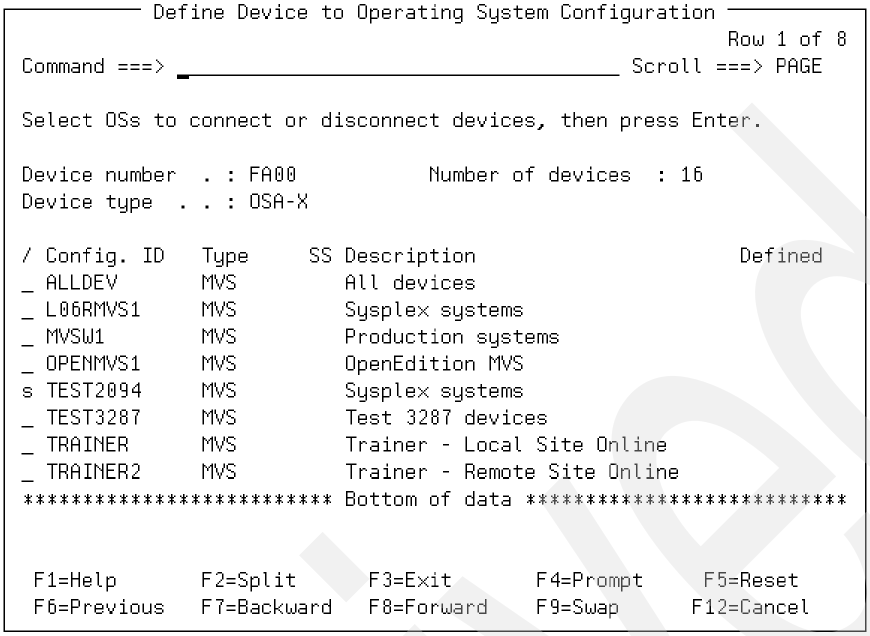
After selecting the processor ID, the following panel is displayed (Figure 11-41). We have selected a unit address of 00.



```
                      Define Device / Processor

 Specify or revise the following values.

 Device number  . . . : FA00          Number of devices . . . . : 16
 Device type  . . . . : OSA-X
 Processor ID . . . . : SCZP301
 Channel Subsystem ID : 0

 Subchannel set ID  . . . . . . . _   +
 Unit address . . . . . . . . . . 00  + (Only necessary when different from
                                      the last 2 digits of device number)
 Time-Out . . . . . . . . . . . . No   (Yes or No)
 STADET . . . . . . . . . . . . . No   (Yes or No)

 Preferred CHPID  . . . . . . . . __  +
 Explicit device candidate list . No   (Yes or No)

  F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap
 F12=Cancel
```

Figure 11-41   OSX device definition for processor

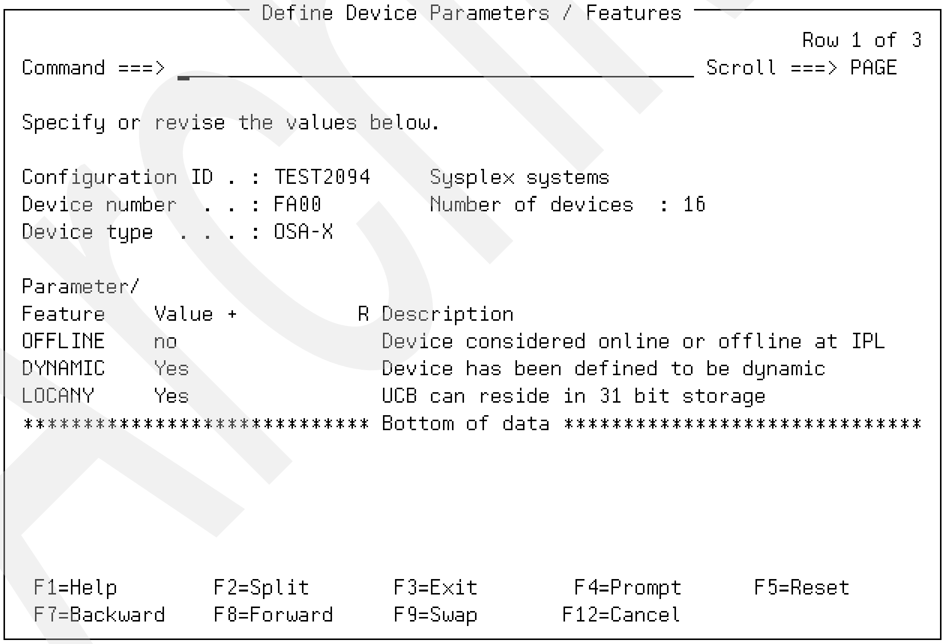
Next, the devices are added to the TEST2094 operating system configuration shown in Figure 11-42.



```
           Define Device to Operating System Configuration
                                                           Row 1 of 8
Command ===> _____________________________________ Scroll ===> PAGE

Select OSs to connect or disconnect devices, then press Enter.

Device number  . : FA00          Number of devices  : 16
Device type  . . : OSA-X

/ Config. ID   Type     SS Description                     Defined
_ ALLDEV       MVS         All devices
_ L06RMVS1     MVS         Sysplex systems
_ MVSW1        MVS         Production systems
_ OPENMVS1     MVS         OpenEdition MVS
s TEST2094     MVS         Sysplex systems
_ TEST3287     MVS         Test 3287 devices
_ TRAINER      MVS         Trainer - Local Site Online
_ TRAINER2     MVS         Trainer - Remote Site Online
************************** Bottom of data ***************************


 F1=Help       F2=Split      F3=Exit       F4=Prompt     F5=Reset
 F6=Previous   F7=Backward   F8=Forward    F9=Swap      F12=Cancel
```

Figure 11-42 OSX device add to operating system

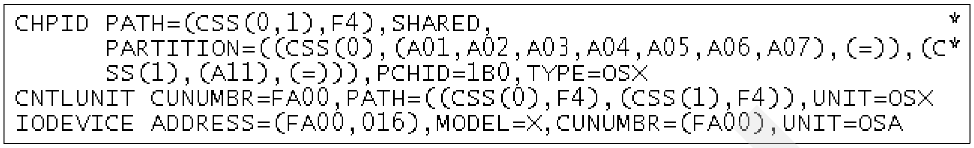
Finally, the operating system configuration parameters are defined (Figure 11-43).



```
                    Define Device Parameters / Features
                                                                 Row 1 of 3
Command ===> ___________________________________________ Scroll ===> PAGE

Specify or revise the values below.

Configuration ID . : TEST2094     Sysplex systems
Device number  . . : FA00         Number of devices  : 16
Device type  . . . : OSA-X

Parameter/
Feature    Value +          R Description
OFFLINE    no                 Device considered online or offline at IPL
DYNAMIC    Yes                Device has been defined to be dynamic
LOCANY     Yes                UCB can reside in 31 bit storage
***************************** Bottom of data ******************************





 F1=Help        F2=Split       F3=Exit        F4=Prompt      F5=Reset
 F7=Backward    F8=Forward     F9=Swap       F12=Cancel
```

Figure 11-43 OSX device OS parameters

The IOCDS statements shown in Figure 11-44 were generated. Note the CHPID type of `OSX`, the Control Unit type of `OSX`, and the IODEVICEs `UNIT=OSA` and `MODEL-X`.



```
CHPID PATH=(CSS(0,1),F4),SHARED,                                  *
      PARTITION=((CSS(0),(A01,A02,A03,A04,A05,A06,A07),(=)),(C*
      SS(1),(A11),(=))),PCHID=1B0,TYPE=OSX
CNTLUNIT CUNUMBR=FA00,PATH=((CSS(0),F4),(CSS(1),F4)),UNIT=OSX
IODEVICE ADDRESS=(FA00,016),MODEL=X,CUNUMBR=(FA00),UNIT=OSA
```

Figure 11-44 OSM IOCDS statements

11.7 z/OS display commands

This section contains some common device status z/OS operator commands to display the status of the OSM and OSX type devices.

11.7.1 z/OS display commands for CHPID type OSM

The command shown in Figure 11-45 displays the CHPID path status for the OSM type 31 CHPID.

```
D M=CHP(B8)

RESPONSE=S02
 IEE174I 08.34.42 DISPLAY M 908
 CHPID B8:  TYPE=31, DESC=OSA ZBX MANAGEMENT, ONLINE
 DEVICE STATUS FOR CHANNEL PATH B8
      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
 0FA4 +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +
 SWITCH DEVICE NUMBER = NONE
 PHYSICAL CHANNEL ID = 05C0
 *********************** SYMBOL EXPLANATIONS ************************
 + ONLINE    @ PATH NOT VALIDATED   - OFFLINE    . DOES NOT EXIST
 * PHYSICALLY ONLINE   $ PATH NOT OPERATIONAL
```

Figure 11-45 OSM D M=CHP)

The command and the response in Figure 11-46 displays the OSM device path status. Notice the node descriptor information returned includes the pseudo control unit 1730.005 and 1732.001 used for the OSA-Express3 port. Also included is the 2817 machine type, serial number, and a TAG of B800 indicating the CHPID.

```
D M=DEV(FA40)

RESPONSE=SO2
 IEE174I 08.36.52 DISPLAY M 073
 DEVICE FA40   STATUS=ONLINE
 CHP                   B8
 ENTRY LINK ADDRESS    ..
 DEST LINK ADDRESS     0D
 PATH ONLINE           Y
 CHP PHYSICALLY ONLINE Y
 PATH OPERATIONAL      Y
 MANAGED               N
 CU NUMBER             FA40
 MAXIMUM MANAGED CHPID(S) ALLOWED:  0
 DESTINATION CU LOGICAL ADDRESS = 00
 SCP CU ND         = 001730.005.IBM.02.281700096595.B800
 SCP TOKEN NED     = 001730.005.IBM.02.281700096595.B800
 SCP DEVICE NED    = 001732.001.IBM.02.281700096595.B800
```

Figure 11-46 OSM D M=DEV(FA40)

The command and response in Figure 11-47 displays the status for the OSM devices

```
D U,,,FA40,4

RESPONSE=SO2
 IEE457I 08.37.52 UNIT STATUS 542
 UNIT TYPE STATUS        VOLSER     VOLSTATE
 FA40 OSAM A-BSY
 FA41 OSAM A-RAL
 FA42 OSAM A-BSY
 FA43 OSAM A-BSY
```

Figure 11-47 OSM D U,,,device

The command and response in Figure 11-48 shows the OSM device job allocation as VTAM®.

```
D U,,alloc,FA40,4

RESPONSE=SO2
 IEE106I 08.38.46 UNITS ALLOCATED 617
 UNIT    JOBNAME  ASID   JOBNAME  ASID   JOBNAME  ASID   JOBNAME  ASID
 FA40    VTAM     0027
 FA41    VTAM     0027
 FA42    VTAM     0027
 FA43    VTAM     0027
```

Figure 11-48 OSM D U,,alloc,device

11.7.2 z/OS display commands for CHPID type OSX

The command and response in Figure 11-49 displays the CHPID path status for the OSX type 30 CHPID.

```
D M=CHP(F4)

RESPONSE=S02
 IEE174I 08.41.18 DISPLAY M 262
 CHPID F4:  TYPE=30, DESC=OSA ZBX DATA, ONLINE
 DEVICE STATUS FOR CHANNEL PATH F4
      0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
 0FA0 +  +  +  +  +  +  +  +  +  +  +  +  +  +  +  +
 SWITCH DEVICE NUMBER = NONE
 PHYSICAL CHANNEL ID = 01B0
```

Figure 11-49 OSX D M=CHP

The command and response in Figure 11-50 displays the OSX device path status. Notice the node descriptor information returned includes the pseudo control unit 1730.005 and 1732.001 used for the OSA-Express3 port. Also included is the 2817 machine type, serial number, and a TAG of F400 indicating the CHPID.

```
D M=DEV(FA00)

RESPONSE=S02
 IEE174I 08.42.03 DISPLAY M 320
 DEVICE FA00   STATUS=ONLINE
 CHP                   F4
 ENTRY LINK ADDRESS    ..
 DEST LINK ADDRESS     0D
 PATH ONLINE           Y
 CHP PHYSICALLY ONLINE Y
 PATH OPERATIONAL      Y
 MANAGED               N
 CU NUMBER             FA00
 MAXIMUM MANAGED CHPID(S) ALLOWED:  0
 DESTINATION CU LOGICAL ADDRESS = 00
 SCP CU ND         = 001730.005.IBM.02.281700096595.F400
 SCP TOKEN NED     = 001730.005.IBM.02.281700096595.F400
 SCP DEVICE NED    = 001732.001.IBM.02.281700096595.F400
```

Figure 11-50 OSX D M=DEV

The command and response in Figure 11-51 displays the status for the OSX devices.

```
D U,,,FA00,2

RESPONSE=S02
 IEE457I 08.42.49 UNIT STATUS 428
 UNIT TYPE STATUS        VOLSER     VOLSTATE
 FA00 OSAX A-BSY
 FA01 OSAX A
```

Figure 11-51 OSX D U,,,device

The command and response in Figure 11-48 on page 538 shows the OSX device job allocation as VTAM.

```
D U,,alloc,FA00,2

RESPONSE=S02
 IEE106I 08.43.56 UNITS ALLOCATED 480
 UNIT    JOBNAME  ASID   JOBNAME  ASID   JOBNAME  ASID   JOBNAME  ASID
 FA00    VTAM     0027
 FA01    VTAM     0027
```

Figure 11-52 OSX D U,,alloc,device

11.8 Additional references

The following IBM manuals provide more detailed information about zBX and the Ensemble:

- *Ensemble Planning and Configuration Guide,* SC27-2608
- *Ensemble Performance Management Guide,* SC27-2607
- *IBM System z196 Enterprise Class Technical Introduction,* SG24-7833
- *Introduction to Ensembles,* SC27-2609
- *zBX Installation Manual 2458-002,* GC27-2610
- *zBX Installation Manual for Physical Planning 2458-002,* GC27-2611
- *zBX Service Guide,* GC28-6884

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks

For information about ordering these publications, see "How to get Redbooks" on page 543. Note that some of the documents referenced here may be available in softcopy only.

- *Getting Started with InfiniBand on System z10 and System z9,* SG24-7539
- *IBM System z Connectivity Handbook*, SG24-5444
- *IBM System z196 Enterprise Class Technical Introduction,* SG24-7833
- *IBM zEnterprise System Technical Introduction*, SG24-7832
- *OSA-Express Implementation Guide*, SG24-5948.
- *Server Time Protocol Implementation Guide*, SG24-7281
- *Server Time Protocol Planning Guide,* SG247280

Other publications

These publications are also relevant as further information sources:

- *Capacity on Demand User's Guide,* SC28-6871
- *CHPID Mapping Tool User's Guide*, GC28-6825
- *Common Information Model (CIM) Management Interfaces*, SB10-7154
- *Ensemble Performance Management Guide,* SC27-2607
- *Ensemble Planning and Configuration Guide,* SC27-2608
- *Hardware Configuration Definition User's Guide*, SC33-7988
- *Hardware Management Console Operations Guide (V2.11.0),* SC28-6895
- *IBM System z Functional Matrix*, ZSW0-1335
- *IBM z/OS Hardware Configuration Definition User's Guide*, SC33-7988
- *Installation Manual 2817 All Models, IBM zEnterprise 196*, GC28-6890
- *Introduction to Ensembles,* SC27-2609
- *IOCP User's Guide*, SB10-7037
- *Planning for Fiber Optic Links*, GA23-0367
- *Safety Inspection Guide, IBM zEnterprise 196*, GC28-6894
- *Service Guide, IBM zEnterprise 196*, GC28-6892
- *Stand-Alone Input/Output Configuration Program User's Guide*, SB10-7152
- *Support Element Operations Guide V2.10.2*, SC28-6882

- *z/OS Cryptographic Services Integrated Cryptographic Service Facility Administrator's Guide*, SA22-7521
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility Application Programmer's Guide*, SA22-7522
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility Messages,* SA22-7523
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility Overview,* SA22-7519
- *z/OS Cryptographic Services Integrated Cryptographic Service Facility System Programmer's Guide*, SA22-7520
- *z/OS Migration to the IBM zEnterprise System*, SA23-2269
- *zArchitecture Principles of Operation*, SA22-7832
- *zBX Installation Manual 2458-002,* GC27-2610
- *zBX Installation Manual for Physical Planning 2458-002,* GC27-2611
- *zBX Service Guide,* GC28-6884
- *zEnterprise 196, System z10, System z9, and eServer zSeries Open Systems Adapter-Express Customer's Guide and Reference*, SA22-7935

Online resources

These Web sites are also relevant as further information sources:

- CFS

  `http://www.ibm.com/systems/z/cfsizer/`
- HCD

  `http://www.ibm.com/systems/z/os/zos/zos_elefeat.html`
- HCM CHPID Mapping Tool

  `https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/chpidmain`
- IBM Resource Link

  `http://www.ibm.com/servers/resourcelink/`
- Machine information

  `https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/machineinformation`
- OSA/SF

  `http://www.ibm.com/systems/z/os/zos/zos_elefeat.html`
- Power Estimation Tool

  `https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/powerestimationmain`
- Server Time Protocol

  `http://www.ibm.com/systems/z/advantages/pso/stp.html`
- WWPN Prediction Tool

  `https://www.ibm.com/servers/resourcelink/hom03010.nsf/pages/wwpnMain`
- z/PCR

  `http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1381`

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